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Article summary

Article focus:

- To explore the extent at which doctor-rating websites are known and used among the general population.
- To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low, although significantly higher than what previously documented by the literature.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' awareness of, and intention to use, doctor-rating websites.

Strength and Limitations:

- We provide for the first time direct evidence on the determinants of people's awareness of and willingness to use doctor-rating websites.
- The relatively small and non-representative sample size in one borough of London limits the possibility to immediately generalise the results of the analysis to a national level.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.
Design: A cross-sectional study.
Setting: The Borough of Hammersmith and Fulham, London, England.
Participants: 200 individuals from the borough.
Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.
Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining awareness and intention to use the websites: the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.
Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on

doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of the general public which uses doctor-rating websites is still quite low, although significantly higher than what previously documented by the literature.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

Doctor-rating websites such as *NHS Choices* and *Dr Foster Intelligence* are a relatively recent phenomenon in the UK. Compared to other sources of healthcare information – such as official hospital statistics - the websites claim to be more user-friendly and easy to understand. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice in healthcare, as they potentially enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health and wellbeing.

In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK. A study by the Kings Fund[1] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.[2]

Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[3] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as the rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[4]

The apparently limited uptake of doctor rating in the UK calls into question how effective the existing websites may be as information exchange platforms from and to representative groups of patients.

Interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users providing feedback online, require a better understanding of which characteristics drive the patients' awareness and actual use of doctor-rating websites.

The aim of this work is to provide evidence on the degree at which doctor ratings websites are known and used among the general public. It also aims to provide some novel insights on what appear to be the most significant predictors of the fact that people are aware of, and willing to use, doctor-ratings websites.

SURVEY DESIGN AND DATA COLLECTION

We conducted a self-administered survey to directly collect quantitative data in the field. The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The final questionnaire contained questions on awareness and use of online rating websites; a wide range of socio-demographic and health variables; individual characteristics related to the access to healthcare services and the doctor-patient relationship; and internet use in general. A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Sample

The questionnaire was administered in June 2010 to a sample of respondents from the Borough of Hammersmith and Fulham, London. The sampling method used was convenience sampling, a form of non-probability sampling. Subjects were approached in public places and asked whether they wanted to take part in a survey on internet usage. To account for confounding variables, the questionnaire explicitly assessed a range of individual socio-demographic and behavioural characteristics to be used as controls in the statistical analysis (see section on Variables).
The sample size was calculated at a minimum number of 200 respondents to achieve a sufficient number of events to use maximum likelihood techniques in the statistical analysis. The target minimum sample size was readily achieved by the convenience sampling procedure, as only 68 subjects who were initially approached refused to take part to the survey, giving a response rate of around 74.6%.

While the convenience sampling in one borough of London, and the relatively small sample size limit the possibility to immediately generalise the results of the analysis to a

national level, the careful choice of the location for the fieldwork was dictated by the consideration that the borough of Hammersmith and Fulham comprises a mix of both affluent and deprived neighbourhoods, and a broad heterogeneity in ethnic background, two key dimensions we aimed to relate to doctor websites' awareness and intended usage.

DATA ANALYSIS

Descriptive statistics

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[5] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%). Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.[4]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough). This is also significantly lower than figures for England, White British accounting for 87% of the population. The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population. Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

One major difference in our sample was that 19.32% of respondents were unemployed compared to only 5% from the Census data for the borough. The high number of respondents who are unemployed is a result of the convenience sampling method which was used to select respondents, which may have over-represented people who were out of work and at home, and who had time to fill out the questionnaire. This feature is quite common in field surveys conducted with convenience sampling. Moreover an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.[6]

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.

[Figure 1 in here]

Variables

The main aim of the empirical analysis is to explore the determinants of the individual awareness of, and attitude to use, doctor-ratings websites. The dependent variables (Y) of our empirical analysis are thus two:

i) the likelihood of being aware of doctor-rating websites (*Awareness*), which is a binary variable (*Awareness*=1 if patient is aware, *Awareness*=0 otherwise);
ii) the likelihood of the individual intention to use doctor-rating websites in the future (*IntentionToUse*), which is an ordered discrete dependent variable that assumes values equal to 1 if the respondent is not likely to use the websites in the future, 2 if is not sure, and 3 if is likely to use.

The explanatory variables (X_i) include five groups of individual variables, namely:

i) individual socio-demographic characteristics such as age (*Age*); gender (*Gender*); a set of dummies variables for ethnicity (*WhiteNonBritish, WhiteBritish*) with the non-white respondents taken as reference group; education (*Education*), taking values between 1 and 7 increasing with the highest level of attained formal education; income (*Income*), taking values between 1 and 6 increasing with the bracket level of pre-tax income;
ii) a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care, including the clinical performance of the healthcare providers (*HC_ClinicalPerform)*; the closeness to home *(HC_CloseHome)*; the familiarity with the doctor (*HC_Familiarity*); the financial performance of the hospital (*HC_FinPerform*); the reputation of the doctor (*HC_GPReputation*); the accessibility of the hospital (*HC_Access*); the past experience with the hospital (*HC_PastExp*); the waiting lists (*HC_Waiting*); and, finally, the rates of hospital-acquired complications (*HC_HospComp*);
iii) a set of variables on the sources of information that are important in making decisions about where to receive health care, including published hospital statistics (*SI_HospStat*); online doctor-rating websites (*SI_DoctorRating*); advice from the GP (*SI_GPAdvice*); feedback from relatives or friends (*SI_Family*); and, finally, past experience (*SI_PastExp*);
iv) two dummy variables which take value 1 if the gender and the age of the patient are the same, or within a comparable range, respectively, than the characteristics of her GP, and 0 otherwise (*GenderMatch, AgeMatch*,);
v) a set of variables that describe the respondents' feelings about their relation with their doctor, including the feeling that the doctor listens to their problems (*DOC_Listens*); spends enough time in the consultation (*DOC_Time*); explains things clearly (*DOC_Explains*); is sociable and friendly (*DOC_Friend*); and can be trusted (*DOC_Trust*);
vi) a variable indicating the level of participation of the respondents in their GPs' decisions (*Participation*);
vii) a set of variables on patients' satisfaction with the level of choice in their healthcare decisions, and in particular for the choice of the GP (*SAT_C_GP*); of treatments (*SAT_C_Treatment*); of a doctor for an outpatient appointment (*SAT_C_Doc*); of an hospital for an outpatient appointment (*SAT_C_Hosp*); of an appointment time (*SAT_C_Time*);

viii) a dummy variable controlling for whether the subjects had access to internet at home or at work (*WEB_Access*);
ix) in the estimation of the likelihood of the intention to use websites, an extra dummy variable controlling for whether the subjects were aware of the existence of doctor-rating websites (*AlreadyAware*)
x) a dummy variable (*SameGP*) for whether the subject always asks to see the same GP.

Methodology

Using STATA 11, we estimate a binary probit model for the awareness of doctor online rating websites (*Awareness*), and, an ordered probit for the likelihood of intention to use these websites (*IntentionToUse*).

The main idea beyond the binary probit regression is that the likelihood of observing a positive awareness of the websites (*Awareness*=1) can be modelled as:

$$\Pr(Y = 1|X_1, X_2, X_3, \cdots, X_k) = \Phi(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k) \quad (1)$$

Where Φ is the cumulative standard normal distribution function, X_1, X_2, ... X_k are the above described explanatory variables, and β_0, β_1, β_2,... β_k are the coefficients of the explanatory variables to be estimated, which can be immediately interpreted as determining whether the likelihood of observing awareness increases with the corresponding explanatory variable.

The binary probit model can be equivalently generalised to the case where more than two discrete outcomes are possible, using an ordered probit model. In such a case, threshold parameters shown by cut-points between the outcomes are estimated by the data together with the regression coefficients and help to match the probabilities associated with the outcome.[7 8] We in fact employ an ordered probit model to estimate the likelihood that the respondents to our survey intend to use online doctor-rating websites in the future (*IntentionToUse*).

RESULTS AND DISCUSSION

Missing data

The incomplete questionnaires were used and missing observations were considered for the questions not answered. From the sample 3.9% did not report their age, 2.43% their gender, 2.9% their ethnicity, 3.4% whether they had internet access, 6.34% did not report how many people they lived with, 3.41% did not report whether they had an outpatient appointment in the previous year.
Missing data was higher for income (15.1% of the sample), education (10.2% of the sample). Also, 27.31% of the respondents did not answer on the gender of their GP, 28.29% on the age and 29.37% on the ethnicity.
On the awareness only 1.46% of our sample did not answer to whether they were aware of the existence of online rating websites and 3.95% failed to answer on the likelihood of using these websites in the future.

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the use of these online sources is still quite limited in our sample, although significantly higher than what the previous studies have shown. [1]

We then used a probit regression to explore the possible characteristics that make patients more likely to be aware of the doctor-rating websites. Table 2 summarises the results.

[**Table 2 in here**]

Among the demographic factors, age and ethnicity were the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Although white British and white non-British respondents were sometimes less likely to be aware of the websites, the effect of these variables is not fully robust across all specifications. Other demographic factors, including income, education and gender were not significant predictors of awareness.

When considering the importance that individuals give to different information channels in order to decide on where to receive care, three sources were significant: clinical performance rates, the reputation of the doctor, and the hospital statistics. Those who consider the reputation of the doctor and the hospital statistics important in deciding where to receive care were more likely to be aware of the rating websites. This is consistent with the fact that individuals who give importance to these factors are more likely to seek for this information and therefore be aware of the websites that provide it. On the contrary, those who considered clinical performance rates important were less likely to be aware of the doctor-rating websites, perhaps signalling that those respondents may be more familiar with other sources of information, such as hospital statistics, for instance.

Finally, although the majority of the variables on doctor-patient relationship were not significant, the gender match between the GP and the patient predicted higher awareness of the website ratings. We see this as an interesting finding. The doctor-patient gender concordance has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[9] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Our evidence is consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues [10] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the patient-doctor consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to

that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[11]

Results on the likelihood to use online rating websites

Table 3 below summarizes several statistical specifications of the ordered probit model looking at the determinants of the likelihood that respondents to our survey declared their intention to use doctor-rating websites in the future.

[Table 3 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. This result is partly in contrast to what found by the previous literature[6 12 13] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because are in the position of directly accessing alternative sources of information through their networks of acquaintances. As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

Among other socio-demographic variables, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from authors upon request). These results seem to suggest that while age and gender can be significant factors in explaining the use of Internet for health information,[4] they are not significant factors to explain the intention to use doctor-rating websites once subjects are made aware of their existence.

Of the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are consistent with the nature of the information provided in these websites. Also, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics (and, sometimes also online doctor-rating websites) as important sources of information are more likely to use the rating websites. On the other hand, and interestingly, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patients relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. This seems consistent with the

analogous effect found for the likelihood of being aware of those websites, and together they point to the possible explanation that the doctor and the Internet may sometimes be seen as complementary, rather than alternative, information channels.[12] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggesting that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and how they perform relative to each other.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues [6] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[12] that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

Regarding other respondents' attitudes within the patient-doctor relationship, it also transpires that the more autonomy patients have in their healthcare, the more likely they are to be willing to use the rating websites. This intuitive result is consistent with the evidence by McMullan[12] that a patient would look up health information before a consultation 'to seek information to manage their own healthcare independently'. These may be the type of people who are 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[14]

Concerning, finally, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. These results may be considered as reinforcing the above discussed interpretation that some dimensions of the patient-doctor relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally.

On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites. Together with the above result, these findings suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

Of course, the study was conducted on a relatively small sample in one borough of London which limits the possibility to generalise the findings. Yet, having chosen a borough which comprises a mix of ethnicities and both affluent and deprived neighbourhoods and having controlled for a range of characteristics in the analysis, makes the provided evidence of potential relevance under a much broader perspective.

CONCLUSIONS

The use of doctor-rating websites in our sample remains particularly low. Our findings suggest that older and more affluent people, as well as subjects of a white ethnic background, are less likely to use them.

One of the main results that seem to emerge from our empirical analysis is the importance of the doctor-patient relationship as a factor determining people's awareness or intention to use online websites. In particular, the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the GP and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet. When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[15 16 17] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a stimulating opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population.

Our study shows, however, that subjects who seek and provide feedback on doctor-ranking websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP.

Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback on doctor-ratings.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix 1
Table 1 Variable description

Label	Values
IntentionToUse	Dummy variable =1 if Yes
Awareness	Ordered discrete variable ranging from 1 ="not likely to use" to 3="likely to use
HC_Waiting	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_HospComp	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_Clinical_Performance	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_CloseHome	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_Familiarity	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_FinPerform	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_GP_Reputation	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_Access	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_PastExp	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_GP_Advice	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_HospStat	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_DoctorRating	Ordered discrete variable ranging from 1 =not important to 5=very important

SI_PastExp	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_Family	Ordered discrete variable ranging from 1 =not important to 5=very important
Reliable	Ordered discrete variable ranging from 1 =very runeliableto 5=very reliable
DOC_Listens	Dummy variable =1 if "I feel my doctor listens to my problems"
DOC_Time	Dummy variable =1 if "I feel my doctor spends enough time with me in each consultation"
DOC_Explains	Dummy variable =1 if "I feel my doctorexplains things clearly"
DOC_Friend	Dummy variable =1 if "I feel my doctor is sociable and friendly"
DOC_Trust	Dummy variable =1 if "I feel I can trust in my doctor"
Participation	Ordered discrete variable. Value=1 if "My doctor always makes decisions for me", Value =6 I make decisions with my parents/spouse/relatives
SAT_C_GP	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Hosp	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Doc	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Treatment	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Time	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
CB_AWARE	Dummy variable =1 if aware of Choose &Book
CB_Use	Dummy variable =1 if has used Choose &Book
WEB_Access	Dummy variable =1 if has Internet Access at home or work
AgeMatch	Dummy variable =1 if gender matches GP age
GenderMatch	Dummy variable =1 if age matches GP age
WhiteBritish	Dummy variable =1 if White British
WhiteNonBritish	Dummy variable =1 if White Non British

Income	Ordered discrete variable =1 if Income <15000; =6 if Income>95000
Education	Ordered discrete variable ranging from 1 to 7 increasing with level of highest attained education

Table 2: Probit model on the factors explaining individuals' awareness of doctor-rating websites

Awareness	Model 1	Model 2	Model 3	Model 4
Age	-.02511*	-.03802*		
Gender	0.17571	0.37698		
White British	-0.31364	-0.04029	-0.40867	-1.37686*
WhiteNonBritish	-.77154*	-0.51540	-0.73818	-1.49512*
Education	0.08598	0.22691	0.16062	0.15219
Income	-0.03388	-0.03182	-0.18586	-0.32047
HC_HospComp		0.09907	0.17904	0.13723
HC_Clinical_Performance		-0.24814	-0.34760	-.89496*
HC_Familiarity		-0.20002	-0.15916	-0.00744
HC_GP_Reputation		0.20240	0.23607	.88312*
SI_GP_Advice		0.07143	-0.06556	-0.24120
SI_HospStat		0.11735	0.17486	.78768*
SI_PastExp		-0.14996	0.06721	0.09103
SI_Family		-0.02373	-0.23585	-0.67718
DOC_Listens			-0.39510	-0.78662
DOC_Time			0.17592	-0.91318
DOC_Explains			0.38843	0.32532
DOC_Friend			-0.16654	0.78108
DOC_Trust			0.04683	0.30238
Participation			0.02650	0.22745
AgeMatch			0.41149	1.15968
GenderMatch			.60875*	0.83468
SameGP				-0.43671

SAT_C_GP				0.34304
SAT_C_Hosp				0.03738
SAT_C_Doc				0.17756
SAT_C_Treatment				0.14192
SAT_C_Time				-0.09109
_cons	-0.17923	-0.00659	-0.70032	-3.12100
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		legend:	* p<0.05; ** p<0.01; *** p<0.001	

Table 3 Ordered Probit model on the factors explaining the likelihood to intend to use the doctor-rating websites.

IntentionToUse	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII	Model IX	Model X	Model XI
Awareness	-1.490098 (1.105938)	-1.46876 (1.086428)	-1.37799 (1.013997)	-1.39186 (1.014678)	-1.39135 (1.028182)	-1.32087 (0.964004)	-1.33837 (0.950678)	-1.30858 (0.883072)	-1.21886 (0.859385)	-1.26392 (0.858102)	-1.25845 (0.850407)
HC_Waiting	-0.0333763 (0.4812862)	-0.0289 (0.475927)	0.034038 (0.42562)	0.037041 (0.427061)	-0.00202 (0.404197)	0.037416 (0.351975)					
HC_HospComp	0.1258374 (0.4490633)	0.130149 (0.448609)	-0.14574 (0.389477)	-0.14176 (0.389321)	-0.17246 (0.378143)	-0.17163 (0.376829)	-0.16192 (0.364591)	-0.16609 (0.361465)			
HC_Clinical_Performance	1.27466* (0.706387)	1.24218* (0.664938)	1.108376* (0.567199)	1.114709** (0.566718)	1.084543** (0.552248)	1.068527* (0.542242)	1.049116** (0.507769)	1.051533** (0.506566)	1.013939** (0.473)	0.972573** (0.475465)	0.961459** (0.47394)
HC_CloseHome	0.0479294 (0.4304794)	0.071271 (0.404689)	-0.06446 (0.36145)								
HC_Familiarity	-0.6430315 (0.4431286)	-0.61777 (0.396589)	-0.50769 (0.346218)	-0.50751 (0.346708)	-0.53364 (0.345055)	-0.55836* (0.330284)	-0.55738* (0.330004)	-0.56245* (0.324459)	-0.56886* (0.326828)	-0.59213* (0.330537)	-0.57454* (0.317614)
HC_FinPerform	-0.2879855 (0.5759051)	-0.32068 (0.523122)	-0.17394 (0.474874)	-0.1614 (0.471761)							
HC_GP_Reputation	0.531551 (0.4888328)	0.559182 (0.457822)	0.649998 (0.422641)	0.667459 (0.413469)	0.716391* (0.397221)	0.734803* (0.389075)	0.734723* (0.389097)	0.739415* (0.385034)	0.706219* (0.3866097)	0.690839* (0.385655)	0.686293* (0.379665)
HC_Access	0.0646001 (0.3598014)	0.063482 (0.358318)	0.126025 (0.335348)	0.106341 (0.314739)	0.128631 (0.307265)	0.128902 (0.309413)	0.135516 (0.303004)	0.146907 (0.272835)	0.14238 (0.260669)	0.157805 (0.2587)	0.167118 (0.255171)
HC_PastExp	0.0116506 (0.3126032)	0.009942 (0.309821)	-0.07334 (0.285021)	-0.069 (0.284343)	-0.07509 (0.280258)	-0.08766 (0.272015)	-0.07412 (0.240066)	-0.07626 (0.238735)	-0.06161 (0.236172)	-0.05774 (0.236731)	-0.05854 (0.236593)
SI_GP_Advice	-0.965477* (0.5812963)	-0.96164* (0.572932)	-0.68184 (0.478883)	-0.71602* (0.439781)	-0.71349* (0.431606)	-0.70949* (0.431902)	-0.6887* (0.381957)	-0.69106* (0.381335)	-0.73722** (0.368857)	-0.73987** (0.377419)	-0.73816* (0.379712)
SI_HospStat	1.430153** (0.7232476)	1.472196** (0.654768)	1.282785** (0.563935)	1.266714** (0.560111)	1.157914** (0.464421)	1.109429*** (0.382154)	1.112091*** (0.380992)	1.11389*** (0.381585)	1.070698*** (0.366592)	1.077707*** (0.374138)	1.057476*** (0.366079)
SI_DoctorRating	0.3509325 (0.5678123)	0.341427 (0.554121)	0.140798 (0.482839)	0.166676 (0.466254)	0.167322 (0.461632)	0.225253 (0.3595)	0.212759 (0.339169)	0.205901 (0.329077)	0.213284 (0.331575)	0.263376 (0.318113)	0.256045 (0.313808)
SI_PastExp	-0.2323052 (0.6857292)	-0.27113 (0.63673)	-0.33326 (0.61977)	-0.32871 (0.617586)	-0.31629 (0.620509)	-0.33499 (0.617278)	-0.33643 (0.617512)	-0.33403 (0.615972)	-0.33182 (0.595386)	-0.34589 (0.593174)	-0.21412 (0.321702)
SI_Family	0.0969089 (0.6530482)	0.100416 (0.654709)	0.153811 (0.644386)	0.144818 (0.640823)	0.129728 (0.635845)	0.147216 (0.631958)	0.143252 (0.630112)	0.140679 (0.62874)	0.17626 (0.566482)	0.149968 (0.563479)	
Reliable	0.8541392 (0.6146382)	0.836024 (0.610583)	0.998539* (0.553175)	0.950086** (0.481689)	0.93444* (0.485219)	0.904671* (0.455675)	0.91699** (0.441021)	0.931441** (0.410032)	0.951635** (0.389758)	0.951738** (0.391553)	0.968708** (0.383293)
DOC_Listens	2.783105* (1.595183)	2.701009* (1.459189)	2.107379 (1.28265)	2.050764* (1.240544)	2.200222* (1.196851)	2.186488* (1.190079)	2.191035* (1.186518)	2.203634* (1.177361)	2.115074* (1.142362)	2.276804** (1.12992)	2.254619** (1.115993)
DOC_Time	0.0028009 (0.9663045)	0.031698 (0.935949)	0.263194 (0.862893)	0.291105 (0.846794)	0.288719 (0.841739)	0.295651 (0.83964)	0.277058 (0.820967)	0.279926 (0.819897)	0.426324 (0.746708)		

DOC_Explains	-2.873068** (1.451857)	-2.79747** (1.322986)	-2.93956** (1.211433)	-2.89406** (1.183745)	-2.9724** (1.189955)	-2.99408** (1.187278)	-3.01245*** (1.171195)	-3.03793*** (1.136076)	-3.01943*** (1.162068)	-3.13156*** (1.153486)	-3.08263*** (1.119211)
DOC_Friend	1.476197 (1.253959)	1.39654 (1.084211)	1.262265 (0.994411)	1.2366 (0.987052)	1.44486* (0.816683)	1.500166* (0.774784)	1.514821** (0.760908)	1.526402** (0.750412)	1.530325** (0.759932)	1.712944** (0.693328)	1.66892** (0.663803)
DOC_Trust	-1.186211 (1.151477)	-1.14321 (1.101659)	-0.33227 (0.852505)	-0.34088 (0.851113)	-0.45629 (0.781121)	-0.47195 (0.772027)	-0.47596 (0.770021)	-0.47622 (0.768023)	-0.42764 (0.744095)	-0.49349 (0.749657)	-0.52024 (0.741436)
Participation	0.8461796* (0.491942)	0.855876* (0.48811)	0.800821* (0.458173)	0.794849* (0.455168)	0.8473** (0.423296)	0.819995** (0.397621)	0.831744** (0.382059)	0.830086** (0.381645)	0.838354** (0.377555)	0.830293** (0.381665)	0.833261** (0.383463)
SAT_C_GP	1.616577* (0.9071144)	1.580913* (0.871629)	1.086233 (0.676455)	1.0879 (0.677227)	0.969971* (0.558515)	0.976733* (0.564364)	0.974172* (0.562785)	0.973823* (0.562188)	1.023485** (0.555839)	1.11913** (0.545879)	1.101251** (0.535677)
SAT_C_Hosp	1.723845** (0.8389526)	1.695945** (0.799005)	1.751533** (0.742486)	1.759649** (0.740237)	1.916303*** (0.614399)	1.923682** (0.612479)	1.932668*** (0.607808)	1.925975*** (0.60232)	1.903824*** (0.612007)	1.939607*** (0.614163)	1.891536*** (0.576251)
SAT_C_Doc	-0.7285988 (1.060924)	-0.66508 (0.948389)	-0.76136 (0.860521)	-0.75242 (0.857113)	-0.93997 (0.677123)	-0.94502 (0.675133)	-0.97965* (0.592137)	-0.97734* (0.591815)	-0.9978* (0.596322)	-1.05803* (0.586979)	-1.01815* (0.566104)
SAT_C_Treatment	-1.567085** (0.7866272)	-1.57843* (0.782397)	-1.35684* (0.693826)	-1.33813* (0.684359)	-1.28051* 0.655734 ()	-1.23127** (0.600107)	-1.20025** (0.52193)	-1.20117** (0.521766)	-1.21581** (0.522225)	-1.16225** (0.517201)	-1.13815** (0.503693)
SAT_C_Time	0.1581313 (0.581505)	0.194839 (0.510654)	0.093667 (0.448609)	0.11126 (0.439809)	0.083362 (0.435461)						
CB_AWARE	0.1785468 (1.21653)										
CB_Use	2.871912 (2.383214)	2.922662 (2.309773)									
WEB_Access	-0.1814284 (2.107242)	-0.33442 (1.813491)	-0.68649 (1.689725)	-0.68119 (1.688781)	-0.30375 (1.248163)	-0.36828 (1.201655)	-0.39107 (1.18264)	-0.39367 (1.181729)	-0.56363 (1.087667)	-0.64547 (1.078176)	-0.62991 (1.073669)
AgeMatch	0.3049883 (0.675904)	0.321252 (0.667981)	0.436832 (0.642998)	0.3895 (0.587025)	0.382174 (0.585798)	0.36762 (0.579437)	0.374635 (0.576317)	0.368968 (0.573503)	0.399045 (0.573024)	0.454745 (0.562488)	0.470967 (0.555307)
GenderMatch	1.625302* (0.9550201)	1.646905* (0.940185)	1.271183 (0.794867)	1.32497* (0.737975)	1.346428* (0.726754)	1.295927* (0.674346)	1.302533* (0.671871)	1.290756** (0.65768)	1.303267** (0.658903)	1.251888* (0.655342)	1.285204** (0.642696)
WhiteBritish	-2.445666* (1.302153)	-2.37552** (1.199783)	-1.66445* (0.967674)	-1.73668** (0.88187)	-1.65291** (0.833364)	-1.64323** (0.838285)	-1.64111** (0.837516)	-1.61578** (0.78357)	-1.6038** (0.792896)	-1.68753** (0.793251)	-1.67893** (0.790574)
WhiteNonBritish	0.1386463 (1.338847)	0.148545 (1.334615)	-0.03916 (1.133546)	-0.05989 (1.130741)	-0.08249 (1.115916)	-0.07566 (1.144774)	-0.09611 (1.119425)				
Income	-0.4429667* (0.2316356)	-0.44365* (0.230714)	-0.45861** (0.209061)	-0.44977** (0.202333)	-0.44793** (0.20238)	-0.44075** (0.199407)	-0.43956** (0.198726)	-0.43487** (0.19095)	-0.43322** (0.188427)	-0.41784** (0.188807)	-0.41836** (0.188147)
Education	-0.4187334 (0.6287027)	-0.44168 (0.603559)	-0.22666 (0.52803)	-0.27136 (0.466123)	-0.263 (0.467876)	-0.21485 (0.395259)	-0.21566 (0.394563)	-0.21695 (0.393897)	-0.17452 0.368419 ()	-0.17701 (0.367215)	-0.19386 (0.362042)

Significance: *** 1%, **5%, *10%

IntentionToUse	Model XII	Model XIII	Model XIV	Model XV	Model XVI	Model XVII	Model XVIII
Awareness	-1.35405* (0.762141)	-1.39636* (0.71649)	-1.51122** (0.697829)	-1.39906** (0.664531)	-1.23561* (0.640507)	-1.07294* (0.62631)	-1.12425* (0.575731)
HC_Waiting							
HC_HospComp							
HC_Clinical_Performance	0.742779** (0.375086)	0.752098** (0.366512)	0.764735** (0.359466)	0.849936** (0.336895)	0.898678*** (0.330463)	0.882219*** (0.326485)	0.944563*** (0.295874)
HC_CloseHome							
HC_Familiarity	-0.54233* (0.290214)	-0.51609* (0.276828)	-0.51594* (0.267087)	-0.49808** (0.25428)	-0.54864** (0.241671)	-0.60725*** (0.232756)	-0.61785*** (0.223936)
HC_FinPerform							
HC_GP_Reputation	0.828095** (0.359508)	0.814669** (0.348304)	0.797127** (0.315723)	0.747344** (0.300588)	0.739494** (0.296632)	0.611509** (0.268221)	0.595868** (0.259027)
HC_Access	0.173275 (0.246916)	0.15193 (0.238385)					
HC_PastExp							
SI_GP_Advice	-0.65977** (0.33332)	-0.62503** (0.322332)	-0.60416** (0.30826)	-0.59226** (0.297143)	-0.53056* (0.293969)	-0.56652* (0.29569)	-0.50096* (0.26816)
SI_HospStat	0.987615*** (0.337093)	0.995717*** (0.316308)	0.994115*** (0.31843)	0.92096*** (0.297078)	0.84345*** (0.284109)	0.921466*** (0.286705)	0.90438*** (0.276913)
SI_DoctorRating	0.263139 (0.308835)	0.230677 (0.295113)	0.333973 (0.255608)	0.375391 (0.251258)	0.552494** (0.228649)	0.475429** (0.213175)	0.500322** (0.214247)
SI_PastExp	-0.32261 (0.27318)	-0.36216 (0.269062)	-0.37955 (0.26113)	-0.33212 (0.252811)	-0.37862 (0.238344)		
SI_Family							
Reliable	0.958473*** (0.367147)	1.01697*** (0.358757)	0.949026*** (0.322317)	0.914138*** (0.311631)	0.816859*** (0.283659)	0.792445** (0.281111)	0.765322*** (0.267114)
DOC_Listens	1.810485** (0.908723)	1.824438** (0.852209)	1.719578** (0.791297)	1.664127** (0.768941)	1.862081** (0.739667)	1.698746** (0.704665)	1.762115*** (0.674643)
DOC_Time							
DOC_Explains	-2.87072*** (1.05123)	-2.81547*** (1.006082)	-2.67299*** (0.904423)	-2.66787*** (0.872004)	-2.74535*** (0.832484)	-2.53694*** (0.795942)	-2.53369*** (0.754888)
DOC_Friend	1.593912*** (0.617866)	1.540915*** (0.591173)	1.46116*** (0.561516)	1.384344*** (0.534861)	1.302343** (0.528824)	1.188568** (0.505959)	1.13078** (0.487777)
DOC_Trust							

Participation	0.684301** (0.344683)	0.693557** (0.331651)	0.603889** (0.289766)	0.577557** (0.281968)	0.5249* (0.276517)	0.446094* (0.26172)	0.433024* (0.256209)
SAT_C_GP	0.952641** (0.45077)	0.888207** (0.391233)	0.966883** (0.392334)	0.955362** (0.363593)	0.933933*** (0.355031)	0.875975** (0.342618)	0.85138*** (0.321651)
SAT_C_Hosp	1.98471*** (0.574437)	1.954144*** (0.556058)	1.932415*** (0.539056)	1.911218*** (0.517017)	1.863321*** (0.507577)	1.647233*** (0.479992)	1.389768*** (0.379117)
SAT_C_Doc	-1.06978* (0.575851)	-0.99994* (0.557385)	-0.9119* (0.531006)	-0.83629 (0.513876)	-0.71345 (0.470408)	-0.45209 (0.428856)	
SAT_C_Treatment	-1.07515** (0.481247)	-1.05954** (0.464941)	-1.08114** (0.45812)	-1.08222** (0.44724)	-1.05645** (0.439241)	-1.09415** (0.43443)	-1.25888*** (0.401232)
SAT_C_Time							
CB_AWARE							
CB_Use							
WEB_Access	-0.61963 (0.996695)						
AgeMatch	0.555876 (0.548903)	0.556183 (0.549439)	0.471949 (0.517743)				
GenderMatch	1.34958** (0.599521)	1.376749** (0.579511)	1.514943*** (0.554387)	1.57004*** (0.540893)	1.673178*** (0.530982)	1.634432*** (0.516775)	1.565512*** (0.493472)
WhiteBritish	-1.61082** (0.76516)	-1.5309** (0.649262)	-1.72099*** (0.619344)	-1.69463*** (0.590724)	-1.4476*** (0.551136)	-1.37653** (0.542948)	-1.312** (0.522632)
WhiteNonBritish							
Income	-0.36211** (0.16748)	-0.36542** (0.165261)	-0.36142** (0.163348)	-0.36243** (0.159068)	-0.39924*** (0.15215)	-0.41213*** (0.151761)	-0.43588*** (0.144619)
Education	-0.27091 (0.335256)	-0.26045 (0.313089)	-0.33076 (0.293814)	-0.29302 (0.287501)			

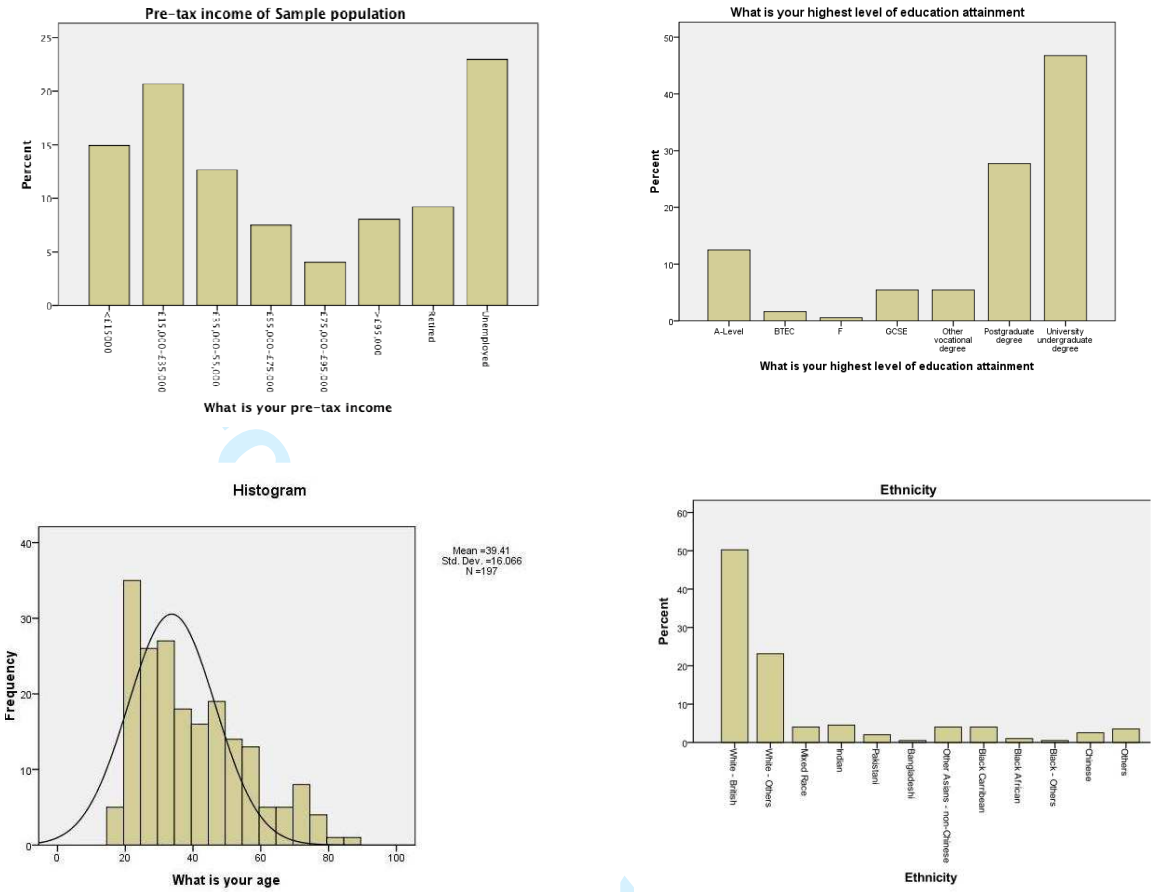
STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	8
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.



Figures 1 (a), (b), (c) and (d) (moving clockwise from top-left figure**). Distribution of pre-tax income (a), highest level of attained education (b), ethnicity (c), and age (d) in the sample of respondents.**

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Who is More Likely to Use Doctor-Rating Websites, and Why?
A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stravopoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

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Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' awareness of, and intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's awareness of and willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining awareness of and intention to use the websites: the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on

doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of the general public which uses doctor-rating websites is still quite low..
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

This study aims, first, at providing direct evidence on the extent to which doctor ratings websites are known and used among the general public in a borough of London. It also aims to directly provide some novel insight on what appear to be the most significant predictors of the fact that people are aware of, and willing to use, doctor-ratings websites.

Although direct evidence on both these aspects is scant, especially for the UK, doctor rating websites are often regarded as key innovations within the broader health policy agenda aiming at enhancing patients' choice.

Both the NHS Plan[1] and the NHS Improvement Plan[2], in fact, set out the changes required for the NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to shape a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement. This was with the aim of creating a patient-led service promptly responding and supporting patients' health needs.[3]

Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"[4] acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community. This would involve empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Along this line, a number of initiatives have been introduced. In particular, *Choose and Book* is an IT service which allows patients needing an outpatient appointment to choose which hospital they are referred to by their GP, as well as the time and date of the appointment. *Choose and Book* was planned from 2003 as part of the National Program for IT (NPfIT), and has been progressively introduced from 2005 onwards. By 2009, 98% of GPs claimed to have used *Choose and Book* at some stage during the week, although only half of all secondary care appointments were being arranged using the system.[5]

A debate exists on whether *Choose and Book* has succeeded in actually increasing patient choice. A survey of 2,181 patients carried out in January 2009, for instance, found that only 46% were aware of having a choice of where to receive hospital care before attending their GP.[6] This seems to naturally lead to the issue that the capability of making informed choices crucially depends on the availability of relevant information.

Key sources of information are doctor-rating websites. Websites such as *NHS Choices* and *Dr Foster Intelligence* are also a relatively recent phenomenon in the UK. Compared to other sources of healthcare information – such as official hospital statistics - these websites claim to be more user-friendly and easy to understand.

In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice in healthcare, as they potentially enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health and wellbeing.

In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK. A study by the Kings Fund[6] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.[7] These figures are consistent with the evidence from the US where usage of doctor rating websites is relatively more diffused and established.[8,9]

Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[10] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[11]

The apparently limited uptake of doctor rating sites in the UK calls into question how effective the existing websites may be as information exchange platforms from and to representative groups of patients.

Interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users providing feedback online, require a thorough understanding of which characteristics drive the patients' awareness and use of online health information such as the doctor-rating websites.[12-14]

The aim of this study is to contribute to fill these gaps by providing more direct evidence to support decision-making.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed to have a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Sample

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week (including weekends). By covering different times and locations within the borough, we aimed at being able to approach both working and non-working members of the public. During the surveys in the field, the interviewers approached every third male and third female that would pass by them. A target of 200 respondents was envisaged, which was readily achieved, since only 68 subjects who were initially approached refused to take part to the survey, with a final response rate of 74%.

Statistical analysis

We have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects. As a result of the convenience sampling, our resulting sample consisted in 141 workers (ten of which reported to be currently unemployed), 33 students, nine officially unemployed and six retired subjects. Eleven respondents did not report their working status.

As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.

Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed, compared to only 5% from the Census data for the borough. The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[15] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).[15] Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.[11]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[15] This is also significantly lower than figures for England, White British accounting for 87% of the population.[15] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.[15] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.[16]

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[15]

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[6]

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).[17]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[**Table 3 in here**]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings, perhaps signalling that those respondents may be more familiar with alternative sources of information.

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio. This may signal the possible existence of 'complementary' effects between the two sources of information, according to which individuals who give importance to hospital statistics are also more likely to actively seek for doctor rating websites.

Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

From those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent outcomes, we have thus focused the rest of the analysis on the determinants of the intention to use, rather than actual usage of, doctor rating websites.

Results on the likelihood to use online rating websites

In Table 4 we present the estimate results of six different specifications of the ordered logistic regression for the dependent variable *IntentionToUse* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 4 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. Moreover, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from the authors upon request).

Looking at the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are consistent with the nature of the information provided in these websites. Also, and quite intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, and interestingly, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who

feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the determinants of the awareness of doctor rating websites; ii) the actual usage of the websites; and iii) the determinants of the intention to use them in the future.

Awareness

As for the determinants of being aware of the doctor rating websites, we see the significant and positive effect by the gender match between the GP and the patient as a particularly interesting finding. The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[18] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Actual usage

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund[6] that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.[7]

The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.[9] analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.[8] also reported a low average number of ratings per physician.

Intention to use

The result that shows that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature[16,19,20] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.[12] As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patient sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).[10] Both results differ from the findings from the US, where women and younger adults are more active 'online health information seekers'.[11]

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.[19] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues[16] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[19] that indicates that patients who become dissatisfied with the information

provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan[19], for instance, reports that patients would seek health information before a consultation 'to manage their own healthcare independently'. These may be the type of people who are 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[21]

Moreover, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

General discussion

Overall, our evidence on the determinants of both awareness and intention to use is broadly consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues[22] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[23]

Our findings that online information can be used not only as "substitute" but also, and perhaps mainly, as "complementary" to several dimensions of the doctor-patient relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.[24,25]

The "complementarity" findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.[8,9,26] Taken together, this evidence can be seen as providing little support to the related concern that the likeliest to use online ratings and enter actual comments may be the most disgruntled patients.[27]

On a related topic, concerns have been expressed about the ability of online ratings to truly reflect the quality of care. A recent UK study, however, demonstrated a strong relationship between the ratings reported online and more objective measures of clinical

quality such as mortality and infection rates,[28] while another study showed that online ratings were associated with ratings derived from a traditional paper-based survey.[29] Online ratings, thus, do not seem to provide systematically biased or misleading information regarding the health care that patients receive, at least not more than a traditional survey would do. Consistently with this evidence, our results seem to support the idea that patients may see online ratings as a supplementary information base to be used in support of direct interaction with their doctor, which remains the most significant and reliable information channel.[30]

More generally, the evidence provided by our study confirms that the actual usage of doctor-rating websites in the UK remains particularly low. In our sample only 29 respondents out of 200 were aware of the existence of the patient rating websites. Among these, however, only 6 subjects reported they were actually using those websites.

While these figures are substantially in line with previous evidence brought forward from the literature,[6,7] considered together these results may pose serious concerns on the reasons and consequences of the lack of patient awareness and usage.

Previous studies in the US have reported a number of reasons behind this slow uptake, including i) the preference for more traditional information channels, such as recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact that people do not recognise that the quality of care may vary.[25]

Our study confirms that not only awareness of rating websites is still limited among the general public in the UK, but awareness per se does not seem a sufficient condition to guarantee active usage. This poses a double challenge from a clinician and health policy perspective.

In fact, on the one hand, the documented correlation between online ratings and other measures of healthcare quality, including survey-based ratings and clinical quality indicators,[28,29] necessarily requires that patients have already gone through two preliminary hurdles, namely i) being aware of, and ii) being active users of the doctor rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality, the effective removal of this double hurdle is likely to become the next priority to guarantee the full spread of online rating website.

On the other hand, while appropriate online and offline informational campaigns are likely to overcome the first hurdle, thus effectively raising patients' awareness of online ratings as a potential source of information on provider quality, informational campaigns alone can fail to effectively trigger changes in behaviour. Alike in several other health contexts, in fact, 'nudging' behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings,[25,31-34] and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome this last hurdle and actively engage with online ratings.

Limitations of the study

While dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. In a sample of the general public from a borough of London only 29 respondents out of 200 were aware of the existence of the patient rating websites, and only 6 reported to be actually using those websites.

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study also explicitly explores the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

Among other results, the statistical analysis provides evidence that the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[8,25,26, 31-34] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a challenging opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population. Indeed, our findings suggest that subjects of non-white background and with lower income are more willing to use online ratings.

Finally, our study highlights that subjects who use doctor rating websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non-white British, medium-low income patients who are not satisfied with their choice of healthcare treatments. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback online.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (*Awareness*) (0=no, 1=yes)	200	0.142	0.350
Intention to use (*IntentionToUse*)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (*HC_Waiting*)	198	3.818	1.165
Rates of hospital-acquired complications (*HC_HospComp*)	188	3.761	1.193
Clinical performance (*HC_Clinical_Performance*)	189	4.037	1.136
Closeness to home (*HC_CloseHome*)	200	3.683	1.265
Familiarity with the doctor (*HC_Familiarity*)	194	3.237	1.306
Financial performance of the hospital (*HC_FinPerform*)	191	2.387	1.164
Reputation of the doctor (*HC_GP_Reputation*)	199	3.980	1.137
Accessibility and parking facilities (*HC_Access*)	192	2.656	1.321
Past experience with the provider (*HC_PastExp*)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (*SI_GP_Advice*)	198	4.071	1.030
Published hospital statistics (*SI_HospStat*)	183	2.934	1.193
Online doctor rating websites (*SI_DoctorRating*)	178	2.315	1.204
Personal experiences in the past (*SI_PastExp*)	192	4.234	1.004
Feedback from family/friends (*SI_Family*)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (*DOC_Listens*)	200	0.575	0.496
...has time (0=no, 1=yes) (*DOC_Time*)	200	0.410	0.493
...explains (0=no, 1=yes) (*DOC_Explains*)	200	0.555	0.498
...is friendly (0=no, 1=yes) (*DOC_Friend*)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (*DOC_Trust*)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (*Reliable*)	141	2.759	1.055
How actively do you participate with your GP in making decisions (*Participation*)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (*SAT_C_GP*)	173	3.451	1.138
...hospital (*SAT_C_Hosp*)	152	3.493	1.055
...doctor (*SAT_C_Doc*)	139	3.252	1.022
...treatment (*SAT_C_Treatment*)	148	3.554	0.928
...time spent (*SAT_C_Time*)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) *(WhiteBritish*)	200	0.488	0.501
White Other (0=no, 1=yes) (*WhiteNonBritish*)	200	0.222	0.417
Highest level of educational attainment* (*Education*)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (*Age*)	199	39.572	16.083
Gender (*Gender*)			
Female (=1)	112		
Male (=0)	88		
Income (*Income*)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (*AgeMatch*)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (*GenderMatch*)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		**DOC_Friend**	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	**DOC_Trust**	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	**Participation**	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	**SAT_C_GP**	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	**SAT_C_Hosp**	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	**SAT_C_Doc**	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	**SAT_C_Treatment**	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	**SAT_C_Time**	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	**CB_AWARE**	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	**CB_Use**	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	**WEB_Access**	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	**AgeMatch**	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	**GenderMatch**	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	**WhiteBritish**	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	**WhiteNonBritish**	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	**Income**	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	**Education**	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	**Gender**	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	**Age**	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in paretheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to usef doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		

Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			
DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09***	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School

We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

☐ Yes No ☐ **(if No, skip ahead to Section C)**

☐ Other (please specify).....

Q2. How did you find out about these sites?

☐ Family/Friends ☐ Doctor

☐ The Media ☐ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes ☐ No ☐ **(if No, skip ahead to Section C)**

Q4. What specialty of doctor have you searched for in the past in these websites?

……..

Q5. When do you use these websites?

On a regular basis ☐ Only before/after an appointment ☐ Rarely ☐

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes ☐ No ☐

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information ☐ Negative information ☐

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	**1**	**2**	**3**	**4**	**5**
Rates of hospital-acquired complications	**1**	**2**	**3**	**4**	**5**
Clinical performance rating	**1**	**2**	**3**	**4**	**5**
Closeness to home	**1**	**2**	**3**	**4**	**5**
Familiarity with the doctor	**1**	**2**	**3**	**4**	**5**
Financial performance of the hospital	**1**	**2**	**3**	**4**	**5**
Reputation of the doctor	**1**	**2**	**3**	**4**	**5**
Accessibility and parking facilities	**1**	**2**	**3**	**4**	**5**
Past experience with the provider	**1**	**2**	**3**	**4**	**5**
None of these ☐					

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	**1**	**2**	**3**	**4**	**5**
Published hospital statistics	**1**	**2**	**3**	**4**	**5**
Online doctor rating website	**1**	**2**	**3**	**4**	**5**
Personal experiences in the past	**1**	**2**	**3**	**4**	**5**
Feedback from family/friends	**1**	**2**	**3**	**4**	**5**

Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure ☐

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

☐ Not likely ☐ Quite likely ☐ Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

☐ Every time
☐ After particularly positive experiences only
☐ After particularly negative experiences only
☐ After both positive and negative experiences
☐ Never
☐ Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

☐ I would not contribute to these websites
☐ To inform other patients
☐ To improve standards of care in the NHS
☐ As a method of complaint
☐ In appreciation of a doctor's service
☐ Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

☐ I feel my doctor listens to my problems
☐ I feel my doctor spends enough time with me in each consultation
☐ I feel my doctor explains things clearly
☐ I feel my doctor is sociable and friendly

☐ I feel that I can trust my doctor's opinions
☐ None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

☐ I always request to see the same GP
☐ I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure ☐

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

☐ Yes No ☐

Q21. Have you used this Choose and Book system in the past?

☐ Yes ☐ No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

☐ I have never used Choose & Book
☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

☐ Routine outpatient consultation
☐ Day-case procedure/surgery
☐ Major surgery
☐ None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

☐ Yes ☐ No

Q25. Have you used the internet in the past to search for health information?

☐ Yes ☐ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

☐ I'm too busy to have the time to use them
☐ The sites are not a reliable source of information
☐ It is difficult to interpret the information provided
☐ I already have enough information from other sources to make choices
☐ I don't have access to the internet
☐ I did not know these websites existed
☐ I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

☐ Shopping websites (e.g. Amazon)
☐ Holiday websites (e.g. TripAdvisor)
☐ Car insurance websites (e.g. Compare The Market)
☐ Restaurants/venue websites (e.g. ViewLondon)
☐ Film websites (e.g. Rottentomatoes)
☐ Other (please specify).....
☐ I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

☐ Star-rating out of 5
☐ Percentage scores
☐ Thumbs Up/Down
☐ Written comments from patients/users
☐ No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age? .....

Q30. What is your gender?

☐ Male ☐ Female

Q31. How would you describe your ethnicity?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. **What is your postcode?** .....

Q33. **How many other individuals do you live with?** .....

Q34. **Do you live with your parents?**

☐ Yes ☐ No

Q35. **What is/was your profession?** .....

☐ Unemployed ☐ Retired

Q36. **What is your level of pre-tax income?**

☐ 0

☐ <£15000 but >0 ☐ £15,000-£35,000

☐ £35,000-55,000 ☐ £55,000-£75,000

☐ £75,000-£95,000 ☐ >£95,000

Q37. **What is your highest level of educational attainment?**

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. **In the last year how many times have you had an outpatient hospital appointment?**

☐ 0 times ☐ 1-3 times
☐ 4-5 times ☐ More than 5 times

Q39. **What is the sex of your GP?**

☐ Male ☐ Female

Q40. **How old is your GP?**

☐ <30 years
☐ 30-50 years
☐ >50 years

Q41. **What is the ethnicity of your GP?**

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP. ☐

This is the end of the questionnaire, thank you for your time.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stravopoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

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Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low, ~~although significantly higher than what previously documented by the literature.~~
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' awareness of, and intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's awareness of and willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from ~~it took place in~~ one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining awareness of and intention to use the websites: the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of the general public which uses doctor-rating websites is still quite low~~, although significantly higher than what previously documented by the literature~~.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

This study aims, first, at providing direct evidence on the extent to which doctor ratings websites are known and used among the general public in a borough of London. It also aims to directly provide some novel insight on what appear to be the most significant predictors of the fact that people are aware of, and willing to use, doctor-ratings websites.

Although direct evidence on both these aspects is scant, especially for the UK, doctor rating websites are often regarded as key innovations within the broader health policy agenda aiming at enhancing patients' choice.

Both the NHS Plan[1] and the NHS Improvement Plan[2], in fact, set out the changes required for the NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to shape a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement. This was with the aim of creating a patient-led service promptly responding and supporting patients' health needs.[3]

Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"[4] acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community. This would involve empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Along this line, a number of initiatives have been introduced. In particular, *Choose and Book* is an IT service which allows patients needing an outpatient appointment to choose which hospital they are referred to by their GP, as well as the time and date of the appointment. *Choose and Book* was planned from 2003 as part of the National Program for IT (NPfIT), and has been progressively introduced from 2005 onwards. By 2009, 98% of GPs claimed to have used *Choose and Book* at some stage during the week, although only half of all secondary care appointments were being arranged using the system-.[5]

A debate exists on whether *Choose and Book* has succeeded in actually increasing patient choice. A survey of 2,181 patients carried out in January 2009, for instance, found that only 46% were aware of having a choice of where to receive hospital care before attending their GP.[6] This seems to naturally lead to the issue that the capability of making informed choices crucially depends on the availability of relevant information.

Key sources of information are doctor-rating websites. Websites such as *NHS Choices* and *Dr Foster Intelligence* are also a relatively recent phenomenon in the UK. Compared to other sources of healthcare information – such as official hospital statistics - these websites claim to be more user-friendly and easy to understand.

In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice in healthcare, as they potentially enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health and wellbeing.

In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK. A study by the Kings Fund[6] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.[7] These figures are consistent with the evidence from the US where usage of doctor rating websites is relatively more diffused and established.[8,9]

Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[10] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[11]

The apparently limited uptake of doctor rating sites in the UK calls into question how effective the existing websites may be as information exchange platforms from and to representative groups of patients.

Interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users providing feedback online, require a thorough understanding of which characteristics drive the patients' awareness and use of online health information such as the doctor-rating websites.[12-14]

The aim of this study is to contribute to fill these gaps by providing more direct evidence to support decision-making.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed to have a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Sample

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week (including weekends). By covering different times and locations within the borough, we aimed at being able to approach both working and non-working members of the public. During the surveys in the field, the interviewers approached every third male and third female that would pass by them. A target of 200 respondents was envisaged, which was readily achieved, since only 68 subjects who were initially approached refused to take part to the survey, with a final response rate of 74%.

Statistical analysis

We have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

Descriptive statistics of all the, dependent and independent, variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects. As a result of the convenience sampling, our resulting sample consisted in 141 workers (ten of which reported to be currently unemployed), 33 students, nine officially unemployed and six retired subjects. Eleven respondents did not report their working status.

As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.

Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed, compared to only 5% from the Census data for the borough. The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[15] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).[15] Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.[11]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[15] This is also significantly lower than figures for England, White British accounting for 87% of the population.[15] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.[15] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.[16]

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[15]

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[6]

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).[17]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[**Table 3 in here**]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings, perhaps signalling that those respondents may be more familiar with alternative sources of information.

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio. This may signal the possible existence of 'complementary' effects between the two sources of information, according to which

individuals who give importance to hospital statistics are also more likely to actively seek for doctor rating websites.

Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

From those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent outcomes, we have thus focused the rest of the analysis on the determinants of the intention to use, rather than actual usage of, doctor rating websites.

Results on the likelihood to use online rating websites

In Table 4 we present the estimate results of six different specifications of the ordered logistic regression for the dependent variable *IntentionToUse* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 4 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. Moreover, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from the authors upon request).

Looking at the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are consistent with the nature of the information provided in these websites. Also, and quite intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, and interestingly, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the

same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the determinants of the awareness of doctor rating websites; ii) the actual usage of the websites; and iii) the determinants of the intention to use them in the future.

Awareness

As for the determinants of being aware of the doctor rating websites, we see the significant and positive effect by the gender match between the GP and the patient as a particularly interesting finding. The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[18] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Actual usage

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund[6] that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.[7]

The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.[9] analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.[8] also reported a low average number of ratings per physician.

Intention to use

The result that shows that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature[16,19,20] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.[12] As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patient sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).[10] Both results differ from the findings from the US, where women and younger adults are more active 'online health information seekers'.[11]

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.[19] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues[16] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[19] that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan[19], for instance, reports that patients would seek health information before a consultation 'to manage their own healthcare independently'. These may be the type of people who are 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[21]

Moreover, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

General discussion

Overall, our evidence on the determinants of both awareness and intention to use is broadly consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues[22] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[23]

Our findings that online information can be used not only as "substitute" but also, and perhaps mainly, as "complementary" to several dimensions of the doctor-patient relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.[24,25]

The "complementarity" findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.[8,9,26] Taken together, this evidence can be seen as providing little support to the

related concern that the likeliest to use online ratings and enter actual comments may be the most disgruntled patients.[27]

On a related topic, concerns have been expressed about the ability of online ratings to truly reflect the quality of care. A recent UK study, however, demonstrated a strong relationship between the ratings reported online and more objective measures of clinical quality such as mortality and infection rates,[28] while another study showed that online ratings were associated with ratings derived from a traditional paper-based survey.[29] Online ratings, thus, do not seem to provide systematically biased or misleading information regarding the health care that patients receive, at least not more than a traditional survey would do. Consistently with this evidence, our results seem to support the idea that patients may see online ratings as a supplementary information base to be used in support of direct interaction with their doctor, which remains the most significant and reliable information channel.[30]

More generally, the evidence provided by our study confirms that the actual usage of doctor-rating websites in the UK remains particularly low. In our sample only 29 respondents out of 200 were aware of the existence of the patient rating websites. Among these, however, only 6 subjects reported they were actually using those websites.

While these figures are substantially in line with previous evidence brought forward from the literature,[6,7] considered together these results may pose serious concerns on the reasons and consequences of the lack of patient awareness and usage.

Previous studies in the US have reported a number of reasons behind this slow uptake, including i) the preference for more traditional information channels, such as recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact that people do not recognise that the quality of care may vary.[25]

Our study confirms that not only awareness of rating websites is still limited among the general public in the UK, but awareness per se does not seem a sufficient condition to guarantee active usage. This poses a double challenge from a clinician and health policy perspective.

In fact, on the one hand, the documented correlation between online ratings and other measures of healthcare quality, including survey-based ratings and clinical quality indicators,[28,29] necessarily requires that patients have already gone through two preliminary hurdles, namely i) being aware of, and ii) being active users of the doctor rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality, the effective removal of this double hurdle is likely to become the next priority to guarantee the full spread of online rating website.

On the other hand, while appropriate online and offline informational campaigns are likely to overcome the first hurdle, thus effectively raising patients' awareness of online ratings as a potential source of information on provider quality, informational campaigns alone can fail to effectively trigger changes in behaviour. Alike in several other health contexts, in fact, 'nudging' behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought

forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings,[25,31-34] and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome this last hurdle and actively engage with online ratings.

Limitations of the study

While dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. In a sample of the general public from a borough of London only 29 respondents out of 200 were aware of the existence of the patient rating websites, and only 6 reported to be actually using those websites.

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study also explicitly explores the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

Among other results, the statistical analysis provides evidence that the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[8,25,26, 31-34] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a challenging opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population. Indeed, our findings suggest that subjects of non-white background and with lower income are more willing to use online ratings.

Finally, our study highlights that subjects who use doctor rating websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non-white British, medium-low income patients who are not satisfied with their choice of healthcare treatments. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback online.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix ~~1~~

Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (*Awareness*) (0=no, 1=yes)	200	0.142	0.350
Intention to use (*IntentionToUse*)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (*HC_Waiting*)	198	3.818	1.165
Rates of hospital-acquired complications (*HC_HospComp*)	188	3.761	1.193
Clinical performance (*HC_Clinical_Performance*)	189	4.037	1.136
Closeness to home (*HC_CloseHome*)	200	3.683	1.265
Familiarity with the doctor (*HC_Familiarity*)	194	3.237	1.306
Financial performance of the hospital (*HC_FinPerform*)	191	2.387	1.164
Reputation of the doctor (*HC_GP_Reputation*)	199	3.980	1.137
Accessibility and parking facilities (*HC_Access*)	192	2.656	1.321
Past experience with the provider (*HC_PastExp*)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (*SI_GP_Advice*)	198	4.071	1.030
Published hospital statistics (*SI_HospStat*)	183	2.934	1.193
Online doctor rating websites (*SI_DoctorRating*)	178	2.315	1.204
Personal experiences in the past (*SI_PastExp*)	192	4.234	1.004
Feedback from family/friends (*SI_Family*)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (*DOC_Listens*)	200	0.575	0.496
...has time (0=no, 1=yes) (*DOC_Time*)	200	0.410	0.493
...explains (0=no, 1=yes) (*DOC_Explains*)	200	0.555	0.498
...is friendly (0=no, 1=yes) (*DOC_Friend*)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (*DOC_Trust*)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (*Reliable*)	141	2.759	1.055
How actively do you participate with your GP in making decisions (*Participation*)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (*SAT_C_GP*)	173	3.451	1.138
...hospital (*SAT_C_Hosp*)	152	3.493	1.055
...doctor (*SAT_C_Doc*)	139	3.252	1.022
...treatment (*SAT_C_Treatment*)	148	3.554	0.928
...time spent (*SAT_C_Time*)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) (*WhiteBritish*)	200	0.488	0.501
White Other (0=no, 1=yes) (*WhiteNonBritish*)	200	0.222	0.417
Highest level of educational attainment* (*Education*)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (*Age*)	199	39.572	16.083
Gender (*Gender*)			
Female (=1)	112		
Male (=0)	88		
Income (*Income*)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (*AgeMatch*)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (*GenderMatch*)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		DOC_Friend	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	DOC_Trust	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	Participation	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	SAT_C_GP	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	SAT_C_Hosp	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	SAT_C_Doc	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	SAT_C_Treatment	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	SAT_C_Time	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	CB_AWARE	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	CB_Use	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	WEB_Access	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	AgeMatch	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	GenderMatch	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	WhiteBritish	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	WhiteNonBritish	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	Income	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	Education	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	Gender	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	Age	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in paretheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

-Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to usef doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		
Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			

DOC_Trust		0.153	0.608	0.460			
		(0.327)	(0.983)	(0.629)			
WEB_Access		1.122	0.558	0.483			
		(4.345)	(1.763)	(0.918)			
HC_Waiting		0.960	1.097				
		(0.806)	(0.846)				
HC_HospComp		1.200	0.790				
		(0.929)	(0.540)				
HC_CloseHome		0.930	0.790				
		(0.726)	(0.516)				
HC_FinPerform		0.610	0.692				
		(0.621)	(0.588)				
SAT_C_Time		1.449	1.530				
		(1.441)	(1.280)				
WhiteNonBritish		0.742	0.493				
		(1.790)	(1.041)				
CB_AWARE		1.422					
		(3.158)					
CB_Use		83.93					
		(354.7)					
_cut1		9454769.9***	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
		(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2		7.05660e+09***	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
		(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School

We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

☐ Yes ☐ No **(if No, skip ahead to Section C)**

☐ Other (please specify).....

Q2. How did you find out about these sites?

☐ Family/Friends ☐ Doctor

☐ The Media ☐ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes ☐ No ☐ **(if No, skip ahead to Section C)**

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis ☐ Only before/after an appointment ☐ Rarely ☐

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes ☐ No ☐

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information ☐ Negative information ☐

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5

None of these ☐

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure ☐

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

☐ Not likely ☐ Quite likely ☐ Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

- ☐ Every time
- ☐ After particularly positive experiences only
- ☐ After particularly negative experiences only
- ☐ After both positive and negative experiences
- ☐ Never
- ☐ Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

- ☐ I would not contribute to these websites
- ☐ To inform other patients
- ☐ To improve standards of care in the NHS
- ☐ As a method of complaint
- ☐ In appreciation of a doctor's service
- ☐ Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

- ☐ I feel my doctor listens to my problems
- ☐ I feel my doctor spends enough time with me in each consultation
- ☐ I feel my doctor explains things clearly
- ☐ I feel my doctor is sociable and friendly

☐ I feel that I can trust my doctor's opinions
☐ None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

☐ I always request to see the same GP
☐ I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure ☐
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure ☐
Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure ☐
Choice of treatment	1	2	3	4	5	Not sure ☐
Choice of appointment time (for primary & secondary care)	1	2	3	4	5	Not sure ☐

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure ☐
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure ☐

Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure ☐
Choice of treatment	1	2	3	4	5	Not sure ☐
Choice of appointment time (for primary & secondary care)	1	2	3	4	5	Not sure ☐

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

☐ Yes ☐ No

Q21. Have you used this Choose and Book system in the past?

☐ Yes ☐ No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

☐ I have never used Choose & Book
☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

☐ Routine outpatient consultation
☐ Day-case procedure/surgery
☐ Major surgery
☐ None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

☐ Yes ☐ No

Q25. Have you used the internet in the past to search for health information?

☐ Yes ☐ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

- ☐ I'm too busy to have the time to use them
- ☐ The sites are not a reliable source of information
- ☐ It is difficult to interpret the information provided
- ☐ I already have enough information from other sources to make choices
- ☐ I don't have access to the internet
- ☐ I did not know these websites existed
- ☐ I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

- ☐ Shopping websites (e.g. Amazon)
- ☐ Holiday websites (e.g. TripAdvisor)
- ☐ Car insurance websites (e.g. Compare The Market)
- ☐ Restaurants/venue websites (e.g. ViewLondon)
- ☐ Film websites (e.g. Rottentomatoes)
- ☐ Other (please specify).....
- ☐ I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- ☐ Star-rating out of 5
- ☐ Percentage scores
- ☐ Thumbs Up/Down
- ☐ Written comments from patients/users
- ☐ No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age? .....

Q30. What is your gender?

☐ Male ☐ Female

Q31. How would you describe your ethnicity?

☐	White – British	☐	Other Asian – non-Chinese
☐	White – Others	☐	Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. What is your postcode? .....

Q33. How many other individuals do you live with? .....

Q34. Do you live with your parents?

☐ Yes ☐ No

Q35. What is/was your profession? .....

☐ Unemployed ☐ Retired

Q36. What is your level of pre-tax income?

☐ 0

☐ <£15000 but >0 ☐ £15,000-£35,000

☐ £35,000-55,000 ☐ £55,000-£75,000

☐ £75,000-£95,000 ☐ >£95,000

Q37. What is your highest level of educational attainment?

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

☐ 0 times ☐ 1-3 times
☐ 4-5 times ☐ More than 5 times

Q39. What is the sex of your GP?

☐ Male ☐ Female

Q40. How old is your GP?

☐ <30 years
☐ 30-50 years
☐ >50 years

Q41. What is the ethnicity of your GP?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP. ☐

This is the end of the questionnaire, thank you for your time.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	8
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Who is More Likely to Use Doctor-Rating Websites, and Why?
A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stavropoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

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Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining intention to use the websites: the GP-patient gender concordance is associated with higher intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on doctor-ranking websites, though, are unlikely to be representative of the overall patients'

pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher intention to use, the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

In recent years, both the NHS Plan[1] and the NHS Improvement Plan[2], set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.[3] Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"[4] acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence,* have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund[5] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.[6] These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.[7,8] Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[9] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[10]

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among the general public in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed to have a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Sample

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week (including weekends). By covering different times and locations within the borough, we aimed at being able to approach both working and non-working members of the public.

During the surveys in the field, the interviewers approached every third male and third female that would pass by them.

Sample size calculations were based on the intended objective to look at the correlation coefficient between the likelihood of using the websites on the one hand, and a typical survey response, on the other. The minimum sample size to test the null hypothesis of no significant correlation between these two variables was calculated given the most conservative assumption that the correlation coefficient between the variables in the population was in the region of 0.2 (a "low" effect size, the variance of one variables accounting for just 4% of the variance of the other). Under the assumptions that all variables are normally distributed, a bi-directional test (both positive and negative correlation were expected) with 95% significance level reaches a standard 80% power level at a minimum sample of n=200 subjects.[11] We thus targeted a sample size of 200 respondents. The envisaged target was then readily achieved, since only 68 subjects who were initially approached refused to take part to the survey, with a final response rate of 74%.

Statistical analysis

We have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in

fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects. As a result of the convenience sampling, our resulting sample consisted in 141 workers (ten of which reported to be currently unemployed), 33 students, nine officially unemployed and six retired subjects. Eleven respondents did not report their working status.

The mean age of our sample was of 39.57. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.[10] From the sample, 54.44% were female, 48.79% of 'White British' ethnicity and 28.99% non white respondents.

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.[12]

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree.

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about.

In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who

see accessibility and financial performances of hospitals important factors in making decisions where to seek healthcare.

[**Table 2 in here**]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[**Table 3 in here**]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings.

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio.
Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

From those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent

outcomes, we have thus focused the rest of the analysis on the determinants of the intention to use, rather than actual usage of, doctor rating websites.

Results on the likelihood to use online rating websites

In Table 2 we present the set of bivariate correlations between the intention to use the doctor rating websites and each of the variables collected in the survey. As it can be noticed, there is a positive correlation between having internet access, and being aware of the doctor rating websites. Both the age and the gender concordance with the GP show a positive correlation with the intention to use. Positive correlations with the willingness to use doctor rating websites also hold for respondents who think that those websites, or hospital statistics, are important sources of information. Also the fact that respondents believe that online rating is a reliable measure is clearly correlated with the intention to use them. Finally, positive correlations also hold for respondents who feel that their doctor has time to dedicate to them, or who see several aspects of healthcare providers - such as reputation, clinical and financial performances, waiting lists, accessibility – as important factors when making decisions where to seek healthcare.

In Table 4 we present the estimate results of six different specifications of the ordered logistic regression for the dependent variable *IntentionToUse* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 4 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. Moreover, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from the authors upon request).

Looking at the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are consistent with the nature of the information provided in these websites. Also, and quite intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, and interestingly, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their

GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the representativeness of our sample; ii) the level of awareness and usage of doctor rating websites; and iii) the determinants of the intention to use them in the future.

The sample

As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.

Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed compared to only 5% from the Census data for the borough.

The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[13] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).[13]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[13] This is also significantly lower than figures for England, White British accounting for 87% of the population.[13] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white

ethnic groups accounting for 9% of the total population.[13] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[13]

Awareness and actual usage

Only 15% of our sample were aware of the existence of these websites, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[5]

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).[14]

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund[5] that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.[6]

The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.[8] analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.[7] also reported a low average number of ratings per physician.

Intention to use

The results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature[12,15,16] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.[17] As the estimated

effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patient sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).[9] Both results differ from the findings from the literature. The literature has shown that socio-demographic characteristics are major determinants of usage of online health information. In particular women and younger adults are more active 'online health information seekers'.[10,18-21]

Education has also been found to determine usage of online and offline health information. Cotton and Gupta[16] and Diaz et al,[12] carried out research into the characteristics of online and offline health information seekers and showed that individuals who are less educated were shown to less likely to be users of online health information.

Therefore even though, according to our findings, intentions to use do not differ across different socio demographic groups, actual usage may be greatly determined by access rather than intentions to use, with the former substantially differing according to socio-economic and demographic characteristics. That is, there may exist income- or age-related barriers to actual access that prevent individuals from using doctor rating sites even though their intentions to use them are similar.

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.[15] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[22] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of and the intention to use the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Nevertheless for those that put a higher weight on financial or clinical performance ratings this is less the case, perhaps signalling that those respondents may be more familiar with alternative sources of information.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues[12] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[15] that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan[15], for instance, reports that patients would seek health information before a consultation 'to manage their own healthcare independently'. These may be the type of people who are 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[23]

Moreover, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

General discussion

Overall, our evidence on the determinants of intention to use is broadly consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues[24] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[25]

Our findings that online information can be used not only as "substitute" but also, and perhaps mainly, as "complementary" to several dimensions of the doctor-patient

relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.[26,27]

The "complementarity" findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.[7,8,28] Taken together, this evidence can be seen as providing little support to the related concern that the likeliest to use online ratings and enter actual comments may be the most disgruntled patients.[29]

On a related topic, concerns have been expressed about the ability of online ratings to truly reflect the quality of care. A recent UK study, however, demonstrated a strong relationship between the ratings reported online and more objective measures of clinical quality such as mortality and infection rates,[30] while another study showed that online ratings were associated with ratings derived from a traditional paper-based survey.[31] Online ratings, thus, do not seem to provide systematically biased or misleading information regarding the health care that patients receive, at least not more than a traditional survey would do. Consistently with this evidence, our results seem to support the idea that patients may see online ratings as a supplementary information base to be used in support of direct interaction with their doctor, which remains the most significant and reliable information channel.[32]

More generally, the evidence provided by our study confirms that the actual usage of doctor-rating websites in the UK remains particularly low. In our sample only 29 respondents out of 200 were aware of the existence of the patient rating websites. Among these, however, only 6 subjects reported they were actually using those websites.

These figures are substantially in line with previous evidence brought forward from the literature for the UK. [5,6] The fact that even in the US, a more market-oriented health system, the use of similar sites is not much higher may suggest that the slow uptake in the UK cannot be attributed only to the early stage of the "choice" model. Considered together these results may pose serious concerns on the reasons and consequences of the lack of patient awareness and usage of online health related information.
Previous studies in the US have reported a number of reasons behind this slow uptake, including i) the preference for more traditional information channels, such as recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact that people do not recognise that the quality of care may vary.[27]
Our study confirms that not only awareness of rating websites is still limited among the general public in the UK, but awareness and willingness to use per se do not seem a sufficient condition to guarantee active usage. This poses a double challenge from a clinician and health policy perspective.

In fact, on the one hand, the documented correlation between online ratings and other measures of healthcare quality, including survey-based ratings and clinical quality indicators,[30,31] necessarily requires that patients have already gone through three preliminary hurdles, namely i) being aware of, ii) having effective access to, and ii) being active users of the doctor rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality, the effective removal of this double hurdle is likely to become the next priority to guarantee the full spread of online rating website.

On the other hand, while appropriate online and offline informational campaigns are likely to overcome the first hurdle, thus effectively raising patients' awareness of online ratings as a potential source of information on provider quality, informational campaigns alone can fail to grant effective access and effectively trigger changes in behaviour. Alike in several other health contexts, in fact, 'nudging' behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings[27,33-36] and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome this last hurdle and actively engage with online ratings.

Limitations of the study

The convenience field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public

However, while dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. In a sample of the general public from a borough of London only 29 respondents out of 200 were aware of the existence of the patient rating websites, and only 6 reported to be actually using those websites.

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare

quality, patient choice, and doctor-patient relationship, the study also explicitly explores the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

Among other results, the statistical analysis provides evidence that the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[7,27,28,33-36] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a challenging opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population. Indeed, our findings suggest that subjects of non-white background and with lower income are more willing to use online ratings.

Finally, our study highlights that subjects who use doctor rating websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non-white British, medium-low income patients who are not satisfied with their choice of healthcare treatments. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback online.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (*Awareness*) **(0=no, 1=yes)**	200	0.142	0.350
Intention to use (*IntentionToUse*)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (*HC_Waiting*)	198	3.818	1.165
Rates of hospital-acquired complications (*HC_HospComp*)	188	3.761	1.193
Clinical performance (*HC_Clinical_Performance*)	189	4.037	1.136
Closeness to home (*HC_CloseHome*)	200	3.683	1.265
Familiarity with the doctor (*HC_Familiarity*)	194	3.237	1.306
Financial performance of the hospital (*HC_FinPerform*)	191	2.387	1.164
Reputation of the doctor (*HC_GP_Reputation*)	199	3.980	1.137
Accessibility and parking facilities (*HC_Access*)	192	2.656	1.321
Past experience with the provider (*HC_PastExp*)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (*SI_GP_Advice*)	198	4.071	1.030
Published hospital statistics (*SI_HospStat*)	183	2.934	1.193
Online doctor rating websites (*SI_DoctorRating*)	178	2.315	1.204
Personal experiences in the past (*SI_PastExp*)	192	4.234	1.004
Feedback from family/friends (*SI_Family*)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (*DOC_Listens*)	200	0.575	0.496
...has time (0=no, 1=yes) (*DOC_Time*)	200	0.410	0.493
...explains (0=no, 1=yes) (*DOC_Explains*)	200	0.555	0.498
...is friendly (0=no, 1=yes) (*DOC_Friend*)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (*DOC_Trust*)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (*Reliable*)	141	2.759	1.055
How actively do you participate with your GP in making decisions (*Participation*)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (*SAT_C_GP*)	173	3.451	1.138
...hospital (*SAT_C_Hosp*)	152	3.493	1.055
...doctor (*SAT_C_Doc*)	139	3.252	1.022
...treatment (*SAT_C_Treatment*)	148	3.554	0.928
...time spent (*SAT_C_Time*)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) *(WhiteBritish)*	200	0.488	0.501
White Other (0=no, 1=yes) (*WhiteNonBritish*)	200	0.222	0.417
Highest level of educational attainment* (*Education*)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (*Age*)	199	39.572	16.083
Gender (*Gender*)			
Female (=1)	112		
Male (=0)	88		
Income (*Income*)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (*AgeMatch*)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (*GenderMatch*)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		**DOC_Friend**	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	**DOC_Trust**	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	**Participation**	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	**SAT_C_GP**	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	**SAT_C_Hosp**	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	**SAT_C_Doc**	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	**SAT_C_Treatment**	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	**SAT_C_Time**	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	**CB_AWARE**	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	**CB_Use**	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	**WEB_Access**	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	**AgeMatch**	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	**GenderMatch**	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	**WhiteBritish**	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	**WhiteNonBritish**	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	**Income**	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	**Education**	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	**Gender**	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	**Age**	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in paretheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to usef doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		
Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09***	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School

We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

☐ Yes No ☐ **(if No, skip ahead to Section C)**

☐ Other (please specify).....

Q2. How did you find out about these sites?

☐ Family/Friends ☐ Doctor

☐ The Media ☐ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes ☐ No ☐ **(if No, skip ahead to Section C)**

Q4. What specialty of doctor have you searched for in the past in these websites?

……..

Q5. When do you use these websites?

On a regular basis ☐ Only before/after an appointment ☐ Rarely ☐

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes ☐ No ☐

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information ☐ Negative information ☐

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these ☐					

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure ☐

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

☐ Not likely ☐ Quite likely ☐ Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

☐ Every time
☐ After particularly positive experiences only
☐ After particularly negative experiences only
☐ After both positive and negative experiences
☐ Never
☐ Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

☐ I would not contribute to these websites
☐ To inform other patients
☐ To improve standards of care in the NHS
☐ As a method of complaint
☐ In appreciation of a doctor's service
☐ Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

☐ I feel my doctor listens to my problems
☐ I feel my doctor spends enough time with me in each consultation
☐ I feel my doctor explains things clearly
☐ I feel my doctor is sociable and friendly

☐ I feel that I can trust my doctor's opinions
☐ None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

☐ I always request to see the same GP
☐ I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure ☐
Choice of treatment	1	2	3	4	5	Not sure ☐
Choice of appointment time (for primary & secondary care)	1	2	3	4	5	Not sure ☐

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

☐ Yes ☐ No

Q21. Have you used this Choose and Book system in the past?

☐ Yes ☐ No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

☐ I have never used Choose & Book
☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

☐ Routine outpatient consultation
☐ Day-case procedure/surgery
☐ Major surgery
☐ None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

☐ Yes ☐ No

Q25. Have you used the internet in the past to search for health information?

☐ Yes ☐ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

☐ I'm too busy to have the time to use them
☐ The sites are not a reliable source of information
☐ It is difficult to interpret the information provided
☐ I already have enough information from other sources to make choices
☐ I don't have access to the internet
☐ I did not know these websites existed
☐ I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

☐ Shopping websites (e.g. Amazon)
☐ Holiday websites (e.g. TripAdvisor)
☐ Car insurance websites (e.g. Compare The Market)
☐ Restaurants/venue websites (e.g. ViewLondon)
☐ Film websites (e.g. Rottentomatoes)
☐ Other (please specify).....
☐ I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

☐ Star-rating out of 5
☐ Percentage scores
☐ Thumbs Up/Down
☐ Written comments from patients/users
☐ No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age? .....

Q30. What is your gender?

☐ Male ☐ Female

Q31. How would you describe your ethnicity?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. **What is your postcode?** .....

Q33. **How many other individuals do you live with?** .....

Q34. **Do you live with your parents?**

☐ Yes ☐ No

Q35. **What is/was your profession?** .....

☐ Unemployed ☐ Retired

Q36. **What is your level of pre-tax income?**

☐ 0

☐ <£15000 but >0 ☐ £15,000-£35,000

☐ £35,000-55,000 ☐ £55,000-£75,000

☐ £75,000-£95,000 ☐ >£95,000

Q37. **What is your highest level of educational attainment?**

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. **In the last year how many times have you had an outpatient hospital appointment?**

☐ 0 times ☐ 1-3 times
☐ 4-5 times ☐ More than 5 times

Q39. **What is the sex of your GP?**

☐ Male ☐ Female

Q40. **How old is your GP?**

☐ <30 years
☐ 30-50 years
☐ >50 years

Q41. **What is the ethnicity of your GP?**

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP. ☐

This is the end of the questionnaire, thank you for your time.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stavropoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

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Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people ~~aware of, and~~ willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' ~~awareness of, and~~ intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's ~~awareness of and~~ willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people ~~aware of, and~~ willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining ~~awareness of and~~ intention to use the websites: the GP-patient gender concordance is associated with higher ~~awareness of, and~~ intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on

doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher ~~awareness of, and~~ intention to use, the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

In recent years, both the NHS Plan[1] and the NHS Improvement Plan[2], set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.[3] Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"[4] acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence,* have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund[5] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.[6] These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.[7,8] Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[9] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[10]

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among the general public in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

~~The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the~~

~~main goal of the study, whether the users of doctor rating websites are fairly representative of the general public.~~

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed to have a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Sample

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several

major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week (including weekends). By covering different times and locations within the borough, we aimed at being able to approach both working and non-working members of the public. During the surveys in the field, the interviewers approached every third male and third female that would pass by them.

Sample size calculations were based on the intended objective to look at the correlation coefficient between the likelihood of using the websites on the one hand, and a typical survey response, on the other. The minimum sample size to test the null hypothesis of no significant correlation between these two variables was calculated given the most conservative assumption that the correlation coefficient between the variables in the population was in the region of 0.2 (a "low" effect size, the variance of one variables accounting for just 4% of the variance of the other). Under the assumptions that all variables are normally distributed, a bi-directional test (both positive and negative correlation were expected) with 95% significance level reaches a standard 80% power level at a minimum sample of n=200 subjects.[11] We thus targeted a sample size of 200 respondents. The envisaged target was then readily achieved, since only 68 subjects who were initially approached refused to take part to the survey, with a final response rate of 74%.

Statistical analysis

We have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of ~~of~~ doctor rating websites; and ii) ~~of~~ the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details).

The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects. As a result of the convenience sampling, our resulting sample consisted in 141 workers (ten of which reported to be currently unemployed), 33 students, nine officially unemployed and six retired subjects. Eleven respondents did not report their working status.

~~As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.~~

~~Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed, compared to only 5% from the Census data for the borough. The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.~~

~~Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[15] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).[15] Age is an important demographic to~~

~~consider when analysing our results as age has been shown to be important in internet usage.[11]~~

The mean age of our sample was of 39.57. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.[10] From the sample, 54.44% were female, 48.79% of 'White British' ethnicity and 28.99% non white respondents.

~~Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[15] This is also significantly lower than figures for England, White British accounting for 87% of the population.[15] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.[15] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.~~

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.[12~~16~~]

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. ~~This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[15]~~

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. ~~This corresponds to less than 15% of our sample, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[6]~~

In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who see accessibility and financial performances of hospitals important factors in making decisions where to seek healthcare.

[Table 2 in here]

~~A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital~~

~~Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).~~[17]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[**Table 3 in here**]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings.~~, perhaps signalling that those respondents may be more familiar with alternative sources of information.~~

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio. ~~This may signal the possible existence of 'complementary' effects between the two sources of information, according to which individuals who give importance to hospital statistics are also more likely to actively seek for doctor rating websites.~~

Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

From those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent

outcomes, we have thus focused the rest of the analysis on the determinants of the intention to use, rather than actual usage of, doctor rating websites.

Results on the likelihood to use online rating websites

In Table 2 we present the set of bivariate correlations between the intention to use the doctor rating websites and each of the variables collected in the survey. As it can be noticed, there is a positive correlation between having internet access, and being aware of the doctor rating websites. Both the age and the gender concordance with the GP show a positive correlation with the intention to use. Positive correlations with the willingness to use doctor rating websites also hold for respondents who think that those websites, or hospital statistics, are important sources of information. Also the fact that respondents believe that online rating is a reliable measure is clearly correlated with the intention to use them. Finally, positive correlations also hold for respondents who feel that their doctor has time to dedicate to them, or who see several aspects of healthcare providers - such as reputation, clinical and financial performances, waiting lists, accessibility – as important factors when making decisions where to seek healthcare.

In Table 4 we present the estimate results of six different specifications of the ordered logistic regression for the dependent variable *IntentionToUse* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 4 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. Moreover, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from the authors upon request).

Looking at the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are consistent with the nature of the information provided in these websites. Also, and quite intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, and interestingly, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their

GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the representativeness of our sample; ii) ~~the determinants of~~ the level of awareness and usage of doctor rating websites; ~~iii) the actual usage of the websites;~~ and iii~~v~~) the determinants of the intention to use them in the future.

The sample

As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.

Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed compared to only 5% from the Census data for the borough.

The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[13] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).[13]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[13] This is also significantly lower than figures for England, White British accounting for 87% of the population.[13] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham

which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.[13] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[13]

Awareness and actual usage

Only 15% of our sample were aware of the existence of these websites, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[5]

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).[14]

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund[5] that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.[6]

The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.[8] analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.[7] also reported a low average number of ratings per physician.

Intention to use

The results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature[12,15,16] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study

among different socio-economic groups in the US by Brodie et al.[17] As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patient sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).[9] Both results differ from the findings from the literature. The literature has shown that socio-demographic characteristics are major determinants of usage of online health information. In particular women and younger adults are more active 'online health information seekers'.[10,18-21]

Education has also been found to determine usage of online and offline health information. Cotton and Gupta[16] and Diaz et al,[12] carried out research into the characteristics of online and offline health information seekers and showed that individuals who are less educated were shown to less likely to be users of online health information.

Therefore even though, according to our findings, intentions to use do not differ across different socio demographic groups, actual usage may be greatly determined by access rather than intentions to use, with the former substantially differing according to socio-economic and demographic characteristics. That is, there may exist income- or age-related barriers to actual access that prevent individuals from using doctor rating sites even though their intentions to use them are similar.

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.[15] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[22] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of and the intention to use the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Nevertheless for those that put a higher weight on financial or clinical performance ratings this is less the case, perhaps signalling that those respondents may be more familiar with alternative sources of information.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues[12] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[15] that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan[15], for instance, reports that patients would seek health information before a consultation 'to manage their own healthcare independently'. These may be the type of people who are 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[23]

Moreover, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

General discussion

Overall, our evidence on the determinants of intention to use is broadly consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues[24] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[25]

Our findings that online information can be used not only as "substitute" but also, and perhaps mainly, as "complementary" to several dimensions of the doctor-patient relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.[26,27]

The "complementarity" findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.[7,8,28] Taken together, this evidence can be seen as providing little support to the related concern that the likeliest to use online ratings and enter actual comments may be the most disgruntled patients.[29]

On a related topic, concerns have been expressed about the ability of online ratings to truly reflect the quality of care. A recent UK study, however, demonstrated a strong relationship between the ratings reported online and more objective measures of clinical quality such as mortality and infection rates,[30] while another study showed that online ratings were associated with ratings derived from a traditional paper-based survey.[31] Online ratings, thus, do not seem to provide systematically biased or misleading information regarding the health care that patients receive, at least not more than a traditional survey would do. Consistently with this evidence, our results seem to support the idea that patients may see online ratings as a supplementary information base to be used in support of direct interaction with their doctor, which remains the most significant and reliable information channel.[32]

More generally, the evidence provided by our study confirms that the actual usage of doctor-rating websites in the UK remains particularly low. In our sample only 29 respondents out of 200 were aware of the existence of the patient rating websites. Among these, however, only 6 subjects reported they were actually using those websites.

These figures are substantially in line with previous evidence brought forward from the literature for the UK. [5,6] The fact that even in the US, a more market-oriented health system, the use of similar sites is not much higher may suggest that the slow uptake in the UK cannot be attributed only to the early stage of the "choice" model. Considered together these results may pose serious concerns on the reasons and consequences of the lack of patient awareness and usage of online health related information.

Previous studies in the US have reported a number of reasons behind this slow uptake, including i) the preference for more traditional information channels, such as recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact that people do not recognise that the quality of care may vary.[27]

Our study confirms that not only awareness of rating websites is still limited among the general public in the UK, but awareness and willingness to use per se do not seem a sufficient condition to guarantee active usage. This poses a double challenge from a clinician and health policy perspective.

In fact, on the one hand, the documented correlation between online ratings and other measures of healthcare quality, including survey-based ratings and clinical quality indicators,[30,31] necessarily requires that patients have already gone through three

preliminary hurdles, namely i) being aware of, ii) having effective access to, and ii) being active users of the doctor rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality, the effective removal of this double hurdle is likely to become the next priority to guarantee the full spread of online rating website.

On the other hand, while appropriate online and offline informational campaigns are likely to overcome the first hurdle, thus effectively raising patients' awareness of online ratings as a potential source of information on provider quality, informational campaigns alone can fail to grant effective access and effectively trigger changes in behaviour. Alike in several other health contexts, in fact, 'nudging' behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings[27,33-36] and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome this last hurdle and actively engage with online ratings.

Limitations of the study

The convenience field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public

However, ~~W~~while dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. In a sample of the general public from a borough of London only 29 respondents out of 200 were aware of the

existence of the patient rating websites, and only 6 reported to be actually using those websites.

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study also explicitly explores the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

Among other results, the statistical analysis provides evidence that the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[7,27,28,33-36] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a challenging opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population. Indeed, our findings suggest that subjects of non-white background and with lower income are more willing to use online ratings.

Finally, our study highlights that subjects who use doctor rating websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non-white British, medium-low income patients who are not satisfied with their choice of healthcare treatments. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health

information on the Internet, and the representativeness of the users who seek and provide feedback online.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (*Awareness*) (0=no, 1=yes)	200	0.142	0.350
Intention to use (*IntentionToUse*)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (*HC_Waiting*)	198	3.818	1.165
Rates of hospital-acquired complications (*HC_HospComp*)	188	3.761	1.193
Clinical performance (*HC_Clinical_Performance*)	189	4.037	1.136
Closeness to home (*HC_CloseHome*)	200	3.683	1.265
Familiarity with the doctor (*HC_Familiarity*)	194	3.237	1.306
Financial performance of the hospital (*HC_FinPerform*)	191	2.387	1.164
Reputation of the doctor (*HC_GP_Reputation*)	199	3.980	1.137
Accessibility and parking facilities (*HC_Access*)	192	2.656	1.321
Past experience with the provider (*HC_PastExp*)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (*SI_GP_Advice*)	198	4.071	1.030
Published hospital statistics (*SI_HospStat*)	183	2.934	1.193
Online doctor rating websites (*SI_DoctorRating*)	178	2.315	1.204
Personal experiences in the past (*SI_PastExp*)	192	4.234	1.004
Feedback from family/friends (*SI_Family*)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (*DOC_Listens*)	200	0.575	0.496
...has time (0=no, 1=yes) (*DOC_Time*)	200	0.410	0.493
...explains (0=no, 1=yes) (*DOC_Explains*)	200	0.555	0.498
...is friendly (0=no, 1=yes) (*DOC_Friend*)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (*DOC_Trust*)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (*Reliable*)	141	2.759	1.055
How actively do you participate with your GP in making decisions (*Participation*)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (*SAT_C_GP*)	173	3.451	1.138
...hospital (*SAT_C_Hosp*)	152	3.493	1.055
...doctor (*SAT_C_Doc*)	139	3.252	1.022
...treatment (*SAT_C_Treatment*)	148	3.554	0.928
...time spent (*SAT_C_Time*)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) *(WhiteBritish*)	200	0.488	0.501
White Other (0=no, 1=yes) (*WhiteNonBritish*)	200	0.222	0.417
Highest level of educational attainment* (*Education*)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (*Age*)	199	39.572	16.083
Gender (*Gender*)			
Female (=1)	112		
Male (=0)	88		
Income (*Income*)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (*AgeMatch*)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (*GenderMatch*)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		**DOC_Friend**	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	**DOC_Trust**	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	**Participation**	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	**SAT_C_GP**	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	**SAT_C_Hosp**	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	**SAT_C_Doc**	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	**SAT_C_Treatment**	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	**SAT_C_Time**	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	**CB_AWARE**	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	**CB_Use**	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	**WEB_Access**	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	**AgeMatch**	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	**GenderMatch**	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	**WhiteBritish**	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	**WhiteNonBritish**	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	**Income**	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	**Education**	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	**Gender**	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	**Age**	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in paretheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to usef doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		
Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09***	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School

We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

☐ Yes No ☐ **(if No, skip ahead to Section C)**

☐ Other (please specify).....

Q2. How did you find out about these sites?

☐ Family/Friends ☐ Doctor

☐ The Media ☐ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes ☐ No ☐ **(if No, skip ahead to Section C)**

Q4. What specialty of doctor have you searched for in the past in these websites?

……..

Q5. When do you use these websites?

On a regular basis ☐ Only before/after an appointment ☐ Rarely ☐

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes ☐ No ☐

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information ☐ Negative information ☐

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	**1**	**2**	**3**	**4**	**5**
Rates of hospital-acquired complications	**1**	**2**	**3**	**4**	**5**
Clinical performance rating	**1**	**2**	**3**	**4**	**5**
Closeness to home	**1**	**2**	**3**	**4**	**5**
Familiarity with the doctor	**1**	**2**	**3**	**4**	**5**
Financial performance of the hospital	**1**	**2**	**3**	**4**	**5**
Reputation of the doctor	**1**	**2**	**3**	**4**	**5**
Accessibility and parking facilities	**1**	**2**	**3**	**4**	**5**
Past experience with the provider	**1**	**2**	**3**	**4**	**5**
None of these ☐					

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	**1**	**2**	**3**	**4**	**5**
Published hospital statistics	**1**	**2**	**3**	**4**	**5**
Online doctor rating website	**1**	**2**	**3**	**4**	**5**
Personal experiences in the past	**1**	**2**	**3**	**4**	**5**
Feedback from family/friends	**1**	**2**	**3**	**4**	**5**

Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure ☐

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

☐ Not likely ☐ Quite likely ☐ Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

☐ Every time
☐ After particularly positive experiences only
☐ After particularly negative experiences only
☐ After both positive and negative experiences
☐ Never
☐ Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

☐ I would not contribute to these websites
☐ To inform other patients
☐ To improve standards of care in the NHS
☐ As a method of complaint
☐ In appreciation of a doctor's service
☐ Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

☐ I feel my doctor listens to my problems
☐ I feel my doctor spends enough time with me in each consultation
☐ I feel my doctor explains things clearly
☐ I feel my doctor is sociable and friendly

☐ I feel that I can trust my doctor's opinions
☐ None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

☐ I always request to see the same GP
☐ I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure ☐

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure ☐

Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure ☐

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

☐ Yes ☐ No

Q21. Have you used this Choose and Book system in the past?

☐ Yes ☐ No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

☐ I have never used Choose & Book
☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

☐ Routine outpatient consultation
☐ Day-case procedure/surgery
☐ Major surgery
☐ None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

☐ Yes ☐ No

Q25. Have you used the internet in the past to search for health information?

☐ Yes ☐ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

☐ I'm too busy to have the time to use them
☐ The sites are not a reliable source of information
☐ It is difficult to interpret the information provided
☐ I already have enough information from other sources to make choices
☐ I don't have access to the internet
☐ I did not know these websites existed
☐ I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

☐ Shopping websites (e.g. Amazon)
☐ Holiday websites (e.g. TripAdvisor)
☐ Car insurance websites (e.g. Compare The Market)
☐ Restaurants/venue websites (e.g. ViewLondon)
☐ Film websites (e.g. Rottentomatoes)
☐ Other (please specify).....
☐ I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

☐ Star-rating out of 5
☐ Percentage scores
☐ Thumbs Up/Down
☐ Written comments from patients/users
☐ No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age? .....

Q30. What is your gender?

☐ Male ☐ Female

Q31. How would you describe your ethnicity?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. **What is your postcode?** .....

Q33. **How many other individuals do you live with?** .....

Q34. **Do you live with your parents?**

☐ Yes ☐ No

Q35. **What is/was your profession?** .....

☐ Unemployed ☐ Retired

Q36. **What is your level of pre-tax income?**

☐ 0

☐ <£15000 but >0 ☐ £15,000-£35,000

☐ £35,000-55,000 ☐ £55,000-£75,000

☐ £75,000-£95,000 ☐ >£95,000

Q37. **What is your highest level of educational attainment?**

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. **In the last year how many times have you had an outpatient hospital appointment?**

☐ 0 times ☐ 1-3 times
☐ 4-5 times ☐ More than 5 times

Q39. **What is the sex of your GP?**

☐ Male ☐ Female

Q40. **How old is your GP?**

☐ <30 years
☐ 30-50 years
☐ >50 years

Q41. **What is the ethnicity of your GP?**

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP. ☐

This is the end of the questionnaire, thank you for your time.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	8
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Who is More Likely to Use Doctor-Rating Websites, and Why?
A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stavropoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

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Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating websites and their usage among a sample of respondents from London.
- To understand the main predictors of what makes people willing to use doctor-ratings websites.

Key messages:

- The share of actual users of doctor-rating websites is quite low.
- Subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' intention to use doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent to which doctor-rating websites are known and used among a sample of respondents from London . To understand the main predictors of what makes people willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. White British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. Aspects of the doctor-patient relationship also play a key role in explaining intention to use the websites. The doctor has both a "complementary" and "substitute" role with respect to Internet information.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from non white British, medium-

low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of actual users of doctor-rating websites is quite low.
- Subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher intention to use the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

In recent years, both the NHS Plan[1] and the NHS Improvement Plan[2], set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.[3] Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"[4] acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence,* have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund[5] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.[6] These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.[7,8] Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[9] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[10]

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among ta sample of respondents in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed in a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

A list of variables with a brief description is discussed in the Statistical analysis section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Data Collection

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week

(including weekends). By covering different times and locations within the borough, we aimed at being able to approach both working and non-working members of the public. During the surveys in the field, the interviewers approached every third male and third female that would pass by them.

Sample size calculations were based on the intended objective to look at the correlation coefficient between the likelihood of using the websites on the one hand, and a typical survey response, on the other. The minimum sample size to test the null hypothesis of no significant correlation between these two variables was calculated given the most conservative assumption that the correlation coefficient between the variables in the population was in the region of 0.2 (a "low" effect size, the variance of one variables accounting for just 4% of the variance of the other). Under the assumptions that all variables are normally distributed, a bi-directional test (both positive and negative correlation were expected) with 95% significance level reaches a standard 80% power level at a minimum sample of n=200 subjects.[11] We thus targeted a sample size of 200 respondents. The envisaged target was then readily achieved, since only 68 subjects who were initially approached refused to take part to the survey, with a final response rate of 74%.

Statistical analysis

Besides a correlation analysis, we have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

The sample and descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects.

Our sample consisted of 200 subjects. Comparing it with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[12] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%).[12]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[12] This is also significantly lower than figures for England, White British accounting for 87% of the population.[12] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.[12] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

Regarding working status, 141 individuals were workers (ten of which reported to be currently unemployed), 33 students, 9 officially unemployed and 6 retired. Eleven respondents did not report their working status. The proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample. The majority of actively working respondents reported an income within the £15-35,000 bracket.

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification

of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[12]

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about and only 6 reported to have used them.
In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who see accessibility and financial performances of hospitals important factors in making decisions where to seek healthcare.

[**Table 2 in here**]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[**Table 3 in here**]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings.

Concerning the sources of information, respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of

the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio.

Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

As mentioned above, from those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent outcomes, we have thus focused the rest of the analysis on the determinants of the intention to use, rather than actual usage of, doctor rating websites.

Results on the likelihood to use online rating websites

In Table 2 we present the set of bivariate correlations between the intention to use the doctor rating websites and each of the variables collected in the survey. As it can be noticed, there is a positive correlation between having internet access, and being aware of the doctor rating websites. Both the age and the gender concordance with the GP show a positive correlation with the intention to use. Positive correlations with the willingness to use doctor rating websites also hold for respondents who think that those websites, or hospital statistics, are important sources of information. Also the fact that respondents believe that online rating is a reliable measure is clearly correlated with the intention to use them. Finally, positive correlations also hold for respondents who feel that their doctor has time to dedicate to them, or who see several aspects of healthcare providers - such as reputation, clinical and financial performances, waiting lists, accessibility – as important factors when making decisions where to seek healthcare.

In Table 4 we present the estimate results of six different specifications of the ordered logistic regression for the dependent variable *IntentionToUse* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 4 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. Moreover, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from the authors upon request).

Looking at the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are

consistent with the nature of the information provided in these websites. Also, and quite intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on the determinants of the intention to use doctor rating websites and the level of awareness and actual usage of these websites. Results show that socio-demographic characteristics (in particular income and ethnicity) and the doctor patient relationship are significant determinants of the intention to use these websites. Regarding the latter we further show that, from a patient's perspective, the doctor and the Internet can be seen as being both "complementary" and "substitute" sources of information. Yet, we find that awareness and usage of doctor rating websites is low in our sample. In what follows we will discuss these results and relate them to evidence from the literature.

Intention to use

On the socio-demographic variables the results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature[13,14,15] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may

trust less information that exists online and they have more concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.[16] As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that, while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patients' sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).[9] Both results differ from the findings from the literature on the use of online information. The literature has shown that socio-demographic characteristics are major determinants of usage of online health information. In particular women and younger adults are more active 'online health information seekers'.[10,17-20] Education has also been found to determine usage of online and offline health information. Cotton and Gupta[15] and Diaz et al,[13] carried out research into the characteristics of online and offline health information seekers and found that less educated individuals were less likely to be users of online health information.

Therefore even though, according to our findings, intentions to use do not differ significantly across all socio demographic characteristics, actual usage may be greatly determined by access rather than only by intention to use, with the former substantially differing according to socio-economic and demographic characteristics. That is, there may exist income-, education- or age-related barriers to actual access that prevent individuals from using doctor rating sites even though their intentions to use them are similar.

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.[14] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[21] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that the intention to use (as well as being aware of) the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels. This could explain why patients that consider hospital statistics as a good source of information are more likely to use these websites. Indeed this type of information might not be provided by the doctor in a consultation.

Indeed, a study by Stevenson and colleagues[22] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[23]

Finally, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly and consider the advice given by the GP as being important are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues[13] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[14] that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

Our findings that online information can be used not only as "substitute" but also, and perhaps mainly, as "complementary" to several dimensions of the doctor-patient relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.[24,25] The "complementarity" findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.[7,8,26] Taken together, this evidence can be seen as providing little support to the related concern that the likeliest to use online ratings and enter actual comments may be the most disgruntled patients.[27]

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan,[14] for instance, reports that patients would seek health information before a consultation 'to

manage their own healthcare independently'. These may be the type of people who are 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[28]

Awareness and actual usage

Only 15% of our sample were aware of the existence of these websites, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[5]

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among a sample of respondents from the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply because those subjects did not actually need to see a doctor.

These figures are substantially in line with previous evidence brought forward from the literature for the UK. [5,6] A slow uptake of online ratings has also been reported in the US. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).[29] Gao et al.[8] analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.[7] also reported a low average number of ratings per physician.

The fact that even in the US, a more market-oriented health system, the use of similar sites is not much higher may suggest that the slow uptake in the UK cannot be attributed only to the early stage of the "choice" model. Considered together these results may pose concerns on the reasons and consequences of the lack of patient awareness and usage of online health related information.

Previous studies in the US have reported a number of reasons behind this slow uptake, including i) the preference for more traditional information channels, such as recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact that people do not recognise that the quality of care may vary.[25]

As for the UK, our study confirms that not only awareness of rating websites is still limited among a sample of respondents the general public in London, but awareness and willingness to use per se do not seem a sufficient condition to guarantee active usage. This poses a double challenge from a clinician and health policy perspective. In fact, on the one hand, the documented correlation between online ratings and other measures of healthcare quality, including survey-based ratings and clinical quality indicators,[30,31] necessarily requires that patients have already gone through three preliminary hurdles, namely i) being aware of, ii) having effective access to, and ii) being active users of the doctor rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality, the effective removal of this triple hurdle is likely to become the next priority to guarantee the full spread of online rating website.

On the other hand, while appropriate online and offline informational campaigns are likely to overcome the first hurdle, thus effectively raising patients' awareness of online ratings as a potential source of information on provider quality, informational campaigns alone

can fail to grant effective access and trigger actual changes in behaviour. Alike in several other health contexts, in particular, 'nudging' behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings [25,32-35] and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome the last hurdle and actively engage with online ratings.

Limitations of the study

The convenience field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study.

However, while dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study explicitly explores the usage doctor-rating websites, the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. The main finding suggests that the doctor-patient relationship plays a key role in explaining intention to use the websites and that the doctor has both a "complementary" and "substitute" role with respect to Internet information.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[7,25-26,32-35] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a challenging opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population. Indeed, our findings suggest that subjects of non-white background and with lower income are more willing to use online ratings.

Finally, our study highlights that subjects who use doctor rating websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from non-white British, medium-low income patients who are not satisfied with their choice of healthcare treatments. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback online.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (*Awareness*) (0=no, 1=yes)	200	0.142	0.350
Intention to use (*IntentionToUse*)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (*HC_Waiting*)	198	3.818	1.165
Rates of hospital-acquired complications (*HC_HospComp*)	188	3.761	1.193
Clinical performance (*HC_Clinical_Performance*)	189	4.037	1.136
Closeness to home (*HC_CloseHome*)	200	3.683	1.265
Familiarity with the doctor (*HC_Familiarity*)	194	3.237	1.306
Financial performance of the hospital (*HC_FinPerform*)	191	2.387	1.164
Reputation of the doctor (*HC_GP_Reputation*)	199	3.980	1.137
Accessibility and parking facilities (*HC_Access*)	192	2.656	1.321
Past experience with the provider (*HC_PastExp*)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (*SI_GP_Advice*)	198	4.071	1.030
Published hospital statistics (*SI_HospStat*)	183	2.934	1.193
Online doctor rating websites (*SI_DoctorRating*)	178	2.315	1.204
Personal experiences in the past (*SI_PastExp*)	192	4.234	1.004
Feedback from family/friends (*SI_Family*)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (*DOC_Listens*)	200	0.575	0.496
...has time (0=no, 1=yes) (*DOC_Time*)	200	0.410	0.493
...explains (0=no, 1=yes) (*DOC_Explains*)	200	0.555	0.498
...is friendly (0=no, 1=yes) (*DOC_Friend*)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (*DOC_Trust*)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (*Reliable*)	141	2.759	1.055
How actively do you participate with your GP in making decisions (*Participation*)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (*SAT_C_GP*)	173	3.451	1.138
...hospital (*SAT_C_Hosp*)	152	3.493	1.055
...doctor (*SAT_C_Doc*)	139	3.252	1.022
...treatment (*SAT_C_Treatment*)	148	3.554	0.928
...time spent (*SAT_C_Time*)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) *(WhiteBritish*)	200	0.488	0.501
White Other (0=no, 1=yes) (*WhiteNonBritish*)	200	0.222	0.417
Highest level of educational attainment* (*Education*)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (*Age*)	199	39.572	16.083
Gender (*Gender*)			
Female (=1)	112		
Male (=0)	88		
Income (*Income*)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (*AgeMatch*)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (*GenderMatch*)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		**DOC_Friend**	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	**DOC_Trust**	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	**Participation**	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	**SAT_C_GP**	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	**SAT_C_Hosp**	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	**SAT_C_Doc**	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	**SAT_C_Treatment**	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	**SAT_C_Time**	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	**CB_AWARE**	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	**CB_Use**	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	**WEB_Access**	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	**AgeMatch**	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	**GenderMatch**	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	**WhiteBritish**	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	**WhiteNonBritish**	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	**Income**	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	**Education**	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	**Gender**	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	**Age**	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in paretheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		
Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09***	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School

We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

☐ Yes No ☐ **(if No, skip ahead to Section C)**

☐ Other (please specify).....

Q2. How did you find out about these sites?

☐ Family/Friends ☐ Doctor

☐ The Media ☐ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes ☐ No ☐ **(if No, skip ahead to Section C)**

Q4. What specialty of doctor have you searched for in the past in these websites?

……..

Q5. When do you use these websites?

On a regular basis ☐ Only before/after an appointment ☐ Rarely ☐

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes ☐ No ☐

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information ☐ Negative information ☐

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these ☐					

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure ☐

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

☐ Not likely ☐ Quite likely ☐ Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

☐ Every time
☐ After particularly positive experiences only
☐ After particularly negative experiences only
☐ After both positive and negative experiences
☐ Never
☐ Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

☐ I would not contribute to these websites
☐ To inform other patients
☐ To improve standards of care in the NHS
☐ As a method of complaint
☐ In appreciation of a doctor's service
☐ Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

☐ I feel my doctor listens to my problems
☐ I feel my doctor spends enough time with me in each consultation
☐ I feel my doctor explains things clearly
☐ I feel my doctor is sociable and friendly

☐ I feel that I can trust my doctor's opinions
☐ None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

☐ I always request to see the same GP
☐ I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure ☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure ☐

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

☐ Yes No ☐

Q21. Have you used this Choose and Book system in the past?

☐ Yes ☐ No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

☐ I have never used Choose & Book
☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

☐ Routine outpatient consultation
☐ Day-case procedure/surgery
☐ Major surgery
☐ None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

☐ Yes ☐ No

Q25. Have you used the internet in the past to search for health information?

☐ Yes ☐ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

☐ I'm too busy to have the time to use them
☐ The sites are not a reliable source of information
☐ It is difficult to interpret the information provided
☐ I already have enough information from other sources to make choices
☐ I don't have access to the internet
☐ I did not know these websites existed
☐ I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

☐ Shopping websites (e.g. Amazon)
☐ Holiday websites (e.g. TripAdvisor)
☐ Car insurance websites (e.g. Compare The Market)
☐ Restaurants/venue websites (e.g. ViewLondon)
☐ Film websites (e.g. Rottentomatoes)
☐ Other (please specify).....
☐ I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

☐ Star-rating out of 5
☐ Percentage scores
☐ Thumbs Up/Down
☐ Written comments from patients/users
☐ No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age? .....

Q30. What is your gender?

☐ Male ☐ Female

Q31. How would you describe your ethnicity?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. **What is your postcode?** .....

Q33. **How many other individuals do you live with?** .....

Q34. **Do you live with your parents?**

☐ Yes ☐ No

Q35. **What is/was your profession?** .....

☐ Unemployed ☐ Retired

Q36. **What is your level of pre-tax income?**

☐ 0

☐ <£15000 but >0 ☐ £15,000-£35,000

☐ £35,000-55,000 ☐ £55,000-£75,000

☐ £75,000-£95,000 ☐ >£95,000

Q37. **What is your highest level of educational attainment?**

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. **In the last year how many times have you had an outpatient hospital appointment?**

☐ 0 times ☐ 1-3 times
☐ 4-5 times ☐ More than 5 times

Q39. **What is the sex of your GP?**

☐ Male ☐ Female

Q40. **How old is your GP?**

☐ <30 years
☐ 30-50 years
☐ >50 years

Q41. **What is the ethnicity of your GP?**

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP. ☐

This is the end of the questionnaire, thank you for your time.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	8
		(*c*) Explain how missing data were addressed	8
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stavropoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Declaration: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi[1], Marisa Miraldo[2*], Charitini Stavropoulou[3], Mihir Desai[4], Wikum Jayatunga[4], Mitesh Joshi[4], Sunny Parikh[5]

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating websites and ~~its~~ their usage among a sample of respondents from London~~the general population~~.
- To understand the main predictors of what makes people willing to use doctor-ratings websites.

Key messages:

- The share of ~~the general public~~ actual users of~~which uses~~ doctor-rating websites is ~~still~~ quite low.
- S~~Elderly, s~~ubjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' intention to use~~,~~ doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent ~~at~~ to which doctor-rating websites are known and used among a sample of respondents from London ~~the general population~~. To understand the main predictors of what makes people willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. ~~Elderly, w~~White British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. ~~The~~ Aspects of the doctor-patient relationship also play~~s~~ a key role in explaining intention to use the websites~~: the GP-patient gender concordance is associated with higher intention to use, the websites~~. ~~Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.~~ The doctor has both a "complementary" and "substitute" role with respect to Internet information.

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Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from ~~young,~~ non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of ~~the general public which uses~~actual users of doctor-rating websites is ~~still~~ quite low.
- ~~Elderly, s~~Subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher ~~–~~intention to use~~,~~ the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

In recent years, both the NHS Plan[1] and the NHS Improvement Plan[2], set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.[3] Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"[4] acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence,* have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund[5] explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.[6] These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.[7,8] Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez[9] found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.[10]

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among ~~the general public~~a sample of respondents in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed ~~to have~~in a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for "*Not sure*".

A list of variables with a brief description is discussed in the ~~Variables~~ Statistical analysis section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of each interview, interviewers showed credentials as research assistants at the University of London, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be treated statistically and used for the purposes of scientific research only. Informed consent by respondents was then given at the beginning of each interview.

Data Collection~~Sample~~

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week (including weekends). By covering different times and locations within the borough, we aimed at being able to approach both working and non-working members of the public.

During the surveys in the field, the interviewers approached every third male and third female that would pass by them.

Sample size calculations were based on the intended objective to look at the correlation coefficient between the likelihood of using the websites on the one hand, and a typical survey response, on the other. The minimum sample size to test the null hypothesis of no significant correlation between these two variables was calculated given the most conservative assumption that the correlation coefficient between the variables in the population was in the region of 0.2 (a "low" effect size, the variance of one variables accounting for just 4% of the variance of the other). Under the assumptions that all variables are normally distributed, a bi-directional test (both positive and negative correlation were expected) with 95% significance level reaches a standard 80% power level at a minimum sample of n=200 subjects.[11] We thus targeted a sample size of 200 respondents. The envisaged target was then readily achieved, since only 68 subjects who were initially approached refused to take part to the survey, with a final response rate of 74%.

Statistical analysis

Besides a correlation analysis, ~~W~~we have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in

fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications~~, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio~~. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

The sample and descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects.

Our sample consisted of 200 subjects. Comparing it with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).[~~13~~12] Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%).[~~13~~12]

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).[~~13~~12] This is also significantly lower than figures for England, White British accounting for 87% of the population.[~~13~~12] The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.[12~~13~~] Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

Regarding working status, 141 individuals were workers (ten of which reported to be currently unemployed), 33 students, 9 officially unemployed and 6 retired. Eleven respondents did not report their working status. The proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample. The majority of actively working respondents reported an income within the £15-35,000 bracket.

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.[12~~13~~]

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Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about and only 6 reported to have used them.

In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who see accessibility and financial performances of hospitals important factors in making decisions where to seek healthcare.

[**Table 2 in here**]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[**Table 3 in here**]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings.

Concerning the sources of information, respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio.

Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

As mentioned above, Ffrom those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent outcomes, we have thus focused the rest of the analysis on the determinants of the intention to use, rather than actual usage of, doctor rating websites.

Results on the likelihood to use online rating websites

In Table 2 we present the set of bivariate correlations between the intention to use the doctor rating websites and each of the variables collected in the survey. As it can be noticed, there is a positive correlation between having internet access, and being aware of the doctor rating websites. Both the age and the gender concordance with the GP show a positive correlation with the intention to use. Positive correlations with the willingness to use doctor rating websites also hold for respondents who think that those websites, or hospital statistics, are important sources of information. Also the fact that respondents believe that online rating is a reliable measure is clearly correlated with the intention to use them. Finally, positive correlations also hold for respondents who feel that their doctor has time to dedicate to them, or who see several aspects of healthcare providers - such as reputation, clinical and financial performances, waiting lists, accessibility – as important factors when making decisions where to seek healthcare.

In Table 4 we present the estimate results of six different specifications of the ordered logistic regression for the dependent variable *IntentionToUse* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 4 in here]

Concerning socio-demographic variables, it turns out that white British, as well as respondents who reported income in higher brackets, said they were less likely to use doctor-rating websites. Moreover, we do not find any effect of education, age and gender of the respondents on the likelihood of their intention to use (the results of the specifications including the age and gender variables are not reported in the table for the sake of space but are available from the authors upon request).

Looking at the characteristics of the healthcare providers that respondents perceived as important while making decisions where to receive healthcare, our data suggest that those who consider clinical performance and doctor reputation (in most specifications) as important factors, are more likely to use doctor-rating websites. These results are consistent with the nature of the information provided in these websites. Also, and quite

intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, ~~, and interestingly,~~ those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, ~~it is interesting to~~ note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on the determinants of the intention to use doctor rating websites and the level of awareness and actual usage of these websites. Results show that socio-demographic characteristics (in particular income and ethnicity) and the doctor patient relationship are significant determinants of the intention to use these websites. Regarding the latter we further show that, from a patient's perspective, the doctor and the Internet can be seen as being both "complementary" and "substitute" sources of information. Yet, we find that awareness and usage of doctor rating websites is low in our sample. In what follows we will discuss these results and relate them to evidence from~~in~~ the literature.

Intention to use

On the socio-demographic variables the results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature[~~12,15,16~~13,14,15] and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more

concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.[16~~17~~] As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that, while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patients' sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).[9] Both results differ from the findings from the literature on the use of online information. The literature has shown that socio-demographic characteristics are major determinants of usage of online health information. In particular women and younger adults are more active 'online health information seekers'.[10,~~18-21~~17-20] Education has also been found to determine usage of online and offline health information. Cotton and Gupta[15~~16~~] and Diaz et al,[~~12~~13] carried out research into the characteristics of online and offline health information seekers and found that less educated individuals were less likely to be users of online health information.

Therefore even though, according to our findings, intentions to use do not differ significantly across all socio demographic characteristics, actual usage may be greatly determined by access rather than only by intention to use, with the former substantially differing according to socio-economic and demographic characteristics. That is, there may exist income-, education- or age-related barriers to actual access that prevent individuals from using doctor rating sites even though their intentions to use them are similar.

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.[~~15~~14] This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.[~~22~~21] If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that the intention to use (as well as being aware of) the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels. This could explain why patients that consider hospital statistics as a good source of information are more likely to use these websites. Indeed this type of information might not be provided by the doctor in a consultation.

Indeed, a study by Stevenson and colleagues[~~22~~24] shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting

the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.[23~~25~~]

Finally, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be "complementary" with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors' opinions.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly and consider the advice given by the GP as being important are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues[13~~12~~] that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan[14~~15~~] that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

Our findings that online information can be used not only as "substitute" but also, and perhaps mainly, as "complementary" to several dimensions of the doctor-patient relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.[~~26,27~~24,25] The "complementarity" findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.[7,8,26~~28~~] Taken together, this evidence can be seen as providing little support to the related concern that the likeliest to use online ratings and enter actual comments may be the most disgruntled patients.[27~~29~~]

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan,[~~15~~14] for instance, reports that patients would seek health information before a consultation 'to manage their own healthcare independently'. These may be the type of people who are

'more likely to be health-oriented' or 'health conscious', and therefore be more proactive in consultations.[28~~23~~]

Awareness and actual usage

Only 15% of our sample were aware of the existence of these websites, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.[5]

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among a sample of respondents from the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply because those subjects did not actually need to see a doctor.

These figures are substantially in line with previous evidence brought forward from the literature for the UK. [5,6] A slow uptake of online ratings has also been reported in the US. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).[29~~14~~] Gao et al.[8] analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.[7] also reported a low average number of ratings per physician.

The fact that even in the US, a more market-oriented health system, the use of similar sites is not much higher may suggest that the slow uptake in the UK cannot be attributed only to the early stage of the "choice" model. Considered together these results may pose concerns on the reasons and consequences of the lack of patient awareness and usage of online health related information.

Previous studies in the US have reported a number of reasons behind this slow uptake, including i) the preference for more traditional information channels, such as recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact that people do not recognise that the quality of care may vary.[27~~25~~]

As for the UK, our study confirms that not only awareness of rating websites is still limited among a sample of respondents the general public in London, but awareness and willingness to use per se do not seem a sufficient condition to guarantee active usage. This poses a double challenge from a clinician and health policy perspective. In fact, on the one hand, the documented correlation between online ratings and other measures of healthcare quality, including survey-based ratings and clinical quality indicators,[30,31] necessarily requires that patients have already gone through three preliminary hurdles, namely i) being aware of, ii) having effective access to, and ii) being active users of the doctor rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality, the effective removal of this ~~double~~triple hurdle is likely to become the next priority to guarantee the full spread of online rating website.

On the other hand, while appropriate online and offline informational campaigns are likely to overcome the first hurdle, thus effectively raising patients' awareness of online ratings as a potential source of information on provider quality, informational campaigns alone can fail to grant effective access and trigger actual changes in behaviour. Alike in several

other health contexts, in particular, 'nudging' behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings[7 25,32-35~~27,33-36~~] and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome the last hurdle and actively engage with online ratings.

Limitations of the study

The convenience field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study.~~As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home.~~

However, while dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

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CONCLUSIONS

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study explicitly explores the usage doctor-rating websites, the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. The main finding suggests that the doctor-patient relationship plays a key role in explaining intention to use the websites and that the doctor has both a "complementary" and "substitute" role with respect to Internet information.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.[7,27,28,33-36,25-26,32-35] The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a challenging opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population. Indeed, our findings suggest that subjects of non-white background and with lower income are more willing to use online ratings.

Finally, our study highlights that subjects who use doctor rating websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from non-white British, medium-low income patients who are not satisfied with their choice of healthcare treatments. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback online.

Data sharing: technical appendix, statistical code and dataset available from the corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not obtained but the presented data are anonymised and risk of identification is low.

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (*Awareness*) (0=no, 1=yes)	200	0.142	0.350
Intention to use (*IntentionToUse*)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (*HC_Waiting*)	198	3.818	1.165
Rates of hospital-acquired complications (*HC_HospComp*)	188	3.761	1.193
Clinical performance (*HC_Clinical_Performance*)	189	4.037	1.136
Closeness to home (*HC_CloseHome*)	200	3.683	1.265
Familiarity with the doctor (*HC_Familiarity*)	194	3.237	1.306
Financial performance of the hospital (*HC_FinPerform*)	191	2.387	1.164
Reputation of the doctor (*HC_GP_Reputation*)	199	3.980	1.137
Accessibility and parking facilities (*HC_Access*)	192	2.656	1.321
Past experience with the provider (*HC_PastExp*)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (*SI_GP_Advice*)	198	4.071	1.030
Published hospital statistics (*SI_HospStat*)	183	2.934	1.193
Online doctor rating websites (*SI_DoctorRating*)	178	2.315	1.204
Personal experiences in the past (*SI_PastExp*)	192	4.234	1.004
Feedback from family/friends (*SI_Family*)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (*DOC_Listens*)	200	0.575	0.496
...has time (0=no, 1=yes) (*DOC_Time*)	200	0.410	0.493
...explains (0=no, 1=yes) (*DOC_Explains*)	200	0.555	0.498
...is friendly (0=no, 1=yes) (*DOC_Friend*)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (*DOC_Trust*)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (*Reliable*)	141	2.759	1.055
How actively do you participate with your GP in making decisions (*Participation*)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (*SAT_C_GP*)	173	3.451	1.138
...hospital (*SAT_C_Hosp*)	152	3.493	1.055
...doctor (*SAT_C_Doc*)	139	3.252	1.022
...treatment (*SAT_C_Treatment*)	148	3.554	0.928
...time spent (*SAT_C_Time*)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) *(WhiteBritish*)	200	0.488	0.501
White Other (0=no, 1=yes) (*WhiteNonBritish*)	200	0.222	0.417
Highest level of educational attainment* (*Education*)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (*Age*)	199	39.572	16.083
Gender (*Gender*)			
Female (=1)	112		
Male (=0)	88		
Income (*Income*)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (*AgeMatch*)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (*GenderMatch*)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		**DOC_Friend**	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	**DOC_Trust**	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	**Participation**	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	**SAT_C_GP**	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	**SAT_C_Hosp**	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	**SAT_C_Doc**	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	**SAT_C_Treatment**	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	**SAT_C_Time**	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	**CB_AWARE**	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	**CB_Use**	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	**WEB_Access**	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	**AgeMatch**	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	**GenderMatch**	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	**WhiteBritish**	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	**WhiteNonBritish**	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	**Income**	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	**Education**	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	**Gender**	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	**Age**	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in paretheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use£ doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		
Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
cut2	7.05660e+09***	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School

We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

☐ Yes No ☐ **(if No, skip ahead to Section C)**

☐ Other (please specify).....

Q2. How did you find out about these sites?

☐ Family/Friends ☐ Doctor

☐ The Media ☐ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes ☐ No ☐ **(if No, skip ahead to Section C)**

Q4. What specialty of doctor have you searched for in the past in these websites?

……..

Q5. When do you use these websites?

On a regular basis ☐ Only before/after an appointment ☐ Rarely ☐

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes ☐ No ☐

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information ☐ Negative information ☐

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these	☐				

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure ☐

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

☐ Not likely ☐ Quite likely ☐ Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

☐ Every time
☐ After particularly positive experiences only
☐ After particularly negative experiences only
☐ After both positive and negative experiences
☐ Never
☐ Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

☐ I would not contribute to these websites
☐ To inform other patients
☐ To improve standards of care in the NHS
☐ As a method of complaint
☐ In appreciation of a doctor's service
☐ Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

☐ I feel my doctor listens to my problems
☐ I feel my doctor spends enough time with me in each consultation
I feel my doctor explains things clearly
I feel my doctor is sociable and friendly

☐ I feel that I can trust my doctor's opinions
☐ None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

☐ I always request to see the same GP
☐ I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of doctor for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of treatment	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of appointment time (for primary & secondary care)	**1**	**2**	**3**	**4**	**5**	Not sure	☐

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	**1**	**2**	**3**	**4**	**5**	Not sure	☐
Choice of hospital for outpatient appointment	**1**	**2**	**3**	**4**	**5**	Not sure	

Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure ☐
Choice of treatment	1	2	3	4	5	Not sure ☐
Choice of appointment time (for primary & secondary care)	1	2	3	4	5	Not sure ☐

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

☐ Yes ☐ No

Q21. Have you used this Choose and Book system in the past?

☐ Yes ☐ No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

☐ I have never used Choose & Book
☐ My doctor always makes decisions for me
☐ I like to know the options available but still let my doctor decide for me
☐ My doctor and I make the decisions together
☐ I make decisions for myself, after considering the advice of my GP
☐ I always make my own decisions, independently of the advice of my GP
☐ I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

☐ Routine outpatient consultation
☐ Day-case procedure/surgery
☐ Major surgery
☐ None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

☐ Yes ☐ No

Q25. Have you used the internet in the past to search for health information?

☐ Yes ☐ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

☐ I'm too busy to have the time to use them
☐ The sites are not a reliable source of information
☐ It is difficult to interpret the information provided
☐ I already have enough information from other sources to make choices
☐ I don't have access to the internet
☐ I did not know these websites existed
☐ I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

☐ Shopping websites (e.g. Amazon)
☐ Holiday websites (e.g. TripAdvisor)
☐ Car insurance websites (e.g. Compare The Market)
☐ Restaurants/venue websites (e.g. ViewLondon)
☐ Film websites (e.g. Rottentomatoes)
☐ Other (please specify).....
☐ I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

☐ Star-rating out of 5
☐ Percentage scores
☐ Thumbs Up/Down
☐ Written comments from patients/users
☐ No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age? .....

Q30. What is your gender?

☐ Male ☐ Female

Q31. How would you describe your ethnicity?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. **What is your postcode?** .....

Q33. **How many other individuals do you live with?** .....

Q34. **Do you live with your parents?**

☐ Yes ☐ No

Q35. **What is/was your profession?** .....

☐ Unemployed ☐ Retired

Q36. **What is your level of pre-tax income?**

☐ 0

☐ <£15000 but >0 ☐ £15,000-£35,000

☐ £35,000-55,000 ☐ £55,000-£75,000

☐ £75,000-£95,000 ☐ >£95,000

Q37. **What is your highest level of educational attainment?**

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. **In the last year how many times have you had an outpatient hospital appointment?**

☐ 0 times ☐ 1-3 times
☐ 4-5 times ☐ More than 5 times

Q39. **What is the sex of your GP?**

☐ Male ☐ Female

Q40. **How old is your GP?**

☐ <30 years
☐ 30-50 years
☐ >50 years

Q41. **What is the ethnicity of your GP?**

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP. ☐

This is the end of the questionnaire, thank you for your time.