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Original article

The Internet – friend or foe? A questionnaire study of orthopaedic out-patients

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***Objective*: To examine patients' use of the Internet to obtain medical information, their opinions on the quality of medical Web sites, and their attitudes towards Internet-based consultations.**
***Design*: Questionnaire study.**
***Participants and setting*: 398 patients, aged 10–95 years, visiting the orthopaedic outpatient clinics of a London district general hospital over a 2-week period.**
***Main outcome measures*: (i) The rate of Internet use by patients; (ii) the perception of the quality of medical web sites; (iii) future intentions and attitudes towards Internet-based consultations; and (iv) concurrence between information obtained from Web sites and advice given by the orthopaedic surgeon in the clinic.**
***Results*: From 369 respondents (response rate 93%), 55.3% of patients had accessed the Internet. Of these, 52.0% had obtained medical information from this source. Access was linearly correlated with age ($r^2 = 0.975$, $P < 0.01$) and was also related to social status. Of the 12.3% of patients who had researched their particular orthopaedic condition, 20% reported that the advice received from the surgeon in the clinic contradicted that obtained from the Internet. A total of 35.7% of patients would undergo an Internet-based consultation, whilst a further 25.5% would consider this, depending on the medical condition in question.**
***Conclusions*: Over half of the patients studied were willing to access the Internet for medical information, with younger patients more likely to undertake this activity. Moreover, a significant proportion of respondents were willing to undergo an Internet-based consultation. The increased use of medical Web sites by patients raises important issues regarding the need for quality control, and impacts significantly upon the surgeon–patient relationship.**

Key words: Internet – Orthopaedics – Outpatients

The revolution triggered by the rapid growth of the Internet has provided patients with unprecedented access to information regarding medical conditions. Not only does the World Wide Web provide a forum for medical self-education, but it also enables reporting on latest advances, long before these are incorporated into textbooks or, occasionally, even before they have been subject to peer review.

Several studies have examined the quality of information available on the Internet with regard to a speciality or specific condition.[1–5] McKinley *et al.*[6] remarked on the variable nature of the quality of surgical

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information available on the Internet, and Sacchetti *et al.*[7] concluded that the number of Web sites offering complete, unbiased information on a urological topic was only a small proportion of the total.

Whilst one Harris poll suggested that 40% of residents in the UK have access to the Internet,[8] published reports on rates of Internet use to obtain medical information amongst the UK patient population are limited.[7,9] Thus far, there is no detailed analysis regarding rates of access and attitudes towards Internet use in a UK orthopaedic out-patient population.

With a questionnaire study, we investigated the use of the Internet for medical information by an orthopaedic out-patient population in a London district general hospital. Given the variability of medical advice offered over the Internet,[6] we also assessed patients' perception of the quality of information available, and their attitude towards Internet-based consultations.

Patients and Methods

Participants

Questionnaires were issued to patients visiting the orthopaedic out-patient department of a London district general hospital over a 2-week period. All information was entered anonymously. Participants were grouped in terms of age, sex, occupation, mode of referral and whether they were new or follow-up patients. Patients below the age of 10 years were excluded from the study.

From 398 questionnaires issued, 369 responses were obtained (response rate of 93%). The mean age of patients was 50 years (range, 10–95 years). A total of 224 patients were new referrals and 174 were being followed up.

Social class was determined according to occupation using the current system employed by the Office of Population Censuses and Surveys (OPCS).[10] All social classes were represented.

Questionnaires

One questionnaire containing 12 questions was used. Four questions related to the patient's background and referral. The remaining 8 questions enquired into:

1. The patient's general use of the Internet.
2. Use of the Internet to obtain information of a medical nature.
3. Whether the respondent used the Internet to research their specific condition prior to the consultation.
4. The patient's view of the quality of medical information obtained over the Internet.
5. The degree of concurrence between the medical Web site and the advice given by the participant's orthopaedic surgeon.
6. The patient's future intentions regarding Internet access for medical information.
7. Whether the respondent would consult an orthopaedic surgeon over the Internet if such a site existed.

The questionnaires were administered by out-patient department staff after obtaining verbal consent from the participants in the waiting room. In pilot testing, the survey took approximately 2 min to complete. Data were collected from 8 different general orthopaedic out-patient clinics.

Analysis

Statistical analysis was performed using statistical software (Prism, Graphpad Software Inc., San Diego, CA, USA). Results were considered significant at $P < 0.05$. The chi^2 statistic was used to compare proportions. Spearman's correlation coefficients were used to quantify correlation.

Results

Patients' use of the Internet

From a total of 369 patients, 204 (55.3%) had previously accessed the Internet. Of these, 106 (52.0%) had accessed the Internet for medical purposes (Table 1, Fig. 1). Moreover, 25 (12.3%) had researched their specific orthopaedic condition before their clinic consultation. Use of the Internet was linearly correlated with younger age ($r^2 = 0.975$, $P < 0.001$;

Table 1 Use of the Internet by age

Patient age (years)	Use the Internet Internet	Do not use Internet
10–15	22 (84.6%)	4 (15.4%)
15–25	63 (81.8%)	14 (18.2%)
25–40	77 (70.6%)	32 (29.4%)
40–65	37 (37.3%)	62 (62.7%)
> 65	5 (8.6%)	53 (91.4%)
Total	204 (55.3%)	165 (44.7%)

Table 2 Regression analysis of Internet use

Median age (years)	Proportion using Internet
12.5	0.846154
20	0.818182
32.5	0.706422
52.5	0.373737
70	0.086207

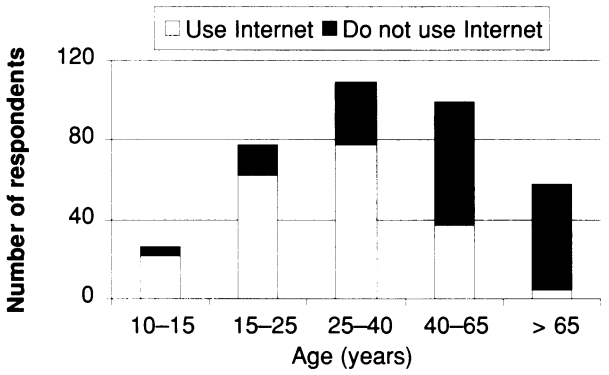

Figure 1 Use of Internet by age.

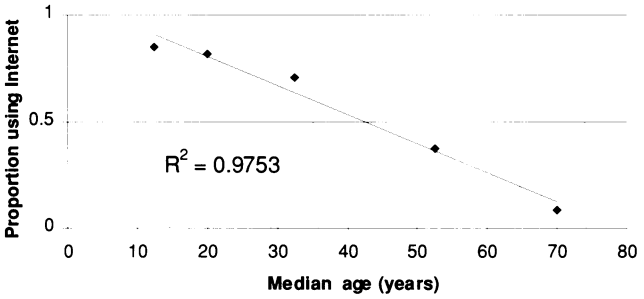

Figure 2 Regression analysis of Internet use by age.

Table 2, Fig. 2). Students and those patients in social classes I and II were more likely to use the Internet than were those in social classes III, IV and V (odds ratio 2.53; 95% confidence intervals [CI] 1.5–4.25; $P < 0.01$).

Subjective quality of Internet sites visited

Most patients (76.3%; Table 3) found their Web visit fruitful and described the sites as either very useful (answered almost all the questions in their mind), or moderately useful (answered some questions). However, 24.8% found sites either confusing or entirely irrelevant.

Agreement of Internet with doctor's consultation

The Internet information obtained by 52% of patients correlated well with their subsequent consultation with the orthopaedic surgeon (Table 4). However, 20% reported that the information obtained over the Internet contradicted the surgeon's advice.

Further use of the Internet and Web-based consultation

The majority of respondents (61.5%) stated that they would use the Internet to seek further medical advice in the future (Table 5, Fig. 3). This included 51.2% of those that had not yet used the World Wide Web for this purpose in the past. Patients below 40 years of age were more likely future users of the Internet than were those over 40 years (odds ratio 4.27; 95% CI 2.72–6.65; $P < 0.001$).

When asked if they would be willing to consult an orthopaedic surgeon over the Internet (Table 6; Fig. 4), 35.2% of patients were prepared to undergo a Web-based consultation, whilst 25.5% would consider this, depending on the medical condition in question. The answer was an unequivocal 'no' in 39.3% of participants.

Table 3 Quality of information available over the Internet as perceived by patients

Perceived quality of information	Number of respondents (n = 101)
Very useful (answered almost all questions)	52 (51.5%)
Moderately useful (answered some questions)	25 (24.8%)
Confusing	16 (15.8%)
Information irrelevant to original problem	8 (7.9%)

Table 4 Did the medical information from the Web site you visited agree with the information provided by the orthopaedic surgeon today?

Number of respondents (n = 25)	Degree of agreement
Agree	13 (52%)
Partially agree	7 (28%)
Disagree	5 (20%)

Table 5 Do you think you will use the Internet for medical information in the future?

Age (years)	Yes	No
10–25	57 (68.7%)	26 (31.3%)
26–40	100 (81.3%)	23 (28.7%)
41–65	56 (53.8%)	48 (46.2%)
> 65	14 (23.7%)	45 (76.3%)
Total	227 (61.5%)	142 (38.5%)

Table 6 Would you consult an orthopaedic surgeon over the Internet if such a Web site existed?

Age (years)	Yes	Depends on the medical condition	No
10–15	1	6	5
15–25	44	13	15
25–40	63	30	31
40–65	19	30	54
> 65	3	15	40
Total	130	94	145
Percentage of total	35.23%	25.47%	39.30%

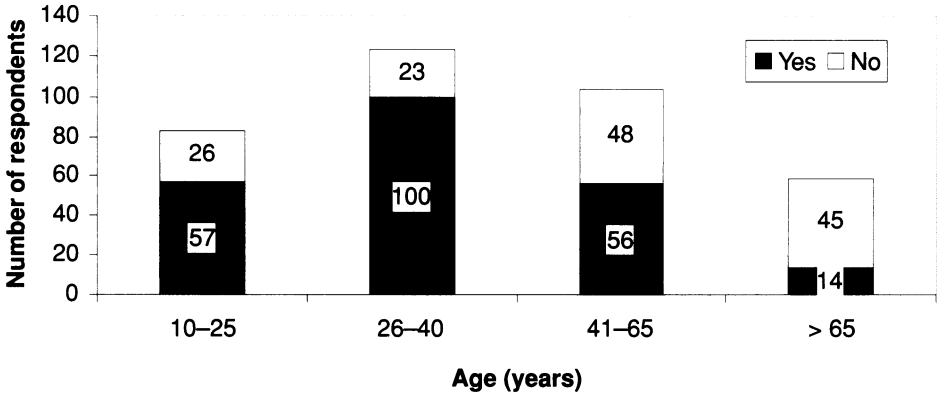

Figure 3 Future intentions: will you use the internet for medical information in the future?

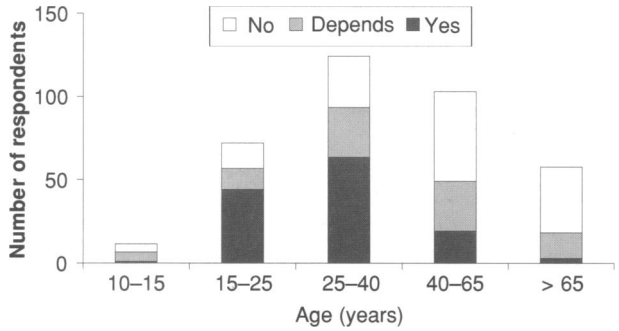

Figure 4 Would you consult an orthopaedic surgeon over the Internet if such a Web site existed?

Discussion

With the Internet emerging as a potentially powerful tool for patient education, we sought to examine the current state of patients' use of the World Wide Web with respect to medical information. Patients' perception of the quality of information gained was also assessed. At present, 55.3% of the orthopaedic out-patient population questioned in this study use the Internet, and of these, 52% research medical information on the World Wide Web. Younger patients were more likely to use the Internet than those in the older age groups. Another determinant of access was social class.

There are few studies examining the emergence of Internet use for medical purposes amongst the UK patient population.[7,9] Computer prices are decreasing, whilst the availability of the Internet is increasing, both in the home and in institutions. It is clear that such activity will increase in the future as awareness and the availability of Internet resources increase.[1,11]

Our study revealed that 12.3% of those using the Internet had researched their specific orthopaedic condition before their clinic consultation. The ascendancy of this type of Web-based learning is commercially attractive. It is anticipated that the number of Web sites catering for this purpose will increase substantially.[7] At present, patients perceive most sites to be useful, and there is agreement between the Internet and the surgeon in 80% of cases. However, as the commercial advantages of a captive patient population become apparent, there is a potential for inaccurate or misleading information to be disseminated, which has not undergone peer review.[6]

The variability of medical information provided over the Internet may present the clinician with many problems. One example is the unrealistic, misguided request of a patient who has stumbled across a new, as yet unproved, drug, procedure, or piece of equipment. Additionally, patients may become as knowledgeable as their surgeon with regard to new developments. On occasions they may even surprise the clinician with data that have not yet filtered through to the medical community at large. This eventuality will contribute to the on-going transformation of the surgeon–patient relationship from paternalistic and doctor-centred, to one where decision-making is shared between clinician and patient.[12,13]

We found that a substantial proportion of patients who used the Internet were prepared to undergo a Web-based consultation with an orthopaedic surgeon. The impersonality of a Web-based consultation appeared not to discourage the use of this mode of communication. Clearly, the basic tenet of history followed by examination still holds true, but there may be a place for consultations over the Internet, perhaps for prioritisation or to monitor a patient's progress post-discharge. The latter has been assessed in other studies,[14–17] and shown to be of varying success.

Wakelin *et al.*[8] raised the issue of how orthopaedic surgeons should respond to unsolicited E-mails from patients. Our study suggests that such requests will increase considerably in the future. Another consequence of this is the need to ensure patient confidentiality when consulting or transferring records over the Internet. Several systems have been devised for this purpose and

have achieved of varying degrees of effectiveness.[18–21] Further systems require evaluation and development in the UK.

Previous studies have questioned the quality of medical Internet sites.[1,2,4,5,22] For the reasons mentioned, much further work is required in every speciality to assess and stratify the quality of information available to the patient population. The potential enormity of the influence of Web-based medical information may necessitate the development of an authority to approve health-based Web sites. In the US, the American Medical Association has issued guidelines to govern aspects of its Web offerings,[23] and has identified four major areas in which quality standards are required: (i) content; (ii) advertising and sponsorship; (iii) privacy and confidentiality; and (iv) E-commerce.

We suggest that the British surgical establishment, and its individual specialities, set up similar guidelines. At the very least, patients require education in the rudiments of critical review when confronted with the wealth of information available over the Internet.[24–26] As was stated by the US Surgeon General, Dr C Everett Koop:[27] 'we must remind patients that correct information and incorrect information both glow on the computer screen with the same intensity'.

Limitations

Our sample consisted of an orthopaedic out-patient population in a London district general hospital. Differences may exist between regions of the UK, and between district general and teaching hospitals. However, we believe these to be a reflection of social class. Thus our sample is likely to represent the National Health Service population as a whole, although further studies are required to confirm this.

There are limitations to the classification of social status based on occupation,[10] as this may not necessarily be related to income, which has been shown to correlate with Internet access.[28] This classification is currently subject to review.[29]

One further determinant of access demonstrated in other studies from the US is race.[30,31] This factor was not assessed in our study and requires further evaluation. The written nature of our survey biases some of the results, as those who declined to fill in the survey may not have been able to read English. However, we believe that this effect is small and does not detract from the overall impression.

Conclusions

This study demonstrates the increasing significance of the Internet to the patient, and its impact on the changing nature of the relationship between doctor and patient. Over half of the patients surveyed intend to use the Internet for medical information in the future. The Internet is increasingly becoming a first port of call when patients are seeking some semblance of a second opinion, particularly in the younger age group. This raises questions as to the regulation of Web sites in the UK, which surgeons and their institutions both need to address.

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References

1. Edworthy SM. World Wide Web: opportunities, challenges, and threats. *Lupus* 1999; **8**: 596–605.
2. Horton KM, Garland MR, Fishman EK. The Internet as a potential source of information about radiological procedures for patients. *J Digit Imaging* 2000; **13**: 46–7.
3. Adelhard K, Obst O. Evaluation of medical Internet sites. *Methods Inf Med* 1999; **38**: 75–9.
4. Mann CE. Searching for HIV / AIDS information on the World Wide Web. *J Assoc Nurses AIDS Care* 1999; **10**: 79–81.
5. Tench CM, Clunie GP, Dacre J, Peacock A. An insight into rheumatology resources available on the World Wide Web. *Br J Rheumatol* 1998; **37**: 1233–5.
6. McKinley J, Cattermole H, Oliver CW. The quality of surgical information on the Internet. *J R Coll Surg Edinb* 1999; **44**: 265–8.
7. Sacchetti P, Zvara P, Plante MK. The Internet and patient education – resources and their reliability: focus on a select urologic topic. *Urology* 1999; **53**: 1117–20.
8. Wakelin S, Oliver CW. How should orthopaedic surgeons respond to unsolicited email? *J Bone Joint Surg [Br]* 2001; **83**: 482–5.
9. Hellawell GO, Turner KJ, Le Monnier KJ, Brewster SF. Urology and the Internet: an evaluation of internet use by urology patients and of information available on urological topics. *BJU Int* 2000; **86**: 191–4.
10. Office of Population Censuses and Surveys. *Standard Occupational Classifications*, vol 3. London: HMSO, 1991.
11. Richards B, Colman AW, Hollingsworth RA. The current and future role of the Internet in patient education. *Int J Med Inf* 1998; **50**: 279–85.
12. Bader SA, Braude RM. 'Patient informatics': creating new partnerships in medical decision making. *Acad Med* 1998; **73**: 408–11.
13. Hjortdahl P, Nylenna M, Aasland OG. [Internet and the physician-patient relationship – from 'thank you' to 'why'?]. *Tidsskr Nor Laegeforen* 1999; **119**: 4339–41.
14. Aucar JA, Doarn CR, Sargsyan A, Samuelson DA, Odonnell MJ, DeBakey ME. Use of the Internet for long-term clinical follow-up. *Telemed J* 1998; **4**: 371–4.
15. Mandl KD, Kohane IS. Healthconnect: clinical grade patient–physician communication. *Proc AMIA Symp* 1999; **53**: 849–53.
16. Mix S, Borchelt M, Nieczaj R, Trilhof G, Steinhagen TE. [Telematics in geriatrics – potentials, problems and application experiences]. *Z Gerontol Geriatr* 2000; **33**: 195–204.
17. Peckham B. Internet access for ESRD patients gives new meaning to 'sleepless in Seattle'. Northwest kidney centers wire all stations at newest unit. *Nephrol News Issues* 1999; **13**: 18–9.

18. Baker DB, Masys DR. PCASSO: a design for secure communication of personal health information via the internet. *Int J Med Inf* 1999; **54**: 97–104.
19. Damster G, Williams JR. The Internet, virtual communities and threats to confidentiality. *S Afr Med J* 1999; **89**: 1175–8.
20. Goldberg HI, Tarczy HP, Stephens K, Larson EB, LoGerfo JP. Internet access to patients' records [Letter]. *Lancet* 1998; **351**: 1811.
21. Masys DR, Baker DB, Barnhart R, Buss T. PCASSO: a secure architecture for access to clinical data via the Internet. *Medinfo* 1998; **9**: 1130–4.
22. Sandvik H. Health information and interaction on the internet: a survey of female urinary incontinence. *BMJ* 1999; **319**: 29–32.
23. Winker MA, Flanagin A, Chi LB, White J, Andrews K, Kennett RL *et al*. Guidelines for medical and health information sites on the internet: principles governing AMA web sites. American Medical Association. *JAMA* 2000; **283**: 1600–6.
24. Lamp JM, Howard PA. Guiding parents' use of the Internet for newborn education. *MCN Am J Matern Child Nurs* 1999; **24**: 33–6.
25. Ling CA. Guiding patients through the maze of drug information on the Internet. *Am J Health Syst Pharm* 1999; **56**: 212–4.
26. Eysenbach G, Diepgen TL. Patients looking for information on the Internet and seeking teleadvice: motivation, expectations, and misconceptions as expressed in e-mails sent to physicians. *Arch Dermatol* 1999; **135**: 151–6.
27. Koop CE. *Convention Highlights*. American Urological Association, 93rd Annual Meeting 1998.
28. Mandl KD, Katz SB, Kohane IS. Social equity and access to the World Wide Web and E-mail: implications for design and implementation of medical applications. *Proc AMIA Symp* 1998; **9**: 215–9.
29. Rose D. *A Report on Phase 1 of the ESRC Review of Social Classifications*. Swindon: ESRC 1995.
30. Mandl KD, Feit S, Pena BM, Kohane IS. Growth and determinants of access in patient e-mail and Internet use. *Arch Pediatr Adolesc Med* 2000; **154**: 508–11.
31. Robinson C, Flowers CW, Alperson BL, Norris KC. Internet access and use among disadvantaged inner-city patients [Letter]. *JAMA* 1999; **281**: 988–9.