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Public attitudes towards healthcare measures promoting tobacco cessation in Germany: results from the representative German Study on Tobacco Use (the DEBRA study)

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ABSTRACT

Objective

The aim of this study was to assess public acceptance of four possible healthcare measures supporting tobacco dependence treatment in Germany.

Design

Cross-sectional household survey.

Setting

Data were drawn from the German population and collected through computer-assisted, face-to-face interviews.

Participants

Representative random sample of 2,087 people (≤ 14 years) of the German population.

Outcome measures

Public acceptance was measured regarding treatment cost reimbursement, standard training on offering cessation treatment for health professionals, and making cessation treatment a standard part of care for smokers with physical or mental disorders. Associations with smoking status and socio-economic (SES) characteristics were assessed.

Results

Support for all measures was high (50%-68%), even among smokers (48%-66%). Ex- or never-smokers were more likely to support standard training on cessation for health professionals than current smokers (OR 1.43, 95%CI 1.07–1.92; OR 1.43; 95%CI 1.14–1.79, respectively). Ex-smokers were also more likely than current smokers to support cessation treatment for smokers with mental disorders (OR 1.39, 95%CI 1.11–1.73). Men were less likely than women to support cessation treatment for smokers with physical diseases (OR 0.74, 95%CI 0.60–0.91) and free provision of treatment (OR 0.80, 95%CI 0.66–0.97). Offering cessation treatment was generally more accepted to smokers with physical rather than mental disorders.

Conclusions

The majority of the German population supports healthcare measures to improve the availability and affordability of tobacco dependence treatment. Non-smokers were more supportive than current

smokers of two of the four policies, but odds of support were only about 40% greater. SES characteristics were not consistently associated with public acceptance.

Trial registration number

DRKS00011322

Strengths and limitations of this study

- This is the first study helping to fill a knowledge gap on what changes to the tobacco cessation treatment system in Germany the country's population would agree to.
- Data was obtained from a sample which is representative for the German population.
- Analysis takes into account sociodemographic and socioeconomic factors as well as smoking status of the respondents.
- Since assessed measures are only hypothetical, we are unable to say whether public support would change in light of actual implementation.
- It would also be important to gain insight into the healthcare professionals' perspective regarding the support towards healthcare measures promoting tobacco cessation in Germany

Key words

Healthcare measures, Public opinion, Smoking cessation, Household Survey

INTRODUCTION

Treating tobacco use is a major public health issue: smoking remains a leading cause of death, killing approximately 6 million people worldwide each year.[1] Compared with other Western European countries, e.g. the Netherlands (19%), England (17%), or Sweden (7%),[2] the prevalence of tobacco smoking in Germany remains high (28%).[3] Moreover, smoking is unequally distributed across different socioeconomic groups within the population, with higher rates of smoking in more disadvantaged groups.[3, 4] Hence, interventions to reduce tobacco consumption should also aim to decrease tobacco-related health inequalities, and smoking cessation treatment as part of health services should be equally accessible to all social groups.

Article 14 of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) [1] states that ratifying countries should take effective measures to promote cessation of tobacco use and provide adequate treatment for tobacco dependence.[5] To assist countries in fulfilling these obligations, guidelines for the implementation of Article 14 of the WHO FCTC have been developed,[5] proposing the following healthcare measures to reduce national smoking prevalence: integrating brief advice to quit smoking into all health-care systems; ensuring that all health care workers are trained to provide brief smoking cessation support to their smoking patients; using existing health infrastructures for access to tobacco cessation (including primary care); and making evidence-based smoking cessation medication available to all smokers wanting to quit, either freely or at least at an affordable cost.

Whereas other European countries that ratified the FCTC made substantial progress to put these healthcare measures into practice, the level of implementation in Germany is comparably poor. In England, for example, a country with exemplary tobacco control,[6] smokers can easily access country-wide Stop Smoking Services to receive behavioural support and pharmacotherapy for free.[7] The National Centre for Smoking Cessation and Training (NCSCT) offers an online brief advice module to healthcare professionals for free, which has been completed by about 40,000 healthcare professionals to date.[8] Moreover, a national payment for performance system, the Quality and Outcomes Framework (QOF), was introduced in England in 2004 to improve the quality of primary care for patients,[9] and for secondary care in 2017.[10] Regarding the care for smoking patients with and without chronic diseases, the QOF rewards general practitioners (GPs) financially for delivering specific evidence-based interventions: e.g., recording their patients' smoking status, providing brief smoking cessation advice, and offering evidence-based smoking cessation treatment.[9]

In Germany, evidence-based treatments are still not, or only partly, reimbursed and stop-smoking services rarely exist. According to national clinical guidelines, evidence-based cessation methods and

brief advice to quit tobacco should be routinely offered to smoking patients in medical and psychosocial healthcare settings.[11, 12] However, GPs lack training in smoking cessation promotion as training is not a standard part of medical education, and to date no specific reimbursement is provided to GPs for offering brief smoking cessation counselling.[13]

As a consequence, less than 20% of smokers in Germany visiting their GP in the past year report receiving brief smoking cessation counselling,[14] which contrasts with England where half of all smokers report having received counselling.[15] The majority (> 80%) of smokers in Germany still try to quit unaided or with the use of non-evidence-based treatments,[3] and thus limit their chances of success.[16] Hence, there is an urgent need to improve implementation of Article 14 FCTC in German healthcare.

Implementation of healthcare measures tackling smoking prevalence at population level can only be successful if it is broadly accepted by the public and used by those affected. However, little is currently known about public support for healthcare measures to reduce tobacco-related health effects in Germany. The few existing studies focus exclusively on public attitudes towards tobacco control measures such as increasing taxes, improving public education, and environmental restrictions.[17-19]

Appropriate data are needed to improve the understanding of structural possibilities for the implementation of measures in German healthcare. Implementation usually requires political will, which often relies on understanding the level of public support. The German Study on Tobacco Use (DEBRA), an ongoing national representative survey, provides such data.

Objective

The aim of this study was to assess public support for possible legislative changes on healthcare measures that, according to Article 14 WHO FCTC, should have long been implemented in German healthcare.

METHODS

Design, setting, and participants

Data on public support for the implementation of potential healthcare measures were collected as part of the nationally representative DEBRA study ("DEutsche Befragung zum RAuchverhalten", www.debra-study.info). DEBRA started in June 2016 and consists of cross-sectional, computer-assisted household interviews in people aged 14 years and older, carried out by a market research

institute as part of a larger omnibus survey. Over a period of at least 3 years, a new representative sample of approximately 2,000 respondents of the German population will complete the survey every two months. Beyond smoking status, smoking and quitting behaviour, use of cessation methods and of electronic cigarettes, respondents report on socio-demographic characteristics. Methodological details, including details of the sampling approach, as well as the complete DEBRA questionnaire have been published in the study protocol.[20] The study was conducted in accordance with the Declaration of Helsinki, and the protocol of this study has been peer-reviewed and approved by the ethics committee of the Heinrich-Heine-University Duesseldorf, Germany (ID 5386/R).

Questions on public support for specific policies were asked during wave 2 of the study in August/September 2016, in a total sample of 2,087 respondents. For this wave, questions on public acceptance towards a) tobacco control strategies and b) healthcare policy measures were included. Findings on legislative tobacco control strategies such as a total ban of tobacco products or raising the legal age for tobacco consumption have been published elsewhere.[21] This article discusses findings of the questions on public attitudes towards healthcare measures suggested in Article 14 of the WHO FCTC.

Measures

Socio-demographic and smoking characteristics

Socio-demographic data on age, sex, education and net household income from all respondents are routinely collected in the omnibus survey by the market research institute. In the current analysis, level of education of every respondent was categorised from highest to lowest as 5 = high school equivalent ("Allgemeine Hochschulreife"), 4 = advanced technical college equivalent ("Fachhochschulreife"), 3 = secondary school equivalent ("Realschulabschluss"), 2 = junior high school equivalent (“Hauptschulabschluss”), and as 1 = no qualification. Respondents provided a point estimate of their net household income, which was categorised into 6= more than 5000€/month, 5 = 4000- less than 5000€/month, 3 = 2000 - less than 3000€/month, 4 = 3000 - less than 4000€/month, 2 = 1000- less than 2000€/month, and 1 = less than 1000€/month. Respondents were categorised as current tobacco smokers (cigarettes or other tobacco products), as ex-smokers if they had stopped during the past year or more than a year ago, or as never smokers if they had never smoked for a year or longer.

Current smokers of tobacco products were asked further details on their smoking behaviour: number of cigarettes smoked per day (answers per week or month were converted for analyses), about their

current motivation to quit smoking using the translated and culturally adapted German version of the Motivation to Stop Smoking Scale,[22] and whether or not they made at least one quit attempt during the past year.

Measures of public support

Public support was assessed with four suggestions on potential healthcare measures related to tobacco cessation. These suggestions have been adapted from the Smoking Toolkit Study (STS),[23] a methodologically comparable household survey, allowing comparisons with data from England at a later stage.

Participants were asked whether they would (a) "strongly support", (b) "tend to support", (c) "have no opinion either way", (d) "tend to oppose", (e) "strongly oppose", or (f) "don't want to answer" the four statements listed below. Answers are classified into "agree" (a and b), "disagree" (d and e), "undecided" (c) and "no answer" (f), and further dichotomised for the regression analyses into "agree" (a and b) and "don't agree" (c, d and e), with those responding 'f' excluded.

1. "Every smoker who wants should get support that is clinically proven to help stop smoking, and costs for these treatments (pharmacological or behavioural smoking cessation therapy) should be reimbursed".
2. "Making sure that all healthcare professionals directly involved in the treatment or care of patients are trained to advise smokers on how to stop smoking".
3. "Making stop-smoking support a standard part of care for smokers with long-term physical health problems (such as cardiovascular or respiratory diseases)".
4. "Making stop-smoking support a standard part of care for smokers with mental health problems (such as depression or schizophrenia)".

Statements were asked in a random order to avoid primacy and recency effects.[24]

Data analysis

Descriptive analyses using unweighted data were carried out to characterise the total sample as well as the subsamples according to smoking status of respondents. For categorical variables, proportions

were computed and for continuous variables, data were presented in terms of means and standard deviations (SD).

To provide prevalence data on public support for potential healthcare policies, the sample was weighted to be representative of the German population. Details on weighting procedures have been published in the study protocol.[20]

Associations between support of suggested healthcare measures and sample characteristics and, in currents smokers, smoking characteristics were assessed with exploratory multivariable logistic regression analyses using unweighted data (dichotomous dependent variable "agree on a potential healthcare policy measure" (yes vs.no)). Sample characteristics included in the model were sex, age, net household income, education, and smoking status. For the subgroup analysis in current smokers, the following smoking characteristics were also included: number of cigarettes smoked per day, current motivation to stop smoking,[22] and attempts to quit smoking (any vs. none) during the past year. To assess whether the sub-sample of smokers differed from the sub-sample of non- and ex-smokers, we ran the regression model for the latter group separately (Supplementary Table 1).

Out of the total sample, 25 respondents (1.1% of the total sample) refused to disclose their smoking status and were thus excluded from all analyses. Respondents who refused to answer questions on either their educational level, their attempts to quit smoking, or on questions regarding their support for potential healthcare policies were only excluded from the multivariate logistic regression analyses (statement 1 = 177 missing (8.6%), statement 2 = 187 missing (9.1%), statement 3 = 179 missing (8.7%), and statement 4 = 245 missing (11.9%)).

RESULTS

Sample characteristics

Unweighted baseline characteristics of the analysed sample of 2,062 respondents with full data on their smoking status are presented in **Table 1**. The sample had a mean age of 51.8 years (standard deviation [SD] = ± 20 years), and 1,070 (51.9%) of the respondents were female. In total, 1,107 (53.7%, 95% confidence interval [CI] = 51%-55%) respondents were never smokers, 369 (17.9%, 95%CI = 16%-19%) were ex-smokers, and 586 (28.4%, 95%CI = 26%-30%; unweighted) were current smokers. **Table 2** presents data on smoking characteristics for this subsample of current smokers.

Public support for healthcare measures

Figure 1 presents rates of support for suggested healthcare measures, weighted to be representative for the German population. All four measures receive support from the majority of the population. Of the total sample, 52% (95%CI = 50%-55%) agreed to providing cessation support to every smoker for free, 62% (95%CI = 60%-64%) would support standard training on cessation for health professionals, 68% (95%CI = 66%-70%) would support cessation as standard care for patients with chronic physical diseases, and half of the sample (50%, 95%CI = 47%-51%) supports cessation for patients with mental disorders.

Among the subsample of current smokers (**Figure 2**), the majority also agreed with all four healthcare measures, with standard cessation provision for patients with physical comorbidities again ranking highest at 66% (95%CI = 62%-70%). Slightly fewer smokers (54%, 95%CI = 50%-58%) than in the total sample would support standard training for all health professionals.

Factors associated with public support

Table 3 presents the results of the multivariable logistic regression for the suggested healthcare measures for the total unweighted sample, and for the subgroup of current smokers (for the sake of completeness we ran the regression model again for the group of non- and ex-smokers, please see Supplementary Table 1). Overall, socio-demographic and smoking characteristics are not consistently associated with support for proposed healthcare measures, with the exception of sex and smoking status.

Men had lower odds of agreeing with **free provision of cessation treatment** (OR 0.80, 95%CI 0.66 – 0.97) than women. Household income showed no significant associations with support for the measure, while those with education levels of junior high school equivalent to advanced technical college equivalent had higher odds of supporting free provision (OR 1.36, 95%CI 1.03-1.79; OR 1.34, 95%CI 1.05-1.72, OR 1.50, 95%CI 1.00-2.24).

Standard **training of health professionals** in cessation had higher odds of being supported by ex- or never-smokers (OR 1.43, 95%CI 1.07-1.92 and OR 1.43, 95%CI 1.14-1.79, respectively) than current smokers.

Men were less likely than women to support **cessation as standard care for patients with physical diseases** (OR 0.74, 95%CI 0.60-0.91).

Regarding **cessation as standard care for patients with mental illness**, ex-smokers had significantly higher odds than current smokers to agree with this healthcare measure (OR 1.39, 95%CI 1.11-1.73). Those earning less than 1000€/month had higher odds of supporting this statement than the highest income group (OR 2.07, 95%CI 1.29-3.31).

Support for measures in the sub-sample of smokers

When adjusting for socio-demographic characteristics (age, sex, education, household income) in the group of current smokers **(Table 3)**, motivation to quit smoking was associated with support for the proposed statement that all health professionals should be trained in offering cessation support: the higher the motivation to quit the greater the odds that a respondent agreed with the statement (continuous variable, OR 1.20, 95%CI 1.04-1.40). No further associations between level of support and smoking characteristics could be found among current smokers.

DISCUSSION

Overall, support in Germany is high for four healthcare policies that would increase the availability and affordability of tobacco cessation treatment: a majority of the adult population support each of four policies. Smoking status was associated with support for two of the four policies, but the odds of agreement were only up to 40% greater among non-smokers than current smokers. Men were less supportive than women but most SES characteristics were not consistently associated with public acceptance.

Acceptance of standard cessation support for patients with chronic physical diseases is higher than of cessation provision for patients with psychological disorders. Compared with the highest income group, people in the lower income groups expressed higher support for standard cessation treatment for the patient group with psychological comorbidities. Prevalence of smoking[25, 26] and of mental health issues[27] is higher in lower SES groups in Germany, similar to other European countries,[28] which could potentially explain these findings. Inequalities persist also for treatment seeking for psychiatric disorders in Germany.[29] A related interesting finding is that the number of people not answering whether they support standard treatment for patients with psychological comorbidities was higher than for other questions. This raises concerns about potential stigmatization of psychiatric illnesses or lack of knowledge about mental health in the general population in Germany. At the same time, this healthcare measure in particular would be of high importance, as patients with mental health issues are more susceptible to tobacco use and could especially profit from standard provision of cessation support.[30] It could be argued that more information about mental health might need to be provided to the public.

We found sex differences in support for statement regarding two statements: support for free cessation treatment among current smokers, and support for standard treatment for patients with

physical disorders among the whole sample. Each time men had lower odds of supporting said healthcare measures. Whether disease concepts, including concepts of addiction,[31] play a role in these differences needs to be explored further, ideally using both survey data and in-depth qualitative research.

Respondents who indicated a high motivation to quit seem to be more supportive of training healthcare professionals to advise smokers on how to quit tobacco. In light of the fact that the majority of quit attempts in Germany occur unaided,[3] this result highlights the need for the integration of such training into health professional education in Germany.

Compared with other European countries, tobacco cessation treatment is not well integrated into healthcare in Germany, despite knowledge about the burden of disease caused by tobacco use. The Germany SimSmoke study estimated that over 140,000 lives could be saved between 2020 and 2040 if cessation treatment were provided for free and comprehensively,[32] indicating a potential for better public health in Germany were such policies implemented.

This study has some limitations. We were only able to pose the healthcare measures support questions in one wave of the DEBRA survey due to resource constraints. It would be interesting to repeat the assessment in the future to gain insights into temporal trends and sensitivity of public acceptance in light of actual healthcare policy changes.

As the proposed healthcare measures would directly affect healthcare professionals in their training and work, it would be useful to not only assess public support, but also healthcare professionals' support towards these measures. As DEBRA is a nationally representative sample, however, findings give good insights into the overall population. Research with a sample of healthcare professionals could complement our national study.

The measures assessed here are only hypothetical. We are therefore unable to say whether public support would change in light of actual implementation. In addition, respondents were not asked about likelihood of such implementation, or who would pay for free cessation treatment. Depending on the contribution expected from the insured, for instance, answers might be different. Other studies have found that the public is willing to pay for effective tobacco control[33] however, this willingness to spend has its limits. At the same time, placing the burden entirely on the insured instead of dividing it between employers, insurer and the insured is unlikely in Germany's insurance-based universal healthcare system. Our findings may therefore well reflect the actual likelihood of support were the measure implemented.

Our findings help fill a knowledge gap on what changes to the tobacco cessation treatment system in Germany the country's population would agree to. Few studies have assessed public support for cessation treatment measures rather than tobacco control policies such as taxation or smokefree legislation. Information on public acceptance for specific tobacco treatment measures is even scarcer in Germany than for tobacco control. In Germany, DEBRA is one of only a few representative surveys targeting smoking and tobacco use behaviour,(e.g.,[20, 34]) and is the only one providing both cross-sectional and longitudinal data on specific tobacco-related questions at 2 month intervals.[20]

Making cessation treatment a part of standard care for patients with physical and psychological disorders is a practice that has already been successful elsewhere,[9] and that would be in line with the German clinical practice guidelines for the treatment of tobacco addiction.[11, 12] As such, these proposed healthcare measures are within the realm of the possible. Our findings show that offering cessation treatment as standard care in Germany would be accepted by the public.

Conclusions

Public support for integrating tobacco cessation treatment into the health system is high in Germany, in both smokers and non- or ex-smokers. Non-smokers were more supportive than current smokers but it is encouraging that the difference regarding the level of support between these two groups is small. Socio-demographic characteristics were not consistently associated with public acceptance. Offering tobacco cessation treatment to patients with physical diseases was generally more accepted than for patients with mental disorders. Providing cessation treatment offers to all smoking patients or, as a bare minimum, to those presenting with chronic disorders could be an accepted way forward in German tobacco control.

ABBREVIATIONS

GP = General practitioner

CI = Confidence interval

DEBRA = German Study on Tobacco Use (In German: "Deutsche Befragung zum Rauchverhalten")

FCTC = Framework Convention on Tobacco Control

MTSS = Motivation to Stop Scale (In German: MRS = "Motivation zum Rauchstopp Skala")

NCSCT = National Centre for Smoking Cessation and Training

NRT = Nicotine replacement therapy

OR = Odds ratio

QOF = Quality Outcome Framework

SD = Standard deviation

SES = Socioeconomic status

STS = Smoking Toolkit Study

WHO = World Health Organization

DECLARATIONS

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Consent to participate

The fieldwork is conducted by the market research institute Kantar Health Munich, Germany. The interviewers from Kantar Health make sure that all participants give oral informed consent. This method of consent has been also approved by the ethics committee.

Data sharing statement

All relevant data are within the paper. The data underlying this study are third-party data and are available to all researchers on reasonable request from the corresponding author.

Patient and Public Involvement statement

Patients were not involved in this study.

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Competing interests

SK and MB have no conflict of interest to declare. JB has received unrestricted research funding from Pfizer, who manufacture smoking cessation medications. LS has received honoraria for talks, an unrestricted research grant and travel expenses to attend meetings and workshops from Pfizer, and has acted as paid reviewer for grant awarding bodies and as a paid consultant for health care companies. DK received an unrestricted grant from Pfizer in 2009 for an investigator-initiated trial on the effectiveness of practice nurse counselling and varenicline for smoking cessation in primary care

(Dutch Trial Register NTR3067). All authors declare no financial links with tobacco companies or e-cigarette manufacturers or their representatives.

Author contributions

SK coordinates the DEBRA study, drafted the manuscript, analysed and interpreted the data. MB co-wrote the manuscript and interpreted the data. DK conceived the DEBRA study, contributed to the study design for the policy question analysis, and contributed to the writing of the manuscript. LS and JB work for the English Smoking Toolkit Study with which DEBRA is closely aligned, and contributed to the study design as well as to the writing of the manuscript. All named authors contributed substantially to the manuscript and agreed on its final version.

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Table 1 Baseline characteristics of the total sample, and by smoking status (unweighted data)[a]

	Total sample (N = 2,062; 100%)	Current smoker (N = 586; 28.4%)	Ex-smoker (N = 369; 17.9%)	Never smoker (N = 1,107; 53.7%)
Age, years (mean ± SD)	51.8 ± 19.8	47.1 ± 17.2	58.4 ± 17.5	52.1 ± 21.1
Sex				
Female	1,070 (51.9%)	271 (46.2%)	143 (38.8%)	656 (59.3%)
Male	992 (48.1%)	315 (53.8%)	226 (61.2%)	451 (40.7%)
Education[b]				
High school equiv.	479 (23.2%)	110 (19.2%)	85 (23.2%)	284 (27.4%)
Adv. tech. college equiv.	133 (6.5%)	28 (4.9%)	30 (8.2%)	75 (7.2%)
Secondary school equiv.	686 (33.3%)	230 (40.1%)	116 (31.7%)	340 (32.8%)
Junior high school equiv.	646 (31.3%)	193 (33.6%)	130 (35.5%)	323 (31.1%)
No qualification	33 (1.6%)	13 (2.3%)	5 (1.4%)	15 (1.4.5%)
Household income				
>€5000 /per month	134 (6.5%)	26 (4.4%)	27 (7.3%)	81 (7.3%)
€4000-5000/per month	128 (6.2%)	31 (5.3%)	24 (6.5%)	73 (6.6%)
€3000-4000/per month	369 (17.9%)	96 (16.4%)	67 (18.2%)	206 (18.6%)
€2000-3000/per month	557 (27.0%)	164 (28.0%)	106 (28.7%)	287 (25.9%)
€1000-2000/per month	638 (30.9%)	173 (29.5%)	117 (31.7%)	348 (31.4%)
< €1,000/per month	236 (11.4%)	96 (16.4%)	28 (7.6%)	112 (10.1%)

[a]Baseline characteristics of the sample have also been published elsewhere[21] under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited: CC BY 4.0. Data are presented as number (% within row), unless otherwise stated. [b]German equivalents to education levels listed in table from highest to lowest: high school equivalent = "Allgemeine Hochschulreife," advanced technical college equivalent = "Fachhochschulreife," secondary school equivalent = "Realschulabschluss," junior high school equivalent = "Hauptschulabschluss."

Table 2 Smoking characteristics of current smokers (unweighted data)

	Current smokers only (N = 586)
Cigarettes smoked per day (mean± SD)	15.3 ± 9.0
Made at least one quit attempt last year	140 (23.9%)
Motivation to stop smoking [20]	
Don't want to stop smoking	268 (45.7%)
Should stop but don't really want to	139 (23.7%)
Want to stop but haven't thought about when	52 (8.9%)
Want to stop but haven't decided when	51 (8.7%)
Really want to stop and hope to soon	43 (7.3%)
Really want to stop and intend to in the next 3 months	7 (1.2%)
Really want to stop and intend to in the next month	6 (1.0 %)

Data are presented as number (%), unless otherwise stated.

Table 3 Multivariable associations with support for the proposed healthcare measures in the total sample (N = 2,062), and in current smokers (N = 586)

	Every smoker gets cessation treatment for free	Training all healthcare professionals to advise smokers	Cessation support as standard care for smokers (physical diseases)	Cessation support as standard care for smokers (mental illness)
Smoking status				
Current smoker (ref.)	1	1	1	1
Ex-smoker	0.88 (0.67-1.16)	1.43 (1.07-1.92)*	1.37 (1.00-1.88)	1.19 (0.89-1.58)
Never smoker	0.88 (0.71-1.09)	1.43 (1.14-1.79)**	1.05 (0.83-1.33)	1.39 (1.11-1.73)**
Age, 10-year units[a]	1.01 (0.96-1.06)	1.05 (1.00-1.11)	1.06 (1.00-1.13)*	1.05 (1.00-1.11)
Sex				
Female (ref.)	1	1	1	1
Male	0.80 (0.66-0.97)*	0.83 (0.68-1.01)	0.74 (0.60-0.91)**	0.91 (0.75-1.10)
Education[b]				
High school equiv. (ref.)	1	1	1	1
Adv. tech. college equiv.	1.50 (1.00-2.24)*	1.16 (0.76-1.77)	1.21 (0.77-1.92)	1.41 (0.93-2.13)
Secondary school equiv.	1.34 (1.05-1.72)*	1.15 (0.88-1.49)	1.02 (0.77-1.34)	1.06 (0.82-1.37)
Junior high school equiv.	1.36 (1.03-1.79)*	0.99 (0.75-1.32)	0.93 (0.69-1.26)	1.23 (0.93-1.63)
No qualification	1.07 (0.49-2.34)	1.68 (0.69-4.11)	1.19 (0.49-2.91)	0.86 (0.39-1.91)
Household income				
€>5000/per month (ref.)	1	1	1	1
€4000-5000/per month	0.99 (0.60-1.64)	0.70 (0.42-1.19)	1.23 (0.69-2.19)	1.32 (0.79-2.21)
€3000-4000/per month	1.04 (0.69-1.58)	0.88 (0.56-1.36)	1.03 (0.65-1.165)	1.59 (1.04-2.43)*

€2000-3000/per month	0.92 (0.62-1.38)	0.87 (0.57-1.33)	0.84 (0.54-1.32)	1.39 (0.92-2.10)
€1000-2000/per month	1.02 (0.68-1.53)	0.91 (0.59-1.40)	1.05 (0.67-1.64)	1.56 (1.03-2.37)*
< €1,000/per month	1.53 (0.97-2.43)	1.10 (0.67-1.78)	1.22 (0.73-2.04)	2.07 (1.29-3.31)**
Current smokers only (N = 586)				
Cigarettes smoked/day, number[c]	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)
Quit attempt last year (yes/no)				
Yes, attempt to quit (ref.)	1	1	1	1
No, attempt to quit	0.80 (0.51-1.26)	0.70 (0.44-1.11)	0.91 (0.56-1.48)	0.84 (0.54-1.32)
Motivation to stop smoking (MRS)[3]	1.00 (0.87-1.14)	1.20 (1.04-1.40)*	1.14 (0.98-1.33)	0.95 (0.83-1.08)

Data are presented as adjusted OR (95% confidence interval around OR). Ref. = reference group. *p<0.05; **p<0.01. [a]continuous variable: age units are based on DEBRA study participation eligibility (14 years and older): 14-23; 24-33; 34-43; 44-53; 54-63; 64-73; 74-83; 84-93; 94-103, [b]German equivalents to education levels listed in table from highest to lowest: high school equivalent = "Allgemeine Hochschulreife," advanced technical college equivalent = "Fachhochschulreife," secondary school equivalent = "Realschulabschluss," junior high school equivalent = "Hauptschulabschluss", [c]continuous variable (MRS: increasing from 1 "don't want to top" to 7 "really want to stop, intend to in the next month").

Figure Legends

Figure 1 Proportion (with 95% confidence interval) of public support for healthcare policies (N=2,062 respondents, weighted data).

Figure 2 Proportion (with 95% confidence interval) of support for healthcare policies in the subsample of current smokers (N=586 respondents, weighted data).

Additional files

Additional file 1: Supplementary Table1_DEBRA_BMJopen.pdf (Content: Results of multivariable associations with support for the proposed healthcare measures in never- and ex-smokers (N = 1,476)).

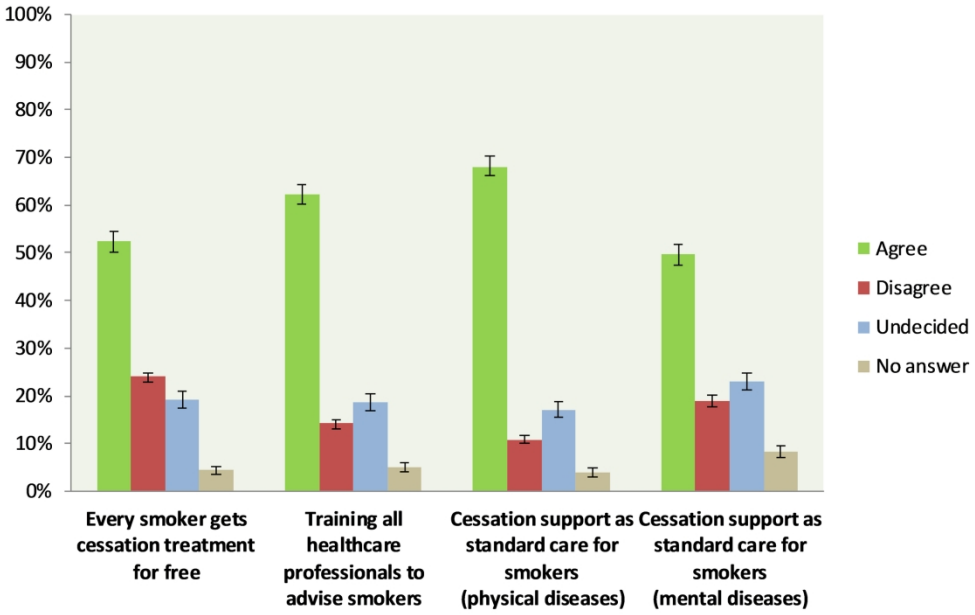

Figure 1 Proportion (with 95% confidence interval) of public support for healthcare policies (N=2,062 respondents, weighted data).

104x66mm (600 x 600 DPI)

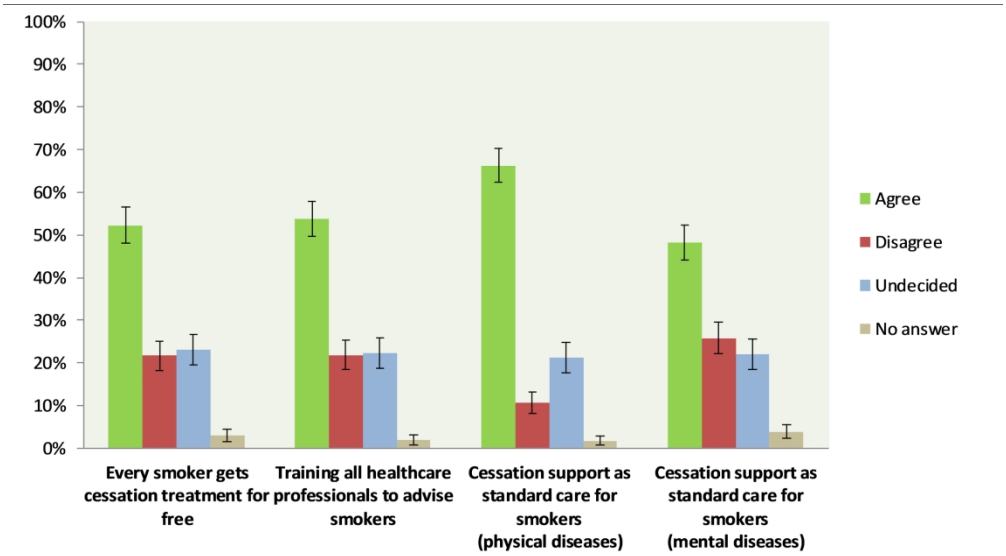

Figure 2 Proportion (with 95% confidence interval) of support for healthcare policies in the subsample of current smokers (N=586 respondents, weighted data).

104x58mm (600 x 600 DPI)

Supplementary Table 1 Multivariable associations with support for the proposed healthcare measures in never- and ex-smokers (N = 1,476)

	Every smoker gets cessation treatment for free	Training all healthcare professionals to advise smokers	Cessation support as standard care for smokers (physical diseases)	Cessation support as standard care for smokers (mental diseases)
Age, 10-year units[a]	0.99 (0.93-1.05)	1.05 (0.99-1.12)	1.08 (1.01-1-16)*	1.04 (0.98-1.11)
Sex				
Female (ref.)	1	1	1	1
Male	0.90 (0.72-1.12)	0.90 (0.71-1.14)	0.82 (0.64-1.05)	0.97 (0.78-1.23)
Education[†]				
High school equiv. (ref.)	1	1	1	1
Advanced technical college equiv.	1.50 (0.95-2.36)	1.14 (0.70-1.83)	1.08 (0.65-1.82)	1.44 (0.89-2.32)
Secondary school equiv.	1.36 (1.01-1.83)*	1.44 (1.04-1.94)	1.06 (0.76-1.48)	1.07 (0.79-1.46)
Junior high school equiv.	1.42 (1.03-1.97)*	1.05 (0.75-1.49)	0.86 (0.60-1.24)	1.15 (0.82-1.61)
No qualification	0.54 (0.19-1.58)	1.03 (0.34-3.08)	0.68 (0.23-2.03)	0.49 (0.17-1.38)
Household income				
€>5000/per month (ref.)	1	1	1	1
€4000-5000/per month	1.08 (0.62-1.91)	0.63 (0.34-1.16)	1.46 (0.75-2.85)	1.74 (0.95-3.16)
€3000-4000/per month	1.13 (0.70-1.80)	0.79 (0.47-1.31)	1.14 (0.67-1.93)	1.67 (1.03-2.72)*
€2000-3000/per month	1.03 (0.66-1.62)	0.76 (0.46-1.24)	0.88 (0.53-1.46)	1.42 (0.89-2.28)
€1000-2000/per month	1.00 (0.64-1.58)	0.82 (0.50-1.36)	1.09 (0.65-1.82)	1.70 (1.06-2.72)*
< €1,000/per month	1.62 (0.93-2.80)	1.16 (0.64-2.13)	1.65 (0.87-3.12)	2.09 (1.19-3.69)*

Data are presented as adjusted OR (95% confidence interval around OR). Ref. = reference group. *p<0.05; **p<0.01; [a]continuous variable, [†]German equivalents to education levels listed in table from highest to lowest: high school equivalent = "Allgemeine Hochschulreife," advanced technical college equivalent = "Fachhochschulreife," secondary school equivalent = "Realschulabschluss," junior high school equivalent = "Hauptschulabschluss." Age units are based on DEBRA study participation eligibility (14 and older): 14-23; 24-33; 34-43; 44-53; 54-63; 64-73; 74-83; 84-93; 94-103.

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
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4ff.
Objectives	3	State specific objectives, including any prespecified hypotheses1	Exploratory design
Methods			
Study design	4	Present key elements of study design early in the paper	5/6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6/7
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	6/7
Bias	9	Describe any efforts to address potential sources of bias	6-8
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	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	6, 8
		(*e*) Describe any sensitivity analyses	-
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	6,8,9
		(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	9, Table 1 (17)
		(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	9, Figure 1 and 2
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	9,10, Table 3 (19)
		(*b*) Report category boundaries when continuous variables were categorized	Table 3 (19/20)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8,9,10
Discussion			
Key results	18	Summarise key results with reference to study objectives	10,11
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
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	13

*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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Public attitudes towards healthcare policies promoting tobacco cessation in Germany: results from the representative German Study on Tobacco Use (the DEBRA study)

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Public attitudes towards healthcare policies promoting tobacco cessation in Germany: results from the representative German Study on Tobacco Use (the DEBRA study)

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Figures: 2

Supplementary files: 1

ABSTRACT

Objective

The aim of this study was to assess public acceptance of four possible healthcare policies supporting tobacco dependence treatment in line with Framework Convention for Tobacco Control (FCTC) Article 14 recommendations in Germany.

Design

Cross-sectional household survey.

Setting

Data were drawn from the German population and collected through computer-assisted, face-to-face interviews.

Participants

Representative random sample of 2,087 people (≥ 14 years) of the German population.

Outcome measures

Public acceptance was measured regarding 1) treatment cost reimbursement, 2) standard training on offering cessation treatment for health professionals, and making cessation treatment a standard part of care for smokers with 3) physical or 4) mental disorders. Associations with smoking status and socio-economic (SES) characteristics were assessed.

Results

Support for all policies was high (50%-68%), even among smokers (48%-66%). Ex- or never-smokers were more likely to support standard training on cessation for health professionals than current smokers (OR 1.43, 95%CI 1.07–1.92; OR 1.43; 95%CI 1.14–1.79, respectively). Ex-smokers were also more likely than current smokers to support cessation treatment for smokers with mental disorders (OR 1.39, 95%CI 1.11–1.73). Men were less likely than women to support cessation treatment for smokers with physical diseases (OR 0.74, 95%CI 0.60–0.91) and free provision of treatment (OR 0.80, 95%CI 0.66–0.97). Offering cessation treatment to smokers with physical disorders was generally more accepted than to those with mental health issues.

Conclusions

The majority of the German population supports healthcare policies to improve the availability and affordability of tobacco dependence treatment. Non-smokers were more supportive than current

smokers of two of the four policies, but odds of support were only about 40% greater. SES characteristics were not consistently associated with public acceptance.

Trial registration number

DRKS00011322

Strengths and limitations of this study

- This is the first study helping to fill a knowledge gap on what changes to the tobacco cessation treatment system in Germany the country's population would agree to.
- Data was obtained from a sample which is representative for the German population.
- Analysis takes into account sociodemographic and socioeconomic factors as well as smoking status of the respondents.
- Since assessed policies are only hypothetical, we are unable to say whether public support would change in light of actual implementation.
- It would also be important to gain insight into the healthcare professionals' perspective regarding the support towards healthcare policies promoting tobacco cessation in Germany

Key words

Healthcare policy, Public opinion, Smoking cessation, Household Survey

INTRODUCTION

Treating tobacco use is a major public health issue: smoking remains a leading cause of death, killing approximately 6 million people worldwide each year.[1] Compared with other Western European countries, e.g. the Netherlands (19%), England (17%), or Sweden (7%),[2] the prevalence of tobacco smoking in Germany remains high (28%).[3] Moreover, smoking is unequally distributed across different groups within the population, with higher rates of smoking in more disadvantaged socioeconomic groups[3, 4] and in people with poor mental health.[5] Hence, interventions to reduce tobacco consumption should also aim to decrease tobacco-related health inequalities, and smoking cessation treatment as part of health services should be equally accessible to all social groups.

Article 14 of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) [1] states that ratifying countries should take effective measures to promote cessation of tobacco use and provide adequate treatment for tobacco dependence.[6] To assist countries in fulfilling these obligations, guidelines for the implementation of Article 14 of the WHO FCTC have been developed,[6] proposing the following healthcare policies to reduce national smoking prevalence: integrating brief advice to quit smoking into all health-care systems; ensuring that all health care workers are trained to provide brief smoking cessation support to their smoking patients; using existing health infrastructures for access to tobacco cessation (including primary care); and making evidence-based smoking cessation medication available to all smokers wanting to quit, either freely or at least at an affordable cost.

Whereas other European countries that ratified the FCTC made substantial progress to put these healthcare measures into practice, the level of implementation in Germany is comparably poor.[7] Evidence-based treatments are still not, or only partly, reimbursed and stop-smoking services rarely exist. According to national clinical guidelines, evidence-based cessation methods and brief advice to quit tobacco should be routinely offered to smoking patients in medical and psychosocial healthcare settings.[8, 9] However, GPs lack training in smoking cessation promotion as training is not a standard part of medical education, and to date no specific reimbursement is provided to GPs for offering brief smoking cessation counselling.[10]

As a consequence, less than 20% of smokers in Germany visiting their GP in the past year report receiving brief smoking cessation counselling,[11] which contrasts with England where half of all smokers report having received counselling.[12] The majority (> 80%) of smokers in Germany still try to quit unaided or with the use of non-evidence-based treatments,[3] and thus limit their chances of success.[13] Hence, there is an urgent need to improve implementation of Article 14 FCTC in German healthcare.

Implementation of healthcare policies tackling smoking prevalence at population level can only be successful if it is broadly accepted by the public and used by those affected. However, little is currently known about public support for healthcare policies to reduce tobacco-related health effects in Germany. The few existing studies focus exclusively on public attitudes towards tobacco control measures such as increasing taxes, improving public education, and environmental restrictions.[14-16]

Appropriate data are needed to improve the understanding of structural possibilities for the implementation of policies in German healthcare. Implementation usually requires political will, which often relies on understanding the level of public support. The German Study on Tobacco Use (DEBRA), an ongoing national representative survey, provides such data.

Objective

The aim of this study was to assess public support for possible legislative changes on healthcare policies that, according to Article 14 WHO FCTC, should have long been implemented in German healthcare.

METHODS

Design, setting, and participants

Data on public support for the implementation of potential healthcare policies were collected as part of the nationally representative DEBRA study ("DEutsche Befragung zum RAuchverhalten", www.debra-study.info). DEBRA started in June 2016 and consists of cross-sectional, computer-assisted household interviews in people aged 14 years and older, carried out by a market research institute as part of a larger omnibus survey. Over a period of at least 3 years, a new representative sample of approximately 2,000 respondents of the German population will complete the survey every two months. Beyond smoking status, smoking and quitting behaviour, use of cessation methods and of electronic cigarettes, respondents report on socio-demographic characteristics. Methodological details, including details of the sampling approach, as well as the complete DEBRA questionnaire have been published in the study protocol.[17] The study was conducted in accordance with the Declaration of Helsinki, and the protocol of this study has been peer-reviewed and approved by the ethics committee of the Heinrich-Heine-University Duesseldorf, Germany (ID 5386/R).

Questions on public support for specific policies were asked during wave 2 of the study in August/September 2016, in a total sample of 2,087 respondents. For this wave, questions on public acceptance towards a) tobacco control strategies and b) healthcare policy were included. Findings

on legislative tobacco control strategies such as a total ban of tobacco products or raising the legal age for tobacco consumption have been published elsewhere.[18] This article discusses findings of the questions on public attitudes towards healthcare policies suggested in Article 14 of the WHO FCTC.

Measures

Socio-demographic and smoking characteristics

Socio-demographic data on age, sex, education and net household income from all respondents are routinely collected in the omnibus survey by the market research institute. In the current analysis, level of education of every respondent was categorised from highest to lowest as 5 = high school equivalent ("Allgemeine Hochschulreife"), 4 = advanced technical college equivalent ("Fachhochschulreife"), 3 = secondary school equivalent ("Realschulabschluss"), 2 = junior high school equivalent ("Hauptschulabschluss"), and as 1 = no qualification. Respondents provided a point estimate of their net household income, which was categorised into 6= more than 5000€/month, 5 = 4000- less than 5000€/month, 3 = 2000 - less than 3000€/month, 4 = 3000 - less than 4000€/month, 2 = 1000- less than 2000€/month, and 1 = less than 1000€/month. Respondents were categorised as current tobacco smokers (cigarettes or other combustible tobacco products), as ex-smokers if they had stopped during the past year or more than a year ago, or as never smokers if they had never smoked for a year or longer.

Current smokers of tobacco products were asked further details on their smoking behaviour: number of cigarettes smoked per day (answers per week or month were converted for analyses), about their current motivation to quit smoking using the translated and culturally adapted German version of the Motivation to Stop Smoking Scale,[19] and whether or not they made at least one quit attempt during the past year.

Measuring public support for healthcare policies

Public support was assessed with four suggestions on potential healthcare policies related to tobacco cessation. These suggestions have been adapted from the Smoking Toolkit Study (STS),[20] a methodologically comparable household survey, allowing comparisons with data from England at a later stage.

Participants were asked whether they would (a) "strongly support", (b) "tend to support", (c) "have no opinion either way", (d) "tend to oppose", (e) "strongly oppose", or (f) "don't want to answer" the

four statements listed below. Answers are classified into “agree” (a and b), “disagree” (d and e), “undecided” (c) and “no answer” (f), and further dichotomised for the regression analyses into “agree” (a and b) and “don’t agree” (c, d and e), with those responding ‘f’ excluded.

1. “Every smoker who wants should get support that is clinically proven to help stop smoking, and costs for these treatments (pharmacological or behavioural smoking cessation therapy) should be reimbursed”.

2. “Making sure that all healthcare professionals directly involved in the treatment or care of patients are trained to advise smokers on how to stop smoking”.

3. “Making stop-smoking support a standard part of care for smokers with long-term physical health problems (such as cardiovascular or respiratory diseases)”.

4. “Making stop-smoking support a standard part of care for smokers with mental health problems (such as depression or schizophrenia)”.

Statements were asked in a random order to avoid primacy and recency effects.[21]

Data analysis

Descriptive analyses using unweighted data were carried out to characterise the total sample as well as the subsamples according to smoking status of respondents. For categorical variables, proportions were computed and for continuous variables, data were presented in terms of means and standard deviations (SD).

To provide prevalence data on public support for potential healthcare policies, the sample was weighted to be representative of the German population. Details on weighting procedures have been published in the study protocol.[17]

Associations between support of suggested healthcare policies and sample characteristics were assessed with exploratory multivariable logistic regression analyses using unweighted data (dichotomous dependent variable “agree on a potential healthcare policy” (agree vs. disagree)). A second multivariable model was run with the subsample of current smokers, assessing associations between support of suggested healthcare policies and smoking characteristics. Sample characteristics included in both models were sex, age, net household income, education, and smoking status. For the subgroup analysis in current smokers, the following smoking characteristics were also included: number of cigarettes smoked per day, current motivation to stop smoking,[18] and attempts to quit smoking (any vs. none) during the past year. To assess whether the sub-sample of

smokers differed from the sub-sample of non- and ex-smokers, we ran a third regression model for the latter group separately (Supplementary Table 1).

Out of the total sample, 25 respondents (1.1% of the total sample) refused to disclose their smoking status and were thus excluded from all analyses. Respondents who refused to answer questions on either their educational level, their attempts to quit smoking, or on questions regarding their support for potential healthcare policies were only excluded from the multivariate logistic regression analyses (statement 1 = 177 missing (8.6%), statement 2 = 187 missing (9.1%), statement 3 = 179 missing (8.7%), and statement 4 = 245 missing (11.9%)).

RESULTS

Sample characteristics

Unweighted baseline characteristics of the analysed sample of 2,062 respondents with full data on their smoking status are presented in **Table 1**. The sample had a mean age of 51.8 years (standard deviation [SD] = ± 20 years), and 1,070 (51.9%) of the respondents were female. In total, 1,107 (53.7%, 95% confidence interval [CI] = 51%-55%) respondents were never smokers, 369 (17.9%, 95%CI = 16%-19%) were ex-smokers, and 586 (28.4%, 95%CI = 26%-30%; unweighted) were current smokers. **Table 2** presents data on smoking characteristics for this subsample of current smokers.

Public support for healthcare policies

Figure 1 presents rates of support for suggested healthcare policies weighted to be representative for the German population. All four policies receive support from the majority of the population. Of the total sample, 52% (95%CI = 50%-55%) agreed to providing cessation support to every smoker for free, 62% (95%CI = 60%-64%) would support standard training on cessation for health professionals, 68% (95%CI = 66%-70%) would support cessation as standard care for patients with chronic physical diseases, and half of the sample (50%, 95%CI = 47%-51%) supports cessation for patients with mental disorders.

Among the subsample of current smokers (**Figure 2**), the majority also agreed with all four healthcare policies, with standard cessation provision for patients with physical comorbidities again ranking highest at 66% (95%CI = 62%-70%). Slightly fewer smokers (54%, 95%CI = 50%-58%) than in the total sample would support standard training for all health professionals.

Factors associated with public support

Table 3 presents the results of the multivariable logistic regression for the suggested healthcare policies for the total unweighted sample, and for the subgroup of current smokers (for the sake of completeness we ran the regression model again for the group of non- and ex-smokers, please see Supplementary Table 1). Overall, socio-demographic and smoking characteristics are not consistently associated with support for proposed healthcare policies, with the exception of sex and smoking status.

Men had lower odds of agreeing with **1) free provision of cessation treatment** (OR 0.80, 95%CI 0.66 – 0.97) than women. Household income showed no significant associations with support for the policy, while those with education levels of junior high school equivalent to advanced technical college equivalent had higher odds of supporting free provision (OR 1.36, 95%CI 1.03-1.79; OR 1.34, 95%CI 1.05-1.72, OR 1.50, 95%CI 1.00-2.24).

Standard **2) training of health professionals** in cessation had higher odds of being supported by ex- or never-smokers (OR 1.43, 95%CI 1.07-1.92 and OR 1.43, 95%CI 1.14-1.79, respectively) than current smokers.

Men were less likely than women to support **3) cessation as standard care for patients with physical diseases** (OR 0.74, 95%CI 0.60-0.91).

Regarding 4**) cessation as standard care for patients with mental illness**, ex-smokers had significantly higher odds than current smokers to agree with this healthcare policy (OR 1.39, 95%CI 1.11-1.73). Those earning less than 1000€/month had higher odds of supporting this statement than the highest income group (OR 2.07, 95%CI 1.29-3.31).

Support for policies in the sub-sample of smokers

When adjusting for socio-demographic characteristics (age, sex, education, household income) in the group of current smokers **(Table 3)**, motivation to quit smoking was associated with support for the proposed statement that all health professionals should be trained in offering cessation support: the higher the motivation to quit the greater the odds that a respondent agreed with the statement (continuous variable, OR 1.20, 95%CI 1.04-1.40). No further associations between level of support and smoking characteristics could be found among current smokers.

DISCUSSION

Overall, support in Germany is high for four healthcare policies that would increase the availability and affordability of tobacco cessation treatment: a majority of the adult population support each of

four policies. Smoking status was associated with support for two of the four policies, but the odds of agreement were only up to 40% greater among non-smokers than current smokers. These findings are in line with results from 89 surveys on smokefree policy in the US and Canada;[22] however, a study from China found equal support for policies among smokers and non-smokers.[23] Men were less supportive than women, which was also observed in the review from the US and Canada,[22] but most SES characteristics were not consistently associated with public acceptance.

Acceptance of standard cessation support for patients with chronic physical diseases is higher than of cessation provision for patients with mental health issues. Compared with the highest income group, people in the lower income groups expressed higher support for standard cessation treatment for the patient group with mental health comorbidities. Prevalence of smoking[24, 25] and of mental health issues[26] is higher in lower SES groups in Germany, similar to other European countries,[27] which could potentially explain these findings. Inequalities persist also for treatment seeking for psychiatric disorders in Germany.[28] Another possible explanation are misconceptions relating to smoking and mental health. A recent systematic review found that even among mental health professionals, smoking is often perceived as a tool to manage stress in patients, and some mental health professionals believe that quitting smoking may be too much for their patients to take on while in treatment.[29]

A related interesting finding is that the number of people not answering whether they support standard treatment for patients with mental health comorbidities was higher than for other questions. This raises concerns about potential stigmatization of psychiatric illnesses or lack of knowledge about mental health in the general population in Germany. At the same time, this healthcare policy in particular would be of high importance, as patients with mental health issues are more susceptible to tobacco use[5] and could especially profit from standard provision of cessation support.[30] It could be argued that more information about mental health might need to be provided to the public. Integrating information on study participants' mental health conditions and treatment into future or ongoing population surveys could further support research on cessation for these groups.

We found sex differences in support for statement regarding two statements: support for free cessation treatment among current smokers, and support for standard treatment for patients with physical disorders among the whole sample. Each time men had lower odds of supporting said healthcare policies. Whether disease concepts, including concepts of addiction,[31] play a role in these differences needs to be explored further, ideally using both survey data and in-depth qualitative research.

Respondents who indicated a high motivation to quit seem to be more supportive of training healthcare professionals to advise smokers on how to quit tobacco. In light of the fact that the majority of quit attempts in Germany occur unaided,[3] this result highlights the need for the integration of such training into health professional education in Germany.

Compared with other European countries, tobacco cessation treatment is not well integrated into healthcare in Germany, despite knowledge about the burden of disease caused by tobacco use. The Germany SimSmoke study estimated that over 140,000 lives could be saved between 2020 and 2040 if cessation treatment were provided for free and comprehensively,[32] indicating a potential for better public health in Germany were such policies implemented.

This study has some limitations. We were only able to pose the healthcare policy support questions in one wave of the DEBRA survey due to resource constraints. It would be interesting to repeat the assessment in the future to gain insights into temporal trends and sensitivity of public acceptance in light of actual healthcare policy changes.

As the proposed healthcare policies would directly affect healthcare professionals in their training and work, it would be useful to not only assess public support, but also healthcare professionals' support towards these measures. As DEBRA is a nationally representative sample, however, findings give good insights into the overall population. Research with a sample of healthcare professionals could complement our national study.

The policies assessed here are only hypothetical. We are therefore unable to say whether public support would change in light of actual implementation. In addition, respondents were not asked about who would pay for free cessation treatment. Other studies have found that the public is willing to pay for effective tobacco control[33] however, this willingness to spend has its limits.

Our findings help fill a knowledge gap on what changes to the tobacco cessation treatment system in Germany the country's population would agree to. Few studies have assessed public support for cessation treatment measures rather than tobacco control policies such as taxation or smokefree legislation. Information on public acceptance for specific tobacco treatment measures is even scarcer in Germany than for tobacco control. In Germany, DEBRA is one of only a few representative surveys targeting smoking and tobacco use behaviour,(e.g.,[34]) and is the only one providing both cross-sectional and longitudinal data on specific tobacco-related questions at 2 month intervals.[17]

Making cessation treatment a part of standard care for patients with physical and mental health disorders is a practice that has already been successful elsewhere,[35] and that would be in line with the German clinical practice guidelines for the treatment of tobacco addiction.[8, 9] As such, these

proposed healthcare policies are within the realm of the possible. Our findings show that offering cessation treatment as standard care in Germany would be accepted by the public.

Conclusions

Public support for integrating tobacco cessation treatment into the health system is high in Germany, in both smokers and non- or ex-smokers. Non-smokers were more supportive than current smokers but it is encouraging that the difference regarding the level of support between these two groups is small. Socio-demographic characteristics were not consistently associated with public acceptance. Offering tobacco cessation treatment to patients with physical diseases was generally more accepted than for patients with mental disorders. Providing cessation treatment offers to all smoking patients or, as a bare minimum, to those presenting with chronic disorders could be an accepted way forward in German tobacco control.

ABBREVIATIONS

GP = General practitioner
CI = Confidence interval
DEBRA = German Study on Tobacco Use (In German: "Deutsche Befragung zum Rauchverhalten")
FCTC = Framework Convention on Tobacco Control
MTSS = Motivation to Stop Scale (In German: MRS = "Motivation zum Rauchstopp Skala")
NCSCT = National Centre for Smoking Cessation and Training
NRT = Nicotine replacement therapy
OR = Odds ratio
QOF = Quality Outcome Framework
SD = Standard deviation
SES = Socioeconomic status
STS = Smoking Toolkit Study
WHO = World Health Organization

DECLARATIONS

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Consent to participate

The fieldwork is conducted by the market research institute Kantar Health Munich, Germany. The interviewers from Kantar Health make sure that all participants give oral informed consent. This method of consent has been also approved by the ethics committee.

Data sharing statement

All relevant data are within the paper. The data underlying this study are third-party data (deidentified participant data, syntax of statistical analyses) and are available to all researchers on reasonable request from the prinicpal investigator of the DEBRA study (Prof. Dr. Daniel Kotz: daniel.kotz@med.uni-duesseldorf.de), up to 10 years following the data collection.

Patient and Public Involvement statement

Patients were not involved in this study.

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Competing interests

SK and MB have no conflict of interest to declare. JB has received unrestricted research funding from Pfizer, who manufacture smoking cessation medications. LS has received honoraria for talks, an unrestricted research grant and travel expenses to attend meetings and workshops from Pfizer, and has acted as paid reviewer for grant awarding bodies and as a paid consultant for health care companies. DK received an unrestricted grant from Pfizer in 2009 for an investigator-initiated trial on the effectiveness of practice nurse counselling and varenicline for smoking cessation in primary care (Dutch Trial Register NTR3067). All authors declare no financial links with tobacco companies or e-cigarette manufacturers or their representatives.

Author contributions

SK coordinates the DEBRA study, drafted the manuscript, analysed and interpreted the data. MB co-wrote the manuscript and interpreted the data. DK conceived the DEBRA study, contributed to the study design for the policy question analysis, and contributed to the writing of the manuscript. LS and JB work for the English Smoking Toolkit Study with which DEBRA is closely aligned, and contributed to the study design as well as to the writing of the manuscript. All named authors contributed substantially to the manuscript and agreed on its final version.

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Table 1 Baseline characteristics of the total sample, and by smoking status (unweighted data)[a]

	Total sample (N = 2,062; 100%)	Current smoker (N = 586; 28.4%)	Ex-smoker (N = 369; 17.9%)	Never smoker (N = 1,107; 53.7%)
Age, years (mean ± SD)	51.8 ± 19.8	47.1 ± 17.2	58.4 ± 17.5	52.1 ± 21.1
Sex				
Female	1,070 (51.9%)	271 (46.2%)	143 (38.8%)	656 (59.3%)
Male	992 (48.1%)	315 (53.8%)	226 (61.2%)	451 (40.7%)
Education[b]				
High school equiv.	479 (23.2%)	110 (19.2%)	85 (23.2%)	284 (27.4%)
Adv. tech. college equiv.	133 (6.5%)	28 (4.9%)	30 (8.2%)	75 (7.2%)
Secondary school equiv.	686 (33.3%)	230 (40.1%)	116 (31.7%)	340 (32.8%)
Junior high school equiv.	646 (31.3%)	193 (33.6%)	130 (35.5%)	323 (31.1%)
No qualification	33 (1.6%)	13 (2.3%)	5 (1.4%)	15 (1.4.5%)
Household income				
>€5000 /per month	134 (6.5%)	26 (4.4%)	27 (7.3%)	81 (7.3%)
€4000-5000/per month	128 (6.2%)	31 (5.3%)	24 (6.5%)	73 (6.6%)
€3000-4000/per month	369 (17.9%)	96 (16.4%)	67 (18.2%)	206 (18.6%)
€2000-3000/per month	557 (27.0%)	164 (28.0%)	106 (28.7%)	287 (25.9%)
€1000-2000/per month	638 (30.9%)	173 (29.5%)	117 (31.7%)	348 (31.4%)
< €1,000/per month	236 (11.4%)	96 (16.4%)	28 (7.6%)	112 (10.1%)

[a]Baseline characteristics of the sample have also been published elsewhere[18] under the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited: CC BY 4.0. Data are presented as number (% within row), unless otherwise stated. [b]German equivalents to education levels listed in table from highest to lowest: high school equivalent = "Allgemeine Hochschulreife," advanced technical college equivalent = "Fachhochschulreife," secondary school equivalent = "Realschulabschluss," junior high school equivalent = "Hauptschulabschluss."

Table 2 Smoking characteristics of current smokers (unweighted data)

	Current smokers only (N = 586)
Cigarettes smoked per day (mean± SD)	15.3 ± 9.0
Made at least one quit attempt last year	140 (23.9%)
Motivation to stop smoking [17]	
Don't want to stop smoking	268 (45.7%)
Should stop but don't really want to	139 (23.7%)
Want to stop but haven't thought about when	52 (8.9%)
Want to stop but haven't decided when	51 (8.7%)
Really want to stop and hope to soon	43 (7.3%)
Really want to stop and intend to in the next 3 months	7 (1.2%)
Really want to stop and intend to in the next month	6 (1.0 %)

Data are presented as number (%), unless otherwise stated.

Table 3 Multivariable associations with support for the proposed healthcare policies in the total sample (N = 2,062), and in current smokers (N = 586)

	1) Every smoker gets cessation treatment for free	2) Training all healthcare professionals to advise smokers	3) Cessation support as standard care for smokers (physical diseases)	4) Cessation support as standard care for smokers (mental illness)
Smoking status				
Current smoker (ref.)	1	1	1	1
Ex-smoker	0.88 (0.67-1.16)	1.43 (1.07-1.92)*	1.37 (1.00-1.88)	1.19 (0.89-1.58)
Never smoker	0.88 (0.71-1.09)	1.43 (1.14-1.79)**	1.05 (0.83-1.33)	1.39 (1.11-1.73)**
Age, 10-year units[a]	1.01 (0.96-1.06)	1.05 (1.00-1.11)	1.06 (1.00-1.13)*	1.05 (1.00-1.11)
Sex				
Female (ref.)	1	1	1	1
Male	0.80 (0.66-0.97)*	0.83 (0.68-1.01)	0.74 (0.60-0.91)**	0.91 (0.75-1.10)
Education[b]				
High school equiv. (ref.)	1	1	1	1
Adv. tech. college equiv.	1.50 (1.00-2.24)*	1.16 (0.76-1.77)	1.21 (0.77-1.92)	1.41 (0.93-2.13)
Secondary school equiv.	1.34 (1.05-1.72)*	1.15 (0.88-1.49)	1.02 (0.77-1.34)	1.06 (0.82-1.37)
Junior high school equiv.	1.36 (1.03-1.79)*	0.99 (0.75-1.32)	0.93 (0.69-1.26)	1.23 (0.93-1.63)
No qualification	1.07 (0.49-2.34)	1.68 (0.69-4.11)	1.19 (0.49-2.91)	0.86 (0.39-1.91)
Household income				
€>5000/per month (ref.)	1	1	1	1
€4000-5000/per month	0.99 (0.60-1.64)	0.70 (0.42-1.19)	1.23 (0.69-2.19)	1.32 (0.79-2.21)
€3000-4000/per month	1.04 (0.69-1.58)	0.88 (0.56-1.36)	1.03 (0.65-1.165)	1.59 (1.04-2.43)*

€2000-3000/per month	0.92 (0.62-1.38)	0.87 (0.57-1.33)	0.84 (0.54-1.32)	1.39 (0.92-2.10)
€1000-2000/per month	1.02 (0.68-1.53)	0.91 (0.59-1.40)	1.05 (0.67-1.64)	1.56 (1.03-2.37)*
< €1,000/per month	1.53 (0.97-2.43)	1.10 (0.67-1.78)	1.22 (0.73-2.04)	2.07 (1.29-3.31)**
Current smokers only (N = 586)				
Cigarettes smoked/day, number[c]	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)
Quit attempt last year (yes/no)				
Yes, attempt to quit (ref.)	1	1	1	1
No, attempt to quit	0.80 (0.51-1.26)	0.70 (0.44-1.11)	0.91 (0.56-1.48)	0.84 (0.54-1.32)
Motivation to stop smoking (MRS)[3]	1.00 (0.87-1.14)	1.20 (1.04-1.40)*	1.14 (0.98-1.33)	0.95 (0.83-1.08)

Data are presented as adjusted OR (95% confidence interval around OR). Ref. = reference group. *p<0.05; **p<0.01. [a]continuous variable: age units are based on DEBRA study participation eligibility (14 years and older): 14-23; 24-33; 34-43; 44-53; 54-63; 64-73; 74-83; 84-93; 94-103, [b]German equivalents to education levels listed in table from highest to lowest: high school equivalent = "Allgemeine Hochschulreife," advanced technical college equivalent = "Fachhochschulreife," secondary school equivalent = "Realschulabschluss," junior high school equivalent = "Hauptschulabschluss", [c]continuous variable (MRS: increasing from 1 "don't want to top" to 7 "really want to stop, intend to in the next month").

Figure Legends

Figure 1 Proportion (with 95% confidence interval) of public support for healthcare policies (N=2,062 respondents, weighted data).

Figure 2 Proportion (with 95% confidence interval) of support for healthcare policies in the subsample of current smokers (N=586 respondents, weighted data).

Additional files

Additional file 1: Supplementary Table1_DEBRA_BMJopen.pdf (Content: Results of multivariable associations with support for the proposed healthcare policy in never- and ex-smokers (N = 1,476)).

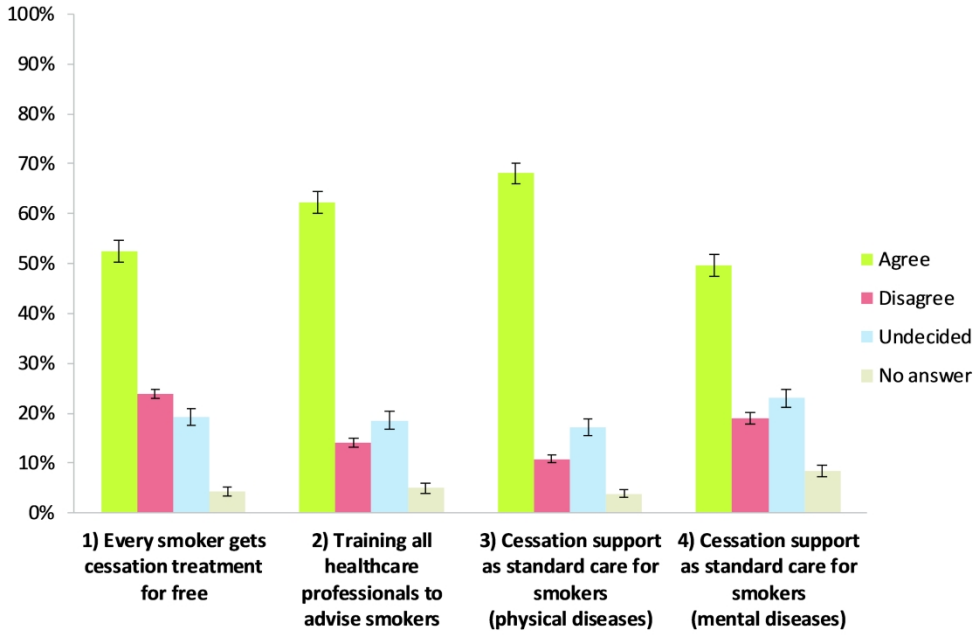

Figure 1 Proportion (with 95% confidence interval) of public support for healthcare policies (N=2,062 respondents, weighted data).

165x107mm (600 x 600 DPI)

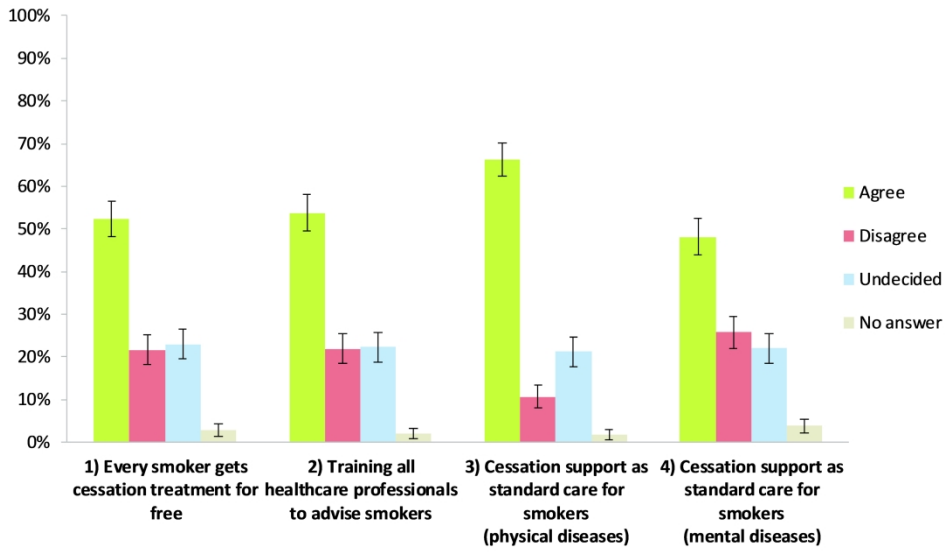

Figure 2 Proportion (with 95% confidence interval) of support for healthcare policies in the subsample of current smokers (N=586 respondents, weighted data).

185x104mm (600 x 600 DPI)

Additional Table 1 Multivariable associations with support for the proposed healthcare policies in never- and ex-smokers (N = 1,476)

	1) Every smoker gets cessation treatment for free	2) Training all healthcare professionals to advise smokers	3) Cessation support as standard care for smokers (physical diseases)	4) Cessation support as standard care for smokers (mental diseases)
Age, 10-year units[a]	0.99 (0.93-1.05)	1.05 (0.99-1.12)	1.08 (1.01-1-16)*	1.04 (0.98-1.11)
Sex				
Female (ref.)	1	1	1	1
Male	0.90 (0.72-1.12)	0.90 (0.71-1.14)	0.82 (0.64-1.05)	0.97 (0.78-1.23)
Education[†]				
High school equiv. (ref.)	1	1	1	1
Advanced technical college equiv.	1.50 (0.95-2.36)	1.14 (0.70-1.83)	1.08 (0.65-1.82)	1.44 (0.89-2.32)
Secondary school equiv.	1.36 (1.01-1.83)*	1.44 (1.04-1.94)	1.06 (0.76-1.48)	1.07 (0.79-1.46)
Junior high school equiv.	1.42 (1.03-1.97)*	1.05 (0.75-1.49)	0.86 (0.60-1.24)	1.15 (0.82-1.61)
No qualification	0.54 (0.19-1.58)	1.03 (0.34-3.08)	0.68 (0.23-2.03)	0.49 (0.17-1.38)
Household income				
€>5000/per month (ref.)	1	1	1	1
€4000-5000/per month	1.08 (0.62-1.91)	0.63 (0.34-1.16)	1.46 (0.75-2.85)	1.74 (0.95-3.16)
€3000-4000/per month	1.13 (0.70-1.80)	0.79 (0.47-1.31)	1.14 (0.67-1.93)	1.67 (1.03-2.72)*
€2000-3000/per month	1.03 (0.66-1.62)	0.76 (0.46-1.24)	0.88 (0.53-1.46)	1.42 (0.89-2.28)
€1000-2000/per month	1.00 (0.64-1.58)	0.82 (0.50-1.36)	1.09 (0.65-1.82)	1.70 (1.06-2.72)*
< €1,000/per month	1.62 (0.93-2.80)	1.16 (0.64-2.13)	1.65 (0.87-3.12)	2.09 (1.19-3.69)*

Data are presented as adjusted OR (95% confidence interval around OR). Ref. = reference group. *p<0.05; **p<0.01; [a]continuous variable, [†]German equivalents to education levels listed in table from highest to lowest: high school equivalent = "Allgemeine Hochschulreife," advanced technical college equivalent = "Fachhochschulreife," secondary school equivalent = "Realschulabschluss," junior high school equivalent = "Hauptschulabschluss." Age units are based on DEBRA study participation eligibility (14 and older): 14-23; 24-33; 34-43; 44-53; 54-63; 64-73; 74-83; 84-93; 94-103.

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
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4ff.
Objectives	3	State specific objectives, including any prespecified hypotheses1	Exploratory design
Methods			
Study design	4	Present key elements of study design early in the paper	5/6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6/7
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	6/7
Bias	9	Describe any efforts to address potential sources of bias	6-8
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	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	6, 8
		(*e*) Describe any sensitivity analyses	-
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	6,8,9
		(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	9, Table 1 (17)
		(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	9, Figure 1 and 2
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	9,10, Table 3 (19)
		(*b*) Report category boundaries when continuous variables were categorized	Table 3 (19/20)
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8,9,10
Discussion			
Key results	18	Summarise key results with reference to study objectives	10,11
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
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	13

*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.