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Smoking habits of future physicians: A survey among medical students of a South German university

Summary

Physicians can play a key role in promoting abstinence from tobacco. In many European countries, however, a large proportion of physicians are still smoking themselves. To assess smoking habits of future physicians, a cross-sectional study was conducted in 1992/1993 among 817 students enrolled in the first, third, and fifth years of medical school at the university of Ulm, Germany, using a self-administered questionnaire. The overall participation rate was 85.2%. Prevalence of current smoking was 17.6% among female participants and 29.2% among male participants. Among male students, smoking prevalence varied between 22.9% in the first year and 34.6% in the fifth year of medical school. Among female students, there were only minor differences in smoking prevalence between the first, third and fifth years at medical school. Most of the smokers had started to smoke prior to entry into medical school. Among third and fifth year students, slightly more students quit smoking than started to smoke during medical school, and smokers in the fifth year of medical school were more frequently willing to quit than smokers in the first and third year. Factors associated with regular smoking of medical students, after adjustment for potential confounders in multivariable analysis, were age, sex, and maternal smoking. While smoking prevalence was somewhat lower in the present study than in previous studies from Germany, further efforts are needed to reduce smoking among future physicians in this country.

multiple barriers that might prevent physicians from doing so. Most evident among these is physicians' own smoking⁷⁻⁸, which continues to be common in European countries⁹⁻¹³.

Of particular importance for the future potential of smoking counseling by physicians are the smoking habits of medical students and their attitudes towards smoking. In an international study initiated by the Tobacco and Health Committee of the International Union against Tuberculosis and Lung Disease in 1985, a very large variation was found in the prevalence of smoking among medical students between countries¹⁴⁻¹⁵, which was attributed mainly to social and cultural factors. The proportion of daily smokers varied from 3 to 33% among medical students of fourteen European countries¹⁴. The prevalence of current (regular or occasional) smoking was very high (about 30%) among medical students of the University of Mainz, the German university included in this international study¹⁶. There were no major differences in smoking habits between first year students and fifth year students at this university. In another study from eight German universities conducted in 1987-1989¹⁷, smoking prevalence among medical

Numerous studies have demonstrated the efficacy of physicians' advice to quit smoking¹. There are many possibilities for physicians for such counseling, given the frequent contacts of smoking patients with their physicians and the physicians' role as models of health

behaviour for their patients². In addition to helping patients to quit, physicians could also play a key role in preventing children and adolescents from starting to smoke³. Many physicians, however, do not counsel their patients on smoking habits⁴⁻⁶. There are

students was found to be even higher: 43.9% of male students and 34.9% of female students were current smokers.

Since these studies were conducted in Germany, a new cohort of medical students has passed through medical school. Furthermore, previous studies did not provide information on the dynamics of smoking habits prior to and during medical school, or on factors associated with smoking among medical students. Therefore, we initiated a study among medical students at the university of Ulm in 1992/1993 to explore in more detail smoking habits and their determinants among medical students at various stages of medical school, and changes in smoking habits during medical school.

Methods

A survey was conducted at the university of Ulm between October 1992 and April 1993. All students who entered the first, third or fifth year of the curriculum at the medical school in October 1992 were eligible for participation. The survey was conducted by a short self-administered questionnaire. The questionnaire was distributed and collected during key lectures or courses at the beginning of the winter semester 1992/1993 and, for some of the fifth year students, at the beginning of the summer semester 1993. The different dates for the fifth year students resulted from a different schedule of courses for subgroups of students in this study year.

The questionnaire contained 58 items. All questions were fully standardized. Items included, among others, current or former smoking status, year of initiation and eventual cessation, amount of smoking, attempts to quit, and willingness to reduce or quit. Students were classified as current smokers if they indicated occasional smok-

ing or regular smoking (at least one cigarette per day) at the time of the survey. Those students who indicated that they had smoked occasionally or regularly in the past, but had quit in the meantime, were classified as former smokers. Information was also collected on sociodemographic factors and on the smoking habits of students' parents.

The sex-specific prevalence of current and former smoking at the time of the study was compared between students of the first, third and fifth years. In addition, the sex-specific prevalence of ever having smoked by age 19, the minimum age at entry into medical school among participants of this study, was derived for the three groups of medical students from reported smoking histories. The temporal relation between smoking initiation and eventual cessation and entry into medical school was assessed in detail for the students who had ever smoked. Furthermore, the regularity and amount of smoking of current smokers, and the proportion among them who wished to reduce or quit were compared between first, third, and fifth year medical students. Finally, a multivariable analysis of potential predictors of regular smoking among medical students was performed using multiple

logistic regression with regular smoking as the dependent variable. The rationale for this analysis was twofold: First, to adjust the relationship between year at medical school and regular smoking for potential confounders, particularly age, which is strongly related to the year at medical school. Second, to identify potential predictors of regular smoking among medical students. The following covariates which were considered to be potential predictors of regular smoking on the basis of prior knowledge^{18,19} were included in this analysis: age (categories 19–21 years, 22–24 years, ≥25 years), sex, level of maternal and paternal school education (categories ≤9 years, 10–11 years, ≥12 years) and maternal and paternal smoking status (categories: ever smoker, never smoker). All analyses were carried out on a PC using the software package SAS²⁰.

Results

Among 817 students who were registered for the first, third, or fifth year of medical school, 696 students participated in the study, which corresponds to an overall participation rate of 85.2%. The participation rate was 90.5% for first year students, 80.1% for third

Smoking Status	Year at Medical School			Total
	1st	3rd	5th	
Females	n = 113	n = 109	n = 108	n = 330
Current	18.6%	16.5%	17.6%	17.6%
Former	12.4%	7.3%	11.1%	10.3%
Never	69.0%	76.2%	71.3%	72.1%
Males	n = 118	n = 112	n = 136	n = 366
Current	22.9%	29.5%	34.6%	29.2%
Former	16.1%	11.6%	12.5%	13.4%
Never	61.0%	58.9%	52.9%	57.4%

Table 1. Smoking status by year at medical school among female and male students at the university of Ulm, Germany, in 1992/1993.

Smoking Status	Year at Medical School			Total
	1st	3rd	5th	
Females	24.2 %	15.0 %	21.2 %	20.2 %
Males	35.8 %	32.2 %	29.4 %	32.3 %
Both Sexes	30.1 %	23.7 %	25.8 %	26.5 %

Table 2. Proportion of medical students who initiated smoking before age 19 by year at medical school.

	Year at Medical School					
	1st year		3rd year		5th year	
	S	Q	S	Q	S	Q
Females						
Before	28	9	20	3	22	4
During	2	4	2	2	3	1
After	N. A.	N. A.	1	3	1	6
Males						
Before	41	10	38	4	49	3
During	1	7	2	4	0	4
After	N. A.	N. A.	0	4	8	9

Table 3. Numbers of male and female students who started (S) and quit (Q) smoking before, during or after the calendar year of entry into medical school by current year at medical school.

Characteristic	Year at Medical School			Total n = 165
	1st n = 48	3rd n = 51	5th n = 66	
Frequency of Smoking				
Regularly ^a	56 %	55 %	64 %	59 %
Occasionally	44 %	45 %	36 %	41 %
Cigarettes per Day				
≤ 5	60 %	57 %	48 %	54 %
6–15	27 %	31 %	37 %	32 %
> 15	13 %	12 %	15 %	13 %
Desire to Reduce or Quit				
Quit	30 %	31 %	48 %	38 %
Reduce	26 %	20 %	14 %	19 %
Neither Quit nor Reduce	44 %	49 %	38 %	43 %

^a at least one cigarette per day

Table 4. Characteristics of current smokers by year at medical school among students at the university of Ulm, Germany, in 1992/1993.

year students and 85.3% for fifth year students. Non-participation was mainly due to absence from the lecture or course in which the questionnaires were distributed and collected. Only a negligible minority of students who were present refused to participate. For logistical reasons, exact enumeration of students in the lecture room at the time of the survey was possible for first year students only. Among 255 students registered for the first year, 236 students attended the lecture, and 231 students filled out the questionnaire.

Overall, 29.2% of male students and 17.6% of female students were current smokers at the time of the survey, whereas 42.6% of male students and 27.9% of female students had ever smoked (see Table 1). The differences in smoking status between both sexes were statistically significant ($p < 0.001$ in the χ^2 -test of independence). Differences in smoking prevalence were very small between first, third and fifth year female students, but the proportion of current smokers was higher in the third (29.5%) and fifth (34.6%) years than in the first (22.9%) year among male students ($p < 0.05$ in the Mantel extension test for trend).

Students of the first, third, and fifth years at medical school represent different birth cohorts. To assess a potential cohort effect that might explain differences in smoking status, the proportion of students who had ever smoked by age 19, the minimum age at entry into medical school of students included in this study, was compared between the three groups of students (see Table 2). Prevalence was higher in first year students than in third and fifth year students, but these differences were not statistically significant. Within all three groups, prevalence of ever having smoked by age 19 was higher among male than among female students.

Table 3 displays the temporal relation of onset and cessation (with-

	OR (95 % Confidence Interval)
Year at Medical School	
1st year ^a	1.00
3rd year	0.73 (0.36–1.47)
5th year	0.80 (0.39–1.66)
Age	
19–21 years ^a	1.00
22–24 years	1.98 (0.93–4.23)
≥25 years	2.58 (1.06–6.24)
Sex	
Females ^a	1.00
Males	1.89 (1.14–3.14)
School Education of Mother	
≤9 years ^a	1.00
10–11 years	1.35 (0.71–2.56)
≥12 years	0.91 (0.43–1.93)
School Education of Father	
≤9 years ^a	1.00
10–11 years	0.92 (0.43–1.95)
≥12 years	0.82 (0.40–1.67)
Smoking Status of Mother	
Never Smoker ^a	1.00
Ever Smoker	2.53 (1.54–4.17)
Smoking Status of Father	
Never Smoker ^a	1.00
Ever Smoker	1.25 (0.74–2.10)

^a Reference Category

Table 5. Odds ratios (95% confidence intervals) for regular smoking by year at medical school, sociodemographic factors and parental smoking among medical students at the University of Ulm, Germany. Odds ratios are adjusted for all other variables listed in the table by multiple logistic regression.

out relapse) of smoking to entry into medical school. The vast majority of students who ever smoked started smoking in the calendar years before and including the year of entry into medical school (the month of entry into medical school at the university of Ulm is October). Nevertheless, a noteworthy proportion of male students who were in their fifth year at the time of the study had begun to smoke after entry into medical

school. In this group, smoking initiation and smoking cessation in the years after entry into medical school were almost balanced. In contrast, more students quit smoking than started smoking after entry into medical school among female students in the third and fifth year and among male students in the third year. These results have to be interpreted with caution, however, due to the small numbers of students.

Among current smokers, the proportion who smoked regularly or who smoked more than five cigarettes per day was higher among fifth year students than among third year and first year students (see Table 4). These differences were not statistically significant, however, given the small numbers of students on which this analysis is based. At the same time, the proportion of smokers who would like to quit increased from 30% of first year students to 48% of fifth year students (p -value for trend = 0.05), whereas the proportions of smokers who would like to reduce smoking was largest among first year students.

Table 5 shows the results of the multivariable analysis on potential predictors of regular smoking among medical students. After adjustment for sex, age, parental school education and parental smoking, the odds for regular smoking were slightly lower among third and fifth year students than among first year students, but these small differences were not statistically significant. In contrast, the odds of regular smoking strongly increased with age (OR for age group ≥25 years compared to age group 19–21 years: 2.58, 95% confidence interval 1.06–6.24). The multivariable analysis confirmed the sex differences in prevalence of regular smoking found in bivariate analyses (OR for regular smoking among males versus female students: 1.89, 95% confidence interval 1.14–3.14). Finally, a strong association of students' regular smoking was observed with maternal smoking (OR = 2.53, 95% confidence interval 1.54–4.17), whereas no such association was found with paternal smoking or parental school education.

Discussion

In Germany, a substantial proportion of medical students, partic-

ularly male medical students, continue to smoke. In this study from the university of Ulm, almost 20% of female students and almost 30% of male students were smoking. Prevalence of smoking was unrelated to year at medical school among female students, while smoking was more prevalent among male students at advanced stages of medical school than among male students who had just entered medical school. The difference between first and fifth year male students is unlikely to reflect "effects" of medical school since there were about equal numbers of male fifth year students who started to smoke and who quit smoking after entry into medical school. Also, the difference can not be explained by differences in baseline smoking rates, since rates of smoking initiation before age 19 were highest in the youngest cohort of male students. An alternative explanation for the differences in smoking prevalence between the three cohorts of male students appears to be more plausible: a noteworthy large proportion of first year students indicated having quit smoking in 1992 and 1991, the year of entry into medical school and the year before. Smoking cessation among these students may or may not be related to entry into medical school. Since relapse rates during the first year after smoking cessation are high²¹, reported smoking prevalence among first year students could be deceptively low, bearing in mind that a substantial proportion of first year students classified as ex-smokers might resume smoking while studying medicine. This question should be addressed in longitudinal studies in the future.

Most medical students who smoked started to do so before entry into medical school. Nevertheless, smoking habits of many medical students were still unstable as reflected in the relatively high proportions of occasional smokers and

in a noteworthy number of students who initiated or quit smoking during medical school. Smokers on the average smoked more cigarettes and smoked more regularly in the fifth year than in the first and third years at medical school, which indicates that smoking habits might stabilize among current smokers while passing through medical school. Results of the multivariable analyses suggest, however, that the higher proportion of regular smokers among 5th year students most likely reflects an age effect rather than an effect of medical school. Besides age and sex, smoking history of the mother was the strongest predictor of regular smoking among medical students. This strong association, which is in agreement with results from Yugoslavia and Israel^{18,19}, underlines the importance of social factors during childhood and adolescence for developing smoking habits. Such social factors should be further studied. Along with the increase in the amount and regularity of smoking, the proportion of smokers who would like to quit also increased from the first to the fifth year, while the proportion of smokers who would like to reduce decreased.

Several limitations of our study require careful discussion. Among these are the well-known limitations inherent in the cross-sectional study design. However, these limitations were strongly reduced (though not eliminated entirely) through the very careful retrospective collection of smoking histories. Although self-reported smoking histories could not be validated by objective measures, such as biological markers, potential misreporting of smoking habits and their changes over time is likely to be of limited magnitude given the anonymous mode of data collection. Nevertheless, administration of the questionnaire in lecture rooms, which was motivated by logistic considerations, and which ensured

a very high response rate, may have hindered concentration of students to some extent. Finally, it should be noted that our results are not necessarily representative of other medical schools in Germany. Most of the medical students at the university of Ulm come from the predominantly rural area around Ulm. Since smoking has traditionally been more common in urban areas in Germany²², the prevalence of current or former smokers is likely to be even higher in medical schools of other German universities, particularly those in metropolitan areas. This may partly explain that smoking prevalence was somewhat lower in our study than in previous studies from Germany, although the difference might also be due to a trend toward lower smoking rates.

Prevalence of smoking medical students observed in this study is also lower than smoking prevalence in the general population. The overwhelming majority of medical students is between 20 and 30 years old. Nationally, more than 40% of men and more than 30% of women in this age group smoke²³. Nevertheless, the smoking prevalence of medical students is still very high compared with other countries, such as the United Kingdom¹⁴ or the United States^{24–25}. This fact, together with the on-going smoking epidemic in the general population^{23,26}, underlines the need for more powerful public health efforts to limit the detrimental effects of tobacco consumption in this country. Physicians should be in the forefront on the way towards a smoke-free society. The instability of the smoking habits of medical students, and the high proportion of smoking students who would like to quit or at least reduce smoking, suggest that efforts to reduce smoking among medical students could be promising. Such efforts could include, among others, offers of smoking cessation classes and a stronger emphasis on epidemiolo-

gy and preventive medicine in the curriculum of medical school. Of course, the most desirable approach would be to prevent adolescents (including future medical students) from starting to smoke in the first place. This appears to be of particular relevance, given the high proportion of first year medical students who had already begun to smoke by age 19 in our study. The experience of other countries, such as the United States, in which smoking prevalence in general and among physicians and medical students in particular has decreased dramatically in recent years^{24–25,27}, suggests that major progress against the smoking epidemic can be achieved within a reasonable period of time in the context of concerted public health efforts.

Zusammenfassung

Rauchgewohnheiten künftiger Ärzte: Eine Studie an Medizinstudenten einer süddeutschen Universität

Den Ärzten kommt bei der Förderung des Nichtrauchens eine Schlüsselrolle zu. In vielen europäischen Ländern ist jedoch ein grosser Teil der Ärzte selbst noch Raucher. Zur Untersuchung der Rauchgewohnheiten künftiger Ärzte führten wir 1992/1993 an der Universität Ulm eine schriftliche Befragung unter 817 Medizinstudenten des ersten, dritten und fünften Studienjahrs durch. Die Teilnahmequote betrug 85,2%. Die Raucherprävalenz der Studentinnen betrug 17,6%, die der Studenten 29,2%. Während 22,9% der männlichen Studenten im ersten Studienjahr rauchten, betrug der Raucheranteil im 5. Studienjahr 34,6%. Bei den Studentinnen variierte die Raucherprävalenz zwischen den unterschiedlichen Studienjahren nur geringfügig. Die meisten Raucher hatten schon vor dem Eintritt ins Medizinstudium mit dem Rauchen begonnen. Die Zahl der Studenten des dritten und fünften Studienjahres, die während des Medizinstudiums mit dem Rauchen aufgehört hatten, lag geringfügig über der Zahl derer, die während des Medizinstudiums anfangen zu rauchen. Der Anteil der Raucher, die gerne mit dem Rauchen aufhören würden, war im fünften Studienjahr grösser als im ersten und dritten Studienjahr. In einer multivariablen Analyse wurden Alter, Geschlecht und mütterliches Rauchen als Prädiktoren regelmässigen Rauchens von Medizinstudenten identifiziert. Obwohl die Raucherprävalenz von Medizinstudenten in dieser Studie etwas niedriger war als in früheren Erhebungen, sollten weitere Anstrengungen zur Verringerung des Rauchens in der künftigen Ärzteschaft unternommen werden.

Résumé**Tabagisme chez les futurs médecins: L'exemple des étudiants en médecine d'une université allemande**

Les médecins jouent un rôle primordial dans la prévention contre le tabagisme. En effet, dans la plupart des pays européens, une grande proportion des médecins sont eux-mêmes fumeurs. Pour examiner les habitudes tabagiques chez les futurs médecins, on a effectué en 1992/1993 une étude à l'Université d'Ulm. 817 étudiants de première, troisième et cinquième année y ont participé. La quote de participation était de 85.2%. La prévalence de fumeuses actives était de 17.6%, parmi les participants de sexe masculin 29.2%. Chez les sujets masculins la prévalence a variée entre 22.9% en première année d'études, et 34.6% en cinquième année. En ce qui concerne la prévalence chez les sujets féminins on a constaté qu'une différence non-significative pour les années examinées. La plupart des fumeurs l'étaient déjà avant le début des études. Le nombre des étudiants de troisième et cinquième année qui ont arrêté de fumer durant leurs études était légèrement plus que le nombre de ceux qui ont commencé durant leurs études. L'envie d'arrêter de fumer était plus prononcée chez les fumeurs de cinquième année. Avec une analyse multivariante, on a montré qu'il existe une association significative entre l'âge, le sexe, la mère fumeuse et l'habitude de fumer régulièrement chez les étudiants. Malgré le fait que la prévalence de fumeurs dans cette étude était moindre, comparée avec des études semblables, un effort en vue de diminuer la consommation de tabac chez les futurs médecins reste indispensable.

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