

## ORIGINAL ARTICLE

# Smoking and Chronic Back Pain

Analyses of the German Telephone Health Survey 2003

Monique Zimmermann-Stenzel, Julia Mannuß, Sven Schneider,  
Marcus Schiltenswolf

## SUMMARY

**Introduction:** Smoking represents the greatest avoidable risk for a large number of serious diseases. The goal of the present study was to investigate the connection between tobacco consumption and back pain, as such a link has yet to be clearly established.

**Methods:** The analysis was based on the public use file of the German Telephone Health Survey 2003 (n = 8318), carried out by the Robert Koch Institute, Berlin. After exclusion of invalid cases, data on 7271 persons (total model) and 1998 persons (smoker model) were analyzed.

**Results:** Multivariate data analysis clearly shows that not only daily smokers (OR 1.45, 95% CI 1.13 to 1.85) but also former smokers (OR 1.65, 95% CI 1.32 to 2.07) have a significantly higher chance of suffering from chronic back pain than non-smokers. Number of smoking years is the factor most significantly correlated with chronic back pain, while starting age and amount of tobacco consumed have no impact.

**Discussion:** Owing to the cross-sectional design of this investigation it is not possible to conclude that smoking causes increased back pain through physical dysfunction. Nevertheless, the correlation should be analyzed in a longitudinal study because clarification of causality always represents potential for prevention.

Dtsch Arztebl Int 2008; 105(24): 441–8  
DOI: 10.3238/arztebl.2008.0441

**Key words:** smoking, back pain, tobacco use disorder, health survey, nicotine

In modern societies tobacco consumption represents the greatest avoidable risk factor for a large number of serious diseases (1). While the link between smoking and cancer, respiratory disease and cardiac disease has been clearly demonstrated, the international data on the correlation between tobacco consumption and orthopedic disorders are sparse and contradictory (2, 3). To date no clearcut causal relationship between nicotine and back pain has been shown (4). Nevertheless, the deleterious effect of nicotine is undisputed. On the one hand, nicotine consumption leads in the short term to vasoconstriction and in the long term to arteriosclerosis, resulting not only in an inadequate supply of blood to the internal organs but also to deficient nutrition of bone and thus to reduced bone formation (5, 6). Decreased perfusion of structures in and around the spinal column, particularly the intervertebral disks and the muscles of the back, seem to promote degenerative changes (7–9). On the other hand, tobacco smoke contains poisons and carcinogenic substances that lead to increased bone resorption.

Almost one third of the German population over 18 years of age are current smokers (25.4% daily, 7.1% occasionally). Including former smokers yields a proportion of almost 60% of people who have smoked at some time in their lives (10). This highlights the importance of continued intensive research into the consequences of smoking, including the previously neglected link between tobacco consumption and back pain.

All of the published studies on the relationship between musculoskeletal symptoms, particularly in the back, and smoking, have serious limitations. The clinical studies have too few cases and too short a study period, and there are no valid studies that take account of both important retrospective data on smoking history and possible confounders or spurious correlations, such as a sedentary lifestyle, manual work, or mental stress (11–15). The epidemiological studies are mostly cross-sectional in design and consider only current consumption: the study population is divided into "smokers" and "non-smokers," usually excluding important longitudinal data on the duration, intensity, and pattern of consumption (11, 14–18, 22). By definition, therefore,

Stiftung Orthopädische Universitätsklinik Heidelberg, Forschung: Dr. rer. soc. Zimmermann-Stenzel, Mannuß, Prof. Dr. med. Schiltenswolf

Mannheimer Institut für Public Health, Sozial- und Präventivmedizin: PD Dr. phil. Schneider

the existing cross-sectional studies on the connection between back pain and tobacco consumption cannot demonstrate whether the tobacco consumption started before the back pain (19), or whether the smoking represents a dysfunctional pain management strategy (i.e., a response to the pain). Mental problems and stress often precisely go hand in hand with tobacco consumption and must therefore be taken into consideration as potential confounders. This has not been the case in the studies published to date.

In contrast with the earlier studies, this investigation tested the influence of smoking on the risk of developing back pain under consideration of data on mental health in multivariate single and total models by means of logistic regression (13–15). This was intended to exclude, as far as possible, potential interactions between smoking behavior, mental health, and prevalence of back pain. In this way the influence of tobacco consumption on the risk of back pain could be ascribed to smoking behavior, rather than reflecting the indirect influence of mental problems on back pain. This study, conducted at the Robert Koch Institute, includes detailed data on individual smoking history, thus permitting valid conclusions on the influence of the duration and intensity of cigarette consumption on the risk of back pain.

## Methods

The investigation reported is based on the first German Telephone Health Survey 2003 (GsTel03), carried out by researchers at the Robert Koch Institute, Berlin. Within the framework of a cooperation agreement, the authors made their data available as a public use file.

Acquisition of data for GsTel03 began in September 2002 and ended in March 2003. A total of 8318 interviews were conducted, representing a completion rate of 59%.

The population from which the study participants were drawn comprised all adult German speakers residing in private households in Germany that were accessible via a telephone landline. A representative sample of households for the survey, selected using the Gabler-Häder method, was obtained by the Centre for Survey Research and Methodology (Zentrum für Umfragen, Methoden und Analysen, ZUMA), Mannheim, Germany and made available to the Robert Koch Institute (20) (*e-box 1*).

The sample's representativeness at the level of the individual participant was achieved by a second selection step: in households with more than one adult, the person whose birthday came first after the initial contact was the only one to be interviewed ("next birthday method").

Data acquisition was by means of computer assisted telephone interviewing (CATI) at the Robert Koch Institute. To ensure that the communicative requirements of the telephone interview situation were met, a survey instrument was used that had been specifically developed for the GsTel03 and repeatedly tested (21).

The GsTel03 survey included questions on subjective health status, chronic diseases and their symptoms,

lifestyle and health related behavior, disability and physical restrictions, and sociodemographic factors.

To enable representative conclusions, a weighting factor was used to adjust for age, gender, and geographic distribution of the overall population (as of 31 December 2001).

## Operationalization

In addition to sociodemographic parameters, the analyses took account of occupational as well as lifestyle and health related factors.

To enable detailed conclusions regarding the effect of smoking on back pain, the analyses were not confined to comparison of smokers and non-smokers, but specifically examined the influence of daily and occasional smoking. Only individuals who had answered all relevant questions were analyzed; hence the total model included 7271 cases and the smoker model, 1998 cases.

As well as current smoking habits, the analyses for smokers included age at onset, and intensity (i.e., the average daily number of cigarettes smoked) and duration of consumption. This allows more accurate statements concerning the individual smoking history and thus permits identification of single aspects of smoking behavior as possible risk factors (*e-box 2*). The remaining independent variables are described in *table 1*.

The 12-month prevalence of chronic back pain, defined as back pain appearing on a daily or almost daily basis over a period of three months or longer, was included in the analyses as a dependent variable (22). This was a subjective assessment by the interviewee, not a doctor's diagnosis.

The ensuing regression models included interaction effects between the variables "current smoking status" and "mental problems" in order to account for possible interplay among tobacco consumption, mental problems, and chronic back pain (*table 1*).

## Statistical Methods

A bivariate analysis began with calculation of the percentage prevalence rates for individual risk groups such as daily smokers, occasional smokers, and previous smokers. Group differences regarding one of the investigated factors were established by means of the chi-square test. The link between tobacco consumption and back pain was further examined by multivariate binary logistic regression analysis (method: inclusion) of the dichotomous dependent variable "back pain in the past 12 months = 0/1." All tests were two-sided with the level of significance set at  $p = 0.05$ . All analyses were performed using SPSS for Windows, version 15.0.

## Results

The results of the bivariate analysis do not at first sight permit the general conclusion that smokers suffer from chronic back pain more frequently than non-smokers (*figure*). The bivariate relationship between the 1-year prevalence of chronic back pain and smoking status was significant only in women, not in men. Closer

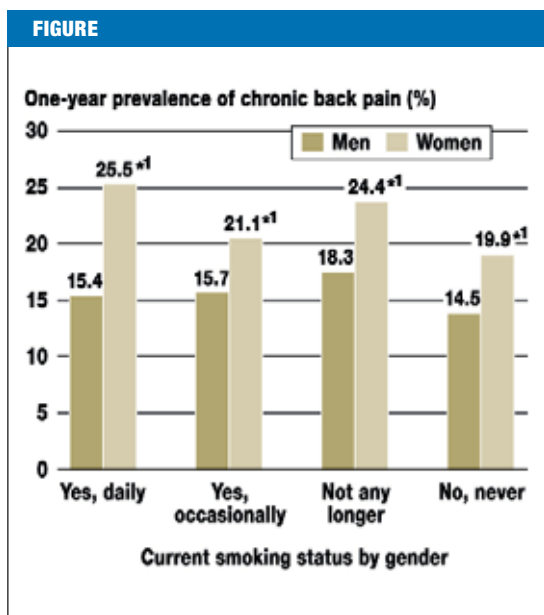
**TABLE 1**

**Variables used for operationalization**

Dimension	Operationalization/coding	Item/remarks
<b>Dependent variable</b>		
One-year prevalence of back pain	Yes	"In the last 12 months, have you had back pain almost daily for a period of 3 months or longer?" (Subjective assessment; pain in lower back, neck, or other region of back)
	No	
<b>Independent variables</b>		
Age		Age in years at time of survey
Gender	Female* <sup>1</sup> Male	No question → noted by interviewer
<b>Lifestyle-related factors</b>		
Smoking	Have never smoked* <sup>1</sup> Not any more Yes, occasionally Yes, daily	"Do you smoke – even just occasionally?"
Duration of consumption	1 to 10 years* <sup>1</sup> 11 to 15 years 16 to 20 years 21 to 25 years 26 to 30 years 31 to 35 years Over 35 years	Only daily and occasional smokers: New variable Duration of consumption = age – starting age
Intensity of cigarette consumption	1 to 10 cigarettes* <sup>1</sup> 11 to 20 cigarettes 21 to 30 cigarettes 31 to 40 cigarettes Over 40 cigarettes	Only daily and occasional smokers: "How many cigarettes do you smoke each day on average?"
Starting age	11 to 17 years* <sup>1</sup> 18 to 25 years 26 to 34 years 35 to 45 years	"How old were you when you started smoking, even just occasionally?"
Alcohol consumption	No alcohol* <sup>1</sup> Very low Low Moderate High	"Overall, how would you describe your alcohol consumption?"
Active sport in the previous 3 months	No* <sup>1</sup> Yes	"Think back over the last 3 months. Have you done any sport in that time?"
Body mass index, corrected	Obesity* <sup>1</sup> 25 to 30 (overweight) 18.5 to 25 (normal weight) < 18.5 (underweight)	Corrected BMI: calculated from height and weight (interviewees' statements); given in the original data
<b>Mental factors</b>		
Mental problems in the previous 4 weeks	None at all* <sup>1</sup> Slight Moderate Severe Very severe	"In the last 4 weeks, to what extent have you been troubled by mental problems?"
Adverse influence of mental problems on normal activities	None at all* <sup>1</sup> Slight Moderate Severe Normal activity impossible	"In the last 4 weeks, to what extent have personal or mental problems prevented you carrying out your normal activities at work, at school/college, or in other areas of your life?"
<b>Social factors</b>		
Occupation – current or most recent	Blue-collar worker* <sup>1</sup> White-collar worker Public official Self-employed/freelance Helping in family business Vocational training Other	"What is/was your occupation?"
Social class	Upper class* <sup>1</sup> Middle class Lower class	Social class according to Winkler and Stolzenberg: In December 2005 Winkler and Stolzenberg undertook a new adjustment of the class index. In contrast with the previous adjustment, which considered only the year-to-year change in income distribution, they took into account the changes in the dimension "Education" resulting from the recent expansion in this area.

\*<sup>1</sup> Reference category total model

One-year prevalence of back pain according to tobacco consumption, by gender. \*1 p ≤ 0.010; the significance values relate to the differences in 1-year prevalence of chronic back pain according to smoking status, by gender. From GsTel03, n = 7271 (50.4% women, 49.6% men), our own calculations.



inspection of the data revealed that of the female smokers, only daily and former smokers, not occasional smokers, had a higher 1-year prevalence of chronic back pain than those who had never smoked (never smokers). Since the risk of back pain is affected by life-style specific and sociodemographic factors such as sporting activity, mental problems, social class, gender, and age, however, definitive appraisal requires consideration of the results of multivariate analyses, controlling for the relevant confounders or spurious correlations.

The multivariate binary logistic regression analysis showed that even when controlling for potential effects by sociodemographic and lifestyle specific factors, both daily smokers and former smokers were significantly more likely than never smokers to suffer from chronic back pain (daily smokers: OR 1.45, 95% CI 1.13 to 1.85; former smokers: OR 1.65, 95% CI 1.32 to 2.07) (table 2). However, the data did not show when the former smokers had stopped smoking; thus, the duration of abstinence from tobacco, a medically relevant factor, was unknown.

Smokers are not a homogeneous group. They differ, for example, in smoking frequency, number of cigarettes smoked, and duration of tobacco consumption. It is therefore important to analyze sub-groups of smokers with regard to back pain risk (table 3).

The multivariate analysis revealed no difference between daily smokers and occasional smokers with regard to the probability of experiencing chronic back pain (OR 1.29, 95% CI 0.68 to 2.42). The age at which smoking began and the average number of cigarettes smoked per day also exerted no effect on the likelihood of experiencing chronic back pain when various life-style specific and sociodemographic factors were taken into account.

Comparison of the two regression models showed contrasting findings for the variable of age. In the first model (table 2) each year of age increased the probability of chronic back pain highly significantly, by 1%. In the second model (table 3) the probability of chronic back pain decreased by 4% with every year of age. Various reasons for this contrasting age effect can be postulated. On the one hand, it may represent a selection effect, because smokers tend to be found in younger age groups. Those smokers who still smoke at an advanced age presumably belong to the more healthy segment of the population, i.e., those who also suffer less frequently from chronic back pain, and have not (yet) had to give up smoking on health grounds. Thus, the 1-year prevalence of chronic back pain among current smokers rose continuously from 14.7% (in 18- to 29-year-olds) to 29.7% (in 50- to 64-year-olds), but then dropped markedly by almost 10% to 20.1% (in over 65-year-olds). (For comparison, the rates in the total model were: 18- to 29-year-olds, 13.9%; 50- to 64-year-olds, 24.1; over 65-year-olds, 23.8%.) On the other hand, the contrasting age effect may have arisen from confounding of age and duration of consumption in the smoker model. Because duration of consumption and age were strongly correlated (Pearson's  $r = 0.946$ ,  $p \leq 0.001$ ), in the multivariate model the portion of the age effect that was attributable to duration of consumption, not to age alone, was subtracted from the overall age effect. In the smoker model, in addition to the selection effect, this presumably led to a weakening or reversal of the age effect.

The most important finding, however, is the clear and central importance of duration of tobacco consumption for the risk of developing chronic back pain (table 3). From 16 years' consumption onward, there is a much higher likelihood of experiencing chronic back pain. Compared with up to 10 years' consumption, the probability of chronic back pain increases significantly, by around 90%, for 16 to 20 years' consumption (OR 1.89; 95% CI 1.04 to 3.46). Consumption for 26 years or more considerably increases the probability of chronic back pain compared with up to 10 years' consumption (21 to 25 years: OR 1.84, 95% CI 0.90 to 3.77; 26 to 30 years: OR 3.24, 95% CI 1.41 to 7.46; 31 to 35 years: OR 5.15, 95% CI 1.91 to 13.93; > 35 years: OR 9.35, 95% CI 2.51 to 33.96).

Therefore, neither frequency of smoking (whether daily or occasional) nor age of onset, nor the number of cigarettes smoked per day, is critical for the relationship between tobacco consumption and chronic back pain. Rather, the decisive factor is the number of years of cigarette smoking.

### Discussion

On the one hand, the representative data of the GsTel03 survey, used in this study, agree with other studies in showing a correlation between tobacco consumption and chronic back pain (4, 11–13, 15, 22). Daily and former smokers have a higher likelihood of

**TABLE 2**

**Influence of lifestyle-specific and sociodemographic factors on the risk of back pain (chronic back pain, 1-year prevalence)**

		Sample characteristics n = 7271	Odds ratio	95% CI	p value
Age		48.87 ± 16.48	1.01* <sup>3</sup>	(1.10–1.02)	p ≤ 0.001
Gender	Female	50.4%	1.00	–	–
	Male	49.6%	0.77* <sup>3</sup>	(0.67–0.88)	p ≤ 0.001
Smoking	No, never	39.9%	1.00	–	–
	Not any more	27.5%	1.65* <sup>3</sup>	(1.32–2.07)	p ≤ 0.001
	Yes, occasionally	6.8%	1.34	(0.88–2.03)	p = 0.171
	Yes, daily	25.8%	1.45* <sup>2</sup>	(1.13–1.85)	p ≤ 0.010
Alcohol consumption	No alcohol	19.3%	1.00	–	–
	Very low	32.2%	0.93	(0.79–1.10)	p = 0.420
	Low	26.2%	0.67* <sup>3</sup>	(0.56–0.81)	p ≤ 0.001
	Moderate	21.3%	0.70* <sup>3</sup>	(0.57–0.85)	p ≤ 0.001
	High	1.0%	0.51	(0.25–1.03)	p = 0.061
Sport (in previous 3 months)	No	38.0%	1.00	–	–
	Yes	62.0%	0.90	(0.79–1.02)	p = 0.105
BMI (corrected)	>30 (obesity)	19.5%	1.00	–	–
	25 to 30 (overweight)	43.0%	0.84* <sup>1</sup>	(0.72–0.99)	p = 0.035
	18.5 to <25 (normal weight)	37.0%	0.69* <sup>3</sup>	(0.57–0.82)	p ≤ 0.001
	<18.5 (underweight)	0.4%	1.56	(0.67–3.66)	p = 0.305
Mental problems (in previous 4 weeks)	None at all	53.7%	1.00	–	–
	Slight	24.2%	1.26	(0.97–1.63)	p = 0.081
	Moderate	14.0%	1.33	(0.97–1.83)	p = 0.077
	Severe	5.7%	1.64* <sup>1</sup>	(1.07–2.52)	p ≤ 0.050
	Very severe	2.4%	0.99	(0.49–2.00)	p = 0.976
Adverse influence of mental problems on normal activities (in previous 4 weeks)	None at all	69.4%	1.00	–	–
	Slight	17.3%	1.55* <sup>2</sup>	(1.18–2.05)	p ≤ 0.010
	Moderate	8.8%	2.80* <sup>3</sup>	(2.02–3.89)	p ≤ 0.001
	Severe	3.1%	4.44* <sup>3</sup>	(2.56–7.70)	p ≤ 0.001
	Normal activity impossible	1.3%	4.06* <sup>3</sup>	(2.00–8.21)	p ≤ 0.001
Occupation	Blue-collar worker	21.9%	1.00	–	–
	White-collar worker	57.2%	1.14	(0.96–1.36)	p = 0.145
	Public official	7.4%	1.1	(0.81–1.49)	p = 0.557
	Self-employed/freelance	9.8%	0.84	(0.64–1.10)	p = 0.193
	Helping in family business	0.5%	0.56	(0.21–1.48)	p = 0.244
	Vocational training	1.8%	0.57	(0.30–1.09)	p = 0.089
	Other	1.4%	0.90	(0.79–1.02)	p = 0.105
Social class according to Winkler	Upper class	23.2%	1.00	–	–
	Middle class	47.8%	1.36* <sup>3</sup>	(1.14–1.63)	p ≤ 0.001
	Lower class	29.0%	1.65* <sup>3</sup>	(1.33–2.04)	p ≤ 0.001

Abbreviated presentation of the total model without the calculated non-significant interaction effects between smoking – mental problems/smoking – adverse influence of mental problems on normal activities; CI, confidence interval; \*<sup>1</sup> p ≤ 0.05; \*<sup>2</sup> p ≤ 0.010; \*<sup>3</sup> p ≤ 0.001; source: GsTel03, our own calculations.

**TABLE 3**

**Influence of lifestyle-specific and sociodemographic factors on the risk of back pain in cigarette smokers (chronic back pain, 1-year prevalence)**

		Sample characteristics n = 1998	Odds ratio	95% CI	p value
Age		41.37 ± 13.78	0.96*1	(0.93 to 0.99)	p ≤ 0.050
Gender	Female	47.1%	1.00	–	–
	Male	52.9%	0.68*2	(0.52 to 0.89)	p ≤ 0.010
Smoking	Yes, occasionally	14.5%	1.00	–	–
	Yes, daily	85.5%	1.29	(0.68 to 2.42)	p = 0.435
Starting age for smoking	11 to 17 years	60.1%	1.00	–	–
	18 to 25 years	36.0%	1.21	(0.90 to 1.62)	p = 0.206
	26 to 34 years	2.4%	1.35	(0.55 to 3.34)	p = 0.511
	35 to 45 years	1.3%	2.35	(0.67 to 8.26)	p = 0.184
Number of cigarettes	1 to 10 cigarettes	40.6%	1.00	–	–
	11 to 20 cigarettes	45.8%	1.09	(0.81 to 1.46)	p = 0.565
	21 to 30 cigarettes	10.2%	1.29	(0.84 to 1.99)	p = 0.247
	31 to 40 cigarettes	2.5%	1.09	(0.49 to 2.42)	p = 0.834
	Over 40 cigarettes	0.9%	0.42	(0.10 to 1.86)	p = 0.254
Duration of consumption	1 to 10 years	18.0%	1.00	–	–
	11 to 15 years	10.5%	1.40	(0.80 to 2.45)	p = 0.243
	16 to 20 years	14.5%	1.89*1	(1.04 to 3.46)	p ≤ 0.050
	21 to 25 years	15.3%	1.84	(0.90 to 3.77)	p = 0.094
	26 to 30 years	13.3%	3.24*2	(1.41 to 7.46)	p ≤ 0.010
	31 to 35 years	10.5%	5.15*3	(1.91 to 13.93)	p ≤ 0.001
Over 35 years	17.8%	9.35*3	(2.51 to 33.96)	p ≤ 0.001	
Alcohol consumption	No alcohol	18.1%	1.00	–	–
	Very low	27.7%	0.82	(0.59 to 1.13)	p = 0.219
	Low	26.6%	0.43*3	(0.30 to 0.62)	p ≤ 0.001
	Moderate	25.5%	0.58*2	(0.40 to 0.83)	p ≤ 0.010
	High	1.9%	0.27*1	(0.08 to 0.86)	p ≤ 0.050
Sport (in previous 3 months)	No	46.0%	1.00	–	–
	Yes	54.0%	0.84	(0.66 to 1.07)	p = 0.159
BMI (corrected)	>30 (obesity)	12.5%	1.00	–	–
	25 to 30 (overweight)	38.0%	0.71	(0.50 to 1.02)	p = 0.064
	18.5 to <25 (normal weight)	48.7%	0.72	(0.51 to 1.03)	p = 0.076
	<18.5 (underweight)	0.7%	0.93	(0.26 to 3.26)	p = 0.906
Mental problems (in previous 4 weeks)	None at all	52.4%	1.00	–	–
	Slight	22.5%	1.89	(0.77 to 4.63)	p = 0.165
	Moderate	14.0%	1.80	(0.65 to 4.98)	p = 0.257
	Severe	7.4%	2.17	(0.51 to 9.20)	p = 0.294
	Very severe	3.8%	0.21	(0.02 to 1.90)	p = 0.163
Adverse influence of mental problems on normal activities (in previous 4 weeks)	None at all	68.6%	1.00	–	–
	Slight	16.0%	1.44	(0.57 to 3.61)	p = 0.440
	Moderate	9.7%	3.00*1	(1.09 to 8.27)	p ≤ 0.050
	Severe	4.5%	10.18*1	(1.64 to 63.19)	p ≤ 0.050
	Normal activity impossible	1.2%	3.29	(0.42 to 25.89)	p = 0.257
Occupation	Blue-collar worker	28.2%	1.00	–	–
	White-collar worker	53.9%	1.36	(0.93 to 1.87)	p = 0.064
	Public official	4.5%	1.33	(0.68 to 2.63)	p = 0.408
	Self-employed/freelance	8.5%	0.85	(0.42 to 25.82)	p = 0.257
	Helping in family business	0.2%	3.30	(0.29 to 1.73)	p = 0.444
	Vocational training	3.0%	0.70	(0.22 to 2.51)	p = 0.630
	Other	1.6%	0.74	(0.66 to 1.07)	p = 0.159
	–	–	–	–	–
Social class according to Winkler	Upper class	15.2%	1.00	–	–
	Middle class	51.3%	1.64*1	(1.08 to 2.49)	p ≤ 0.050
	Lower class	33.5%	2.15*3	(1.35 to 3.44)	p ≤ 0.001

Abbreviated presentation of the total model without the calculated non-significant interaction effects between smoking – mental problems/smoking – adverse influence of mental problems on normal activities; CI, confidence interval; \*1 p ≤ 0.05; \*2 p ≤ 0.010; \*3 p ≤ 0.001; source: GsTel03, our own calculations.

suffering from chronic back pain than people who have never smoked. This relationship persists when controlling for factors that have (or can have) a discrete influence on the occurrence of chronic back pain, such as age, gender, mental problems, adverse influence of mental problems on normal activities, alcohol consumption, sporting activity, and social class, which also reflects differences in physical workload.

On the other hand, the analysis showed no difference in the probability of suffering chronic back pain between current daily and occasional cigarette smokers. The age at smoking onset and the average number of cigarettes smoked per day also have no influence in this regard. The duration of consumption, i.e., the number of years of smoking, is the most important correlate with chronic back pain among smokers.

In interpreting these findings, a few methodological problems and other points should be mentioned. First, although the data show a correlation between tobacco consumption and the 1-year prevalence of chronic back pain, the cross-sectional design of the study does not permit the conclusion that the relationship is causal, i.e., that smoking causes physical derangements that result in increased back pain. The distinction between cause and effect – whether smoking causes chronic back pain or represents an inadequate coping strategy in the face of chronic pain – can only be achieved by means of a longitudinal study. The second caveat relates to mental problems and the adverse influence of such problems on normal activities. These factors were controlled for. However, the information has been obtained exclusively through interviews. Therefore, its validity must be viewed with caution. Nevertheless, the data suggest that an adverse influence of mental problems on normal activities had the known relationship with chronic back pain, namely the likelihood of chronic back pain increases with increasing problems of this nature (12, 14, 22).

The results of the Robert Koch Institute's GsTel03 survey indicate that chronic back pain should not be seen as determined purely by the frequently investigated physical and mental agencies. Sociodemographic and lifestyle specific factors also appear to play a part, one that should not be underestimated. The causal nature of these factors, however, needs to be tested in longitudinal studies (22).

It is crucial to establish whether smokers with chronic back pain are smoking as a dysfunctional coping strategy or whether smoking causes chronic back pain. Clarification of this point is vital because of the considerable potential for prevention: If tobacco consumption is a (dysfunctional) strategy for coping with chronic back pain, presumably some smokers who suffer from chronic back pain could give up smoking if they were offered appropriate alternative pain-coping strategies or treatments. If it emerged that tobacco consumption can also lead to chronic back pain, attempts could be made to reduce the number of sufferers from such pain by means of targeted information campaigns and tobacco withdrawal programs.

**Conflict of interest statement**

The authors declare that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

Manuscript received on 18 January 2008; revised version accepted on 28 April 2008.

Translated from the original German by David Roseveare.

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**Corresponding author**

Dr. rer. soc. Monique Zimmermann-Stenzel  
 Stiftung Orthopädische Universitätsklinik Heidelberg  
 Forschung  
 Schlierbacher Landstr. 200a  
 69118 Heidelberg, Germany  
 E-Mail: monique.zimmermann-stenzel@ok.uni-heidelberg.de



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## ORIGINAL ARTICLE

# Smoking and Chronic Back Pain

Analyses of the German Telephone Health Survey 2003

Monique Zimmermann-Stenzel, Julia Mannuß, Sven Schneider,  
Marcus Schiltenswolf

**E-BOX 1**

In recent decades the proportion of private households not listed in the telephone book has increased considerably, and this non-listing is systematic in character. Therefore, the telephone book is no longer appropriate as a basis for selection of subjects for telephone surveys. The basic principle of the Gabler-Häder method is to use publicly available data to draw up a list of all existing landlines and to generate the numbers that are not in the telephone book (20). This enables countrywide representative sampling of all private households with a telephone landline.

**E-BOX 2**

An established measure of the number of cigarettes a person has smoked over an extended period of time is the "package year," calculated as follows: package years = (cigarettes smoked per day × years of smoking)/20. Package years were not calculated in this study because, apart from the difference in 1-year back pain prevalence between smokers and non-smokers, the focus lay on differentiated analysis of starting age, current number of cigarettes, and duration of consumption, parameters that delineate a person's smoking history. The combining of number of cigarettes and duration of consumption into package years would obscure this differentiated perspective.