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Does the smoking status of general practitioners affect the efficacy of smoking cessation counselling?☆

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ABSTRACT

Objective: To examine the association between the smoking status of general practitioners (GPs) and abstinence rates among patients receiving GP-delivered brief advice for smoking cessation.
Methods: A quasi-experimental multilevel study with follow-up assessments at 6, 12, 18, and 24 months after baseline was conducted using a random sample of 39 general practices in a defined area (participation rate = 87.2%). Patients aged 18–70 were consecutively screened for smoking status (n = 11,560) over the course of 3 weeks and were assigned to a control group (week 1), a computer expert system intervention (week 2), or a personal counselling intervention with the GP (week 3). For the current analysis, patients participating in study week 2 were excluded. A total of 1260 patients fulfilled the inclusion criteria and 80.2% took part: 609 patients in study week 1 and 402 patients from study week 3. GPs participated in a training session concerning smoking counselling, which was held between study weeks 2 and 3. Self-reported 4-week and 6-month prolonged abstinence measures at the 6-, 12-, 18-, and 24-month follow-ups were assessed.
Results: The smoking status of the GP was neither significantly related to 4-week prolonged abstinence nor 6-month prolonged abstinence among patients in a main effects model. Further modelling revealed that the intervention group modified the effect of the non-smoking status of the GP on the likelihood to quit smoking. A significant interactive effect was found between the non-smoking status of the GP and the intervention group on both abstinence measures.
Conclusion: The non-smoking status of the GP had a positive effect among counselled patients.
Practice implications: The consideration of lifestyle behavioural variables such as the smoking status of the GP will be essential for further research concerning the efficacy of smoking interventions.

1. Introduction

Brief, proactive interventions such as counselling or advice delivered by a general practitioner (GP) increase the odds of quitting smoking [1,2]. Evidence also indicates that physician training is effective in increasing smoking cessation activities, while organizational factors are important to ensure the successful delivery of interventions [1]. Smoking cessation intervention tools, such as a GP desktop resource, are effective in prompting GPs to advise their patients [3]. Despite the availability of cost-effective interventions and their recommendation by major practice guidelines [4,5], the transfer of systematic screening and smoking cessation advise into routine care has been inadequate [6–8]. Negative beliefs and attitudes towards smoking counselling among GPs may be partly responsible for this deficiency. GPs often report

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a lack of time, absence of patient interest, and low confidence in their ability to conduct smoking cessation counselling [9]. Moreover, among GPs in Germany, a lack of reimbursement was often considered to be a barrier to engagement in smoking cessation promotion [10]. The results of one study indicated that the reimbursement of GPs for smoking cessation counselling measures does increase rates of smoking status ascertainment and the delivery of smoking cessation advice [11]. The smoking status of GPs has also been discussed as a major factor in influencing the provision of smoking cessation counselling [12]. In countries with a low smoking prevalence among physicians, the translation of knowledge about the dangers of tobacco use into healthcare practice is not as problematic as in countries with a higher proportion of smoking GPs. A study found that the levels of general tobacco control activities, including comprehensive legislative regulations related to smoking and tobacco marketing, are associated with the smoking prevalence among physicians in European countries [10]. Smoking rates below 10% have been reported for physicians in countries with a high level of tobacco control, such as Norway, Sweden, Finland, and the Netherlands [13–17]. In contrast, smoking rates in physician samples were 18% in Germany, 29% in Spain, 32% in France, and 39% in Greece [18–21]. Physicians who smoke are less likely to record patients' tobacco use and are less motivated to promote smoking cessation [10,22–24]. They are also less likely to participate in smoking cessation trials [25].

One study found no association between the smoking status of the GP and his or her readiness to provide counselling [26]. In contrast, a different study found that the readiness to participate in a study aimed to implement smoking cessation interventions was lower among smoking physicians compared to non-smoking physicians [25]. The same study found no association between the smoking status of the GP and the efficacy of a minimal smoking intervention [25]. However, patients who received smoking cessation counselling were not systematically selected by the GPs in this study. For example, there was no procedure in place to assure the systematic assessment of the smoking status of consecutive patients in the participating practices. Also, the total level of counselling activities was rather low, with 40% of participating GPs not applying the intervention [25]. To our knowledge, no study thus far has investigated the association between the GP's own smoking status and patient smoking outcomes over a period of 24 months. Furthermore, this study adds new knowledge by assessing the smoking status of patients while offering systematic counselling. Moreover, the relationship of the smoking status of the GP to the smoking status of the patients as well as the effectiveness of counselling, was examined in this study.

2. Methods

The study is part of the research program "Proactive smoking interventions in general medical practices" (Pro GP). We created a quasi-experimental study design to compare the effect of a computer expert system, personal counselling provided by trained GPs, and a care-as-usual control condition. Assignments to the study arms were based on the time of patients' attendance: (1) patients with appointments during the first study week were allocated to the care-as-usual control condition, (2) patients during the second week received the computer program intervention, and (3) patients during the third week were assigned to the personal counselling intervention. A fixed time frame was essential in order to avoid the risk that the counselling activities of the GPs could be affected by the counselling training session, which was held between study weeks 2 and 3. In the current study, we are interested in knowing whether the smoking status of the GP influences the success of a personal counselling intervention. Therefore, all analyses include patients from study weeks 1 and 3.

2.1. GP sample

A random sample of 39 general practices was drawn from a list of all GPs registered for primary care in a defined region of northeastern Germany. The participation rate was 87.2% ($n = 34$). Because three practices were two-handed practices, a total of 37 general practitioners participated in the study. The average age of the practitioners was 47.5 years (S.D. = 8.2), and 48.8% were female. Among the practices, 59% were located in urban areas, i.e., cities with more than 50,000 inhabitants. Among the practitioners, 24.6% ($n = 9$) were current smokers.

2.2. Patient sample

In each participating practice, a study nurse assessed the smoking status, sex, and age of every consecutive patient over a period of 3 weeks. Current smokers aged 18–70 years who were visiting the practice for the first time during the study period were considered to be eligible. Current smoking was defined as the daily smoking of at least one cigarette within the last 4 weeks. Further inclusion criteria were: sufficient language and intellectual capabilities to fill in the questionnaire and written informed consent to take part in the study. Patients that were selected to participate and had given consent were asked to fill in a questionnaire assessing smoking habits and socio-economic characteristics in the waiting room. A total of 11,560 consecutive patients were screened for smoking status. A total of 1260 patients in study weeks 1 and 3 fulfilled the inclusion criteria. Of this number, 1011 (80.2%) agreed to participate. Among the patients consenting to take part in the study, 609 patients in study week 1 were allocated to the control group and a total of 402 patients in the third week received personal smoking counselling by the GP. The personal counselling was delivered once by the GP during the regular consultation visit.

2.3. Study procedure

All patients who visited the practices during the first study week were allocated to the control group. No intervention was provided for this group. At the beginning of the counselling intervention period of the third week, GPs filled in a questionnaire about their age and smoking status. Subsequently, GPs received a single 2-h training session for smoking cessation counselling in their practice rooms. All GP training sessions were provided by two members of our research team. The training comprised three modules on (1) epidemiological findings about smoking-related diseases, diagnosis and pathogenesis of nicotine dependence, (2) the basics of tailored interventions based on the transtheoretical model of behaviour change, and (3) the principles of behaviour change counselling [27,28]. GPs received a desktop resource (DR) to ensure a standardised counselling procedure. Prior to the consultations, the study nurse provided a documentation sheet to which the GP could refer while counselling. This was used to record smoking-related information about the patient, such as cigarettes smoked per day, the urge to smoke, carbon monoxide in exhaled air, and stage of change. The documentation sheet also served as a reminder for the GP to counsel. The counselling intervention was designed to last about 10 min, and was structured by the DR. The DR included a set of example sentences for opening and closing the counselling session. Furthermore, the DR covered a variety of conversation modules according to the different stages of change.

The first page of the DR depicted an overview of the stages of change and associated counselling topics, so that the GP could quickly and easily choose a relevant module to address smoking. The counselling session was completed by the provision of self-help manuals tailored to the patient's stage of change. The intervention was delivered during regular treatment after a baseline assessment.

2.4. Patient assessment

2.4.1. Baseline

Current smoking status and number of cigarettes smoked per day were assessed. The urge to smoke was measured using the Fagerström test for nicotine dependence [29], a scale combining six items into one score that ranged from 0 (no or low dependence) to 10 (high dependence). Readiness to quit smoking was assessed according to the stage algorithm of the transtheoretical model [30]. Individuals were considered to be in the precontemplation stage if they did not intend to quit smoking within the next 6 months. Patients who were ready to quit in this timeframe were allocated to the contemplation stage. Patients were assigned to the preparation stage if they intended to quit within the next 4 weeks and had at attempted to quit at least once the last 12 months. Because there were only a few subjects in the preparation stage, the contemplation stage and preparation stage were combined for analysis.

Patient education level was measured by asking respondents: "What is the highest level of formal education you have completed?" Education level was divided into three groups corresponding to elementary (compulsory) education (less than 10 years), secondary education (10 years), and higher education (12 years or more).

2.4.2. Outcome

Outcome assessments were conducted 6, 12, 18, and 24 months after baseline. The follow-up assessment included items covering smoking behaviour, such as the self-reported outcome measures, defined as a 4-week prolonged abstinence (i.e., not having smoked at all within the 4 weeks preceding the follow-up) and 6-month prolonged abstinence (i.e., not having smoked in the 6 months preceding the follow-up) [31].

2.5. Data analyses

Initially, bivariate analyses were used to compare the smoking-related and socio-economic baseline characteristics of patients in the control and intervention groups.

To account for potential clustering within practices, we applied the sample survey methods of STATA version 9.2. The STATA command svytab was used to analyse at each time point whether there were differences in abstinence prevalence among patients in the control and intervention group dependent on the smoking status of the GP. Abstinence prevalence figures with the corresponding 95% confidence interval (95% CI) are reported. Afterwards, the relationship between patient variables, GP factors, and outcome measures was investigated using multilevel logistic regression models. These models are indicated when there is a hierarchical data structure, with the dependent variable measured at the lowest level and explanatory variables measured at any level. Our data set had a three-level structure: time points (level 1), nested within patients (level 2), and nested within general practices (level 3).

Multilevel modelling included several steps: the first model included only the main effects of time, intervention group, a variable indicating that the GP was a non-smoker, and patient-level controls (gender, age, urge to smoke, stage of change). The variable "time" included the follow-up points 6, 12, 18 and 24 months after baseline, and was coded as $t = 1, 2, 3, 4$ and centred at the endpoint of the study, i.e., at 24 months. The second model added a product term representing the cross-level interaction of GP non-smoking status and intervention group. Odds ratios (OR) with corresponding 95% CI are reported as effect measures in Table 2. Multilevel models were estimated by using the GLLAMM procedure of STATA 9.2 [32]. GLLAMM dealt with missing data using the assumption that a missing data point is related to the value of the dependent variable or covariates and is labelled missing at random (MAR) [33].

3. Results

Table 1 describes smoking-related and socio-economic baseline characteristics of the patients in the control and intervention group. Since subsequent patients were pseudo-randomized,

Table 1
Demographic and smoking behaviour characteristics of patients

	Control group ($n = 609$)	Intervention group ($n = 402$)	p^*
Age mean (S.D.)	34.8 (13.4)	33.1 (12.5)	0.106
Sex, *n* (%)			0.193
Female	300 (49.3)	179 (44.5)	
Male	309 (50.7)	223 (55.5)	
Education (years of schooling), *n* (%)			0.231
<10	209 (34.3)	117 (29.1)	
=10	294 (48.3)	217 (54.0)	
>10	84 (13.8)	59 (14.7)	
No information	22 (3.6)	9 (2.2)	
Stages of change, *n* (%)			0.059
Precontemplation	412 (67.7)	247 (61.4)	
Contemplation	160 (26.3)	128 (31.9)	
Preparation	27 (4.4)	26 (6.5)	
No information	10 (1.6)	1 (0.2)	
FTND-score[a], mean (S.D.)	3.2 (2.1)	3.3 (2.1)	0.874
No information	26 (4.3)	6 (1.5)	

[a] FTND: Fagerström Test for Nicotine Dependence.
[*] bivariate comparison adjusted for sampling design: Rao/Scott corrected χ^2-statistic for categorical variables and adjusted Wald test statistic for continuous variables.

Table 2
Result of a multilevel regression analysis with 4-weeks (OUT 4)[a] and 6-month (OUT 6)[b] prolonged nicotine abstinence at the 24-months follow-up

	Model 1 (OUT 4) OR (95% CI)	Model 2 (OUT 4) OR (95% CI)	Model 1 (OUT 6) OR (95% CI)	Model 2 (OUT 6) OR (95% CI)
Fixed effects				
Time (month)	1.149 (1.118, 1.181)***	1.149 (1.119, 1.181)***	1.199 (1.143, 1.259)***	1.200 (1.144, 1.260)***
Intervention[c]	1.856 (1.123, 3.065)*	0.553 (0.218, 1.403)	2.288 (1.269 4.126)**	0.706 (0.241, 2.063)
Age	0.997 (0.978, 1.015)	0.998 (0.979 1.017)	1.000 (0.979 1.024)	1.003 (0.981, 1.026)
Sex	0.847 (0.512, 1.402)	0.822 (0.496, 1.361)	0.791 (0.436 1.435)	0.771 (0.425, 1.400)
FTND	0.662 (0.579, 0.757)***	0.672 (0.588, 0.768)**	0.713 (0.609 0.834)***	0.723 (0.618, 0.846)***
Stage of change[d]	2.349 (1.420, 3.884)**	2.50 (1.509, 4.148)***	2.369 (1.314 4.271)**	2.523 (1.395, 4.567)**
GP non-smoking status[e]	0.910 (0.536, 1.547)	0.459 (0.233, 0.902)*	0.839 (0.451 1.561)	0.409 (0.181, 0.926)*
GP non-smoker[e] × intervention[c]		5.704 (1.876, 17.342)**		5.589 (1.530, 20.413)**
Variance (standard error)				
Random effects				
Level 2 (patient)	17.174 (3.636)	16.416 (2.884)	31.201 (9.662)	41.896 (11.994)
Level 3 (GP)	1.362e−14 (0.000)	2.540e−10 (0.000)	1.204 (0.169)	8.357e−16 (0.000)

Fagerström test for nicotine dependence.
[a] OUT 4:1 (not smoked in the last 4 weeks/0 (smoked in the last 4 weeks).
[b] OUT 6:1 (not smoked in the last 6 month)/0 (smoked in the last 6 month).
[c] OUT 6:1 (intervention group/0 (control group).
[d] OUT 6:1 (contemplation/preparation)/0 (precontemplation).
[e] OUT 6:1 (non-smoking GP)/0 (smoking GP).
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

baseline differences were examined. None of the differences reached statistical significance.

Table 2 presents the estimates for the outcome measure of 4-week prolonged abstinence obtained from a stepwise multilevel regression analysis. The dependent variable was dichotomous (0 if the patient smoked in the last 4 weeks, 1 if the patient did not smoke in the last 4 weeks). The results of model 1 revealed that patients who received a personal counselling intervention were more likely to achieve abstinence. Moreover, abstinence increased by time in both study groups. Patient-related variables, such as a higher stage of change and a lower level of nicotine dependence, were also associated with a higher probability to quit smoking. A non-smoking status of the GP was not significantly related to the 4-week outcome measure in the main effects model. Results for the second outcome (i.e., 6-month prolonged abstinence) were similar to those of the 4-week outcome (Table 2). Again, in the main effect model, the smoking intervention was positively associated with 6-month abstinence and increased by time (model 1). Again, a higher stage of change and a lower level of nicotine dependence were also associated with a higher probability to quit smoking for 6 months.

The following figures depict the prevalence of 4-week and 6-month prolonged abstinence: for both measures in the control group, there was a higher prevalence of abstinence among patients who visited a smoking GP compared to patients treated by non-smoking GPs. In contrast, if patients received a counselling intervention, data showed a higher rate of abstinence if the counsellor was a non-smoker (Figs. 1 and 2). Therefore, we included the interaction between the non-smoking status of the GP and the intervention in our multilevel regression model. The findings indicate that the non-smoking status of the GP had a positive effect on both abstinence measures for counselled patients. This suggests that the effect of the non-smoking status of the GP is modified by the intervention condition.

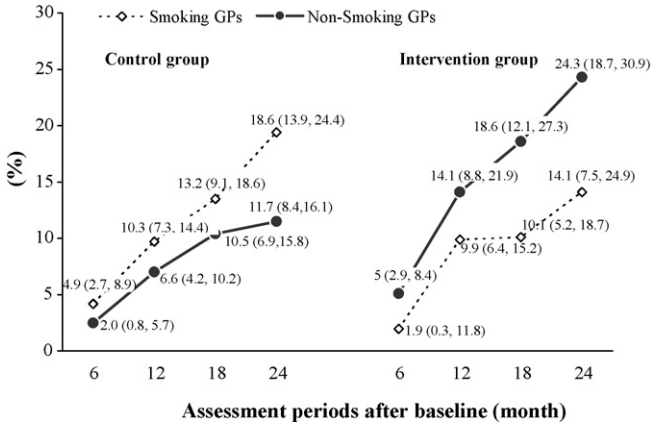

Fig. 1. Four-week prolonged prevalence of abstinence (95% – confidence interval) in the control and intervention group over the course of four follow-ups differentiated by smoking status of the GPs.

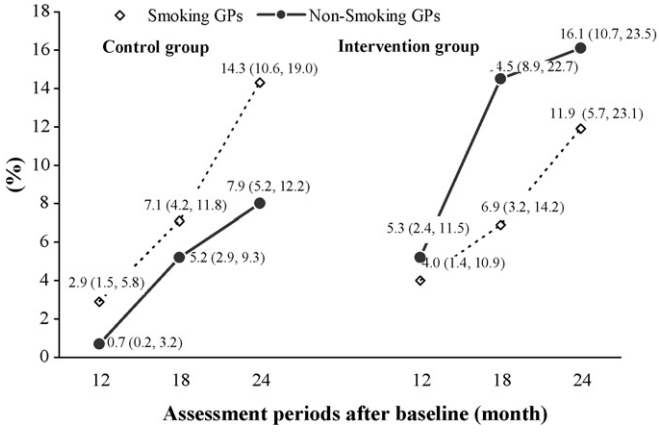

Fig. 2. Six-month prolonged prevalence of abstinence (95% – confidence interval) in the control and intervention group over the course of three follow-ups differentiated by smoking status of the GPs.

4. Discussion and conclusions

4.1. Discussion

This study investigated the relationship between the smoking status of GPs and two outcome measures. The analysis of the interaction between GP smoking status and the realization of a patient counselling intervention to achieve abstinence compared to a control condition was of particular importance. In the main effects models, patients who received a personal counselling intervention were more likely to quit smoking, but we did not find differences in the outcome measures concerning the smoking status of the GP.

However, patients who received a smoking counselling intervention from a non-smoking GP were more likely to benefit in comparison to patients who were counselled by a smoking GP.

In contrast, the finding that smoking GPs are more effective in the control group and non-smoking GPs are more effective in the intervention group in attaining abstinence, as illustrated by Figs. 1 and 2, might also reflect an additional benefit of the smoking counselling training among the non-smoking GPs during the intervention period in comparison to smoking GPs. Another possibility is that the counselling training session prompted the smoking GPs to confront their own smoking behaviour, which subsequently decreased their confidence in providing counselling.

The findings of this study add knowledge about the efficacy of smoking cessation advice provided by smoking GPs. However, in our study, the evaluation of smoking counselling was directly linked to having had the opportunity to provide smoking counselling systematically and to measure long-term outcome data among patients. Considering the high prevalence of smoking GPs in our random sample of approximately 25%, it might be important to provide smoking interventions to engage the majority of GPs, regardless of their own behaviour.

The difficulty of engaging smoking GPs in studies aiming to implement smoking cessation interventions can be illustrated with an anecdote: at the beginning of our study, during the recruitment procedure, one smoking GP had reservations concerning smoking counselling in his practice. He was afraid of being labelled a hypocrite by providing smoking counselling during the day while smoking in the pub with people in the evening. This example seems to be typical in rural areas, where the GP acts as a role model outside the medical practice. To achieve a high participation rate of GPs, it is important to understand the local context.

According to the study protocol, GPs should provide counselling for every smoking patient over a period of 1 week. However, with respect to the self-reported frequency of counselling activity, we did not find differences between smoking and non-smoking GPs [26].

Accordingly, data of a French study indicated that all GPs can provide effective smoking counselling, regardless of their smoking status [25].

For the interpretation of our results, it is important to note some limitations of the study. First, the sample of GPs is representative for only one specific region of Germany and our results should not be generalized to other regions or countries. Second, the GPs provided smoking counselling for the short period of 1 week. To ensure a high compliance of counselling for all consecutive patient smokers, we withheld from tape recording any patient participant. Third, we have no information about the number of consultations or further counselling sessions provided by the GPs between the time of study initiation and the 24-month follow-up. Fourth, we have no information from the smoking GPs about their motivation to quit or about their former quit attempts. Finally, the statistical power of our study was limited with respect to the effects of physician-level factors. Nevertheless, considering lifestyle behavioural variables such as smoking on the GP level as well as the patient level will be essential for further research concerning the efficacy of interventions.

4.2. Conclusions

This study demonstrates a high participation rate among randomly selected GPs, as well as among patients, in a smoking cessation intervention study. In general, patients who received personal counselling from the GP were more likely to quit compared to a control group. Moreover, the benefit of such counselling interventions was higher among patients counselled by a non-smoking GP. This suggests that the effect of the non-smoking status of the GP is modified by the personal intervention condition.

4.3. Practice implications

There is a need for effective strategies to support smoking practitioners in their counselling activities. In addition, future studies should examine whether counselling training measures elevate the readiness to change smoking behaviour among GPs.

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