RESEARCH PAPER

Long term and transitional intermittent smokers: a longitudinal study

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Objective: To investigate differences in snuff consumption, sociodemographic and psychosocial characteristics between baseline intermittent smokers that had become daily smokers, stopped smoking or remained intermittent smokers at the one year follow up.

Design/setting/participants/measurements: A population of 12 507 individuals interviewed at baseline in 1992-94 and at a one year follow up, aged 45–69 years, was investigated in a longitudinal study. The three groups of baseline intermittent smokers were compared to the reference population (all others) according to sociodemographic, psychosocial, and snuff consumption characteristics. A multivariate logistic regression model was used to assess differences in psychosocial conditions, adjusting for age, sex, country of origin, marital status, education, and snuff consumption.

Results: 60% of all baseline intermittent smokers had remained intermittent smokers, 16% had become daily smokers, and 24% had stopped smoking at the one year follow up. The long term intermittent smokers and those who had stopped smoking were young, unmarried, highly educated, and snuff consumers to a higher extent than the reference population. They also had more psychosocial resources than the reference population, while the psychosocial resources of those who had become daily smokers were poorer.

Conclusions: The majority of intermittent smokers are long term intermittent smokers. The results suggest that long term intermittent smokers have other psychosocial characteristics than daily smokers.

A substantial fraction of all smokers are intermittent, non-daily smokers.[1–3] In southern Sweden approximately 20% of all smokers in the age groups 45–69 years are intermittent smokers,[4] and the proportion is even higher (25%) when the younger adult age brackets are included.[5] The proportion of intermittent smokers may even be rising in many western countries.[1 6] Intermittent smokers are younger, and have a comparatively higher educational level and a higher occupational status than daily smokers.[1 6] Country of origin does not seem to be a determinant of intermittent smoking in southern Sweden.[4] Intermittent or occasional smoking seems to be a transitional stage for many smokers. Some intermittent smokers seem to be in the uptake phase of smoking. Others appear to be preparing for smoking cessation. Intermittent smoking is also related to a stronger intention to quit and a greater likelihood of having recently attempted to quit.[1 7] However, there is also evidence that intermittent smoking can be a long term behaviour. These findings support the notion that some intermittent smokers are long term intermittent smokers who are less susceptible to nicotine addiction, since nicotine addicted smokers mostly require a daily cigarette consumption.[8]

Smoking cessation is a dynamic process that begins with a decision to stop smoking and ends with abstinence maintained over a long period.[9] Smoking cessation is thus not a single event, but rather a process influenced by social, psychological, and biological factors.[10–13] A strong biological mechanism can account for the fact that smokers experience stress in connection with acute nicotine withdrawal, and that nicotine re-instatement leads to an immediate improvement in the depleted mood state of the smoker.[10 14–17] Intermittent smokers are more likely than daily smokers to have a strong intention to quit smoking, and are more likely to attempt to quit.[1 7] Chippers—persons that smoke less than five cigarettes per day at least four days a week—have no withdrawal symptoms when abstaining from smoking and they score lower on tests of dependence than regular smokers.[8] Chippers and intermittent smokers may thus have less susceptibility for nicotine addiction.[18] Intermittent smokers probably also suffer less severe withdrawal symptoms during cessation attempts than daily smokers and have greater potential for success.[1] However, these biological characteristics of intermittent smokers are most likely affected by other factors in the social environment of the individual, since some intermittent smokers become daily smokers, while other intermittent smokers remain long term intermittent smokers, and some stop smoking.

Health related behaviours such as intermittent smoking are a result of the interaction between a person and his or her environment. The relationship with the environment can be viewed as a dynamic process, since environmental changes require continuous adaptation by the individual. The successful adaptation to changes in the environment requires both individual resources and social relations—for example, social network and social support. According to the part of the psychosocial stress theory tested in this study, resources are individual ones, but there are also resources that the individual has access to through his or her social network.[19–21] The hypotheses derived from the psychosocial stress theory and tested in this study are that intermittent smokers with low levels of social networks (social participation and social anchorage) and/or low levels of social support factors (emotional support and instrumental support) might be in the uptake phase of smoking, and might have become daily smokers at the one year follow up, while especially baseline intermittent smokers with high psychosocial resources might be long term intermittent smokers or former daily smokers on their way to smoking cessation.

The aim of this longitudinal study is to assess the proportion of all baseline intermittent smokers that have remained

Abbreviations: CI, confidence intervals, MDCS, Malmö diet and cancer study; MSNS, Malmö shoulder-neck study; OR, odds ratio

intermittent smokers at the one year follow up, the proportion that have become daily smokers, and the proportion that have stopped smoking. The aim is also to compare these three groups of baseline intermittent smokers according to sociodemographic, psychosocial, and snuff consumption characteristics with a reference population (all others).

MATERIAL AND METHODS

Study population

This study is based on the Malmö shoulder-neck study (MSNS), which is a subcohort of the Malmö diet and cancer study (MDCS). Malmö is a city in southern Sweden with about 250 000 inhabitants. In 1990 all subjects born in 1926 to 1945 and living in Malmö were defined as a cohort (n = 53 325) for the MDCS. The recruitment to the MDCS took place from March 1991 until September 1996. The MSNS took place between February 1992 and December 1994, and included 14 555 subjects (6489 men and 8066 women) from this cohort. Detailed information concerning the MSNS and the MDCS is given in two other studies.[22 23] The study cohort was approached in two ways, by postal invitation (with respondents randomly selected from the 45–69 year age brackets) or by direct contact taken by the proband after a media campaign. The focus in the information given in the invitation was on the relation between diet and cancer and not on smoking or musculoskeletal problems.

All who participated in the MSNS baseline study were also invited to participate in a second examination one year later (median 12.6 months, interquartiles 12.3–13.3 months). A questionnaire was sent to all participants in the baseline study still registered in the municipality of Malmö. Information letters introduced the questionnaire and two written reminders, and finally a telephone call followed, if needed. In total 12 507 participated in the second examination, giving a response rate of 86%. On their return, the questionnaires were immediately checked for missing values and completed by telephone, if necessary.

Definitions

Outcome variable

The *smoking* item ("Do you smoke?") in both the baseline and the one year follow up questionnaires contained four alternatives: daily smoker, intermittent (non-daily) smoker, stopped smoking, and never smoked. The baseline intermittent smokers had at the one year follow up either become daily smokers (intermittent/daily), remained intermittent smokers (intermittent/intermittent), or had stopped smoking (intermittent/stopped). The three groups of baseline intermittent smokers are separately compared to the aggregate sum (reference population) of daily smokers, former smokers (stopped), and respondents who had never smoked in the univariate and multivariate analyses.

The smoking item includes cigarette, cigar, and pipe smoking, but the vast majority (80.9% of all men and 97.3% of all women) were cigarette smokers.

The reliability of the smoking item was assessed by investigating the test-retest stability of 200 respondents within two weeks after the baseline examination. The test-retest stability was very high. The κ coefficient was 0.96 for all 200 respondents, 0.99 for the men, and 0.94 for the women. No age differences in reliability were observed, since the κ coefficients for the smoking item was 0.97 for the $<$ 58.1 year group and 0.96 for the $>$ 58.1 year group.

Independent variables

The *age* of the participants was computed from birth to the first visit to the MDCS centre and categorised into five groups.

For *country of origin*, all participants born in countries other than Sweden were merged into a single category.

Four categories were used for *marital status*: married, never married, divorced, and widow/widower. In the final analyses, the married category was compared to all unmarried.

Education was categorised by length of education. The respondents were classified into three groups: university degree, medium level (university studies without degree or less than three years of university studies, senior high school), and basal level (primary school, nine years or less).

Social participation (during the past year) describes how actively the person takes part in the activities of formal and informal groups in society. Respondents were asked whether in the previous 12 months they had been involved in any of the following activities: study circle/course at workplace, other study circle/course, union meeting, meeting of other organisations, theatre/cinema, arts exhibition, church, sports event, letter to editor of a newspaper/journal, demonstration, night club/entertainment, large gathering of relatives, private party. It was measured as an index consisting of 13 items and dichotomised. If three alternatives or less were indicated, the social participation of that individual was classified as low.

Social anchorage (five items) described belonging to formal and informal groups and the feeling of membership in these groups (familiarity with neighbourhood, sense of belonging to friends and relatives, membership in organisations or clubs, feeling of belonging at the place of work, and feelings of importance to other people). If three or more items denoted low social anchorage, the whole index variable was regarded as low.

Emotional support (three items) reflected the opportunity for care, encouragement of personal value, and feelings of confidence and trust. Each item had four alternatives: "Yes, I am absolutely sure to get such support", "Yes, possibly", "Not certain", and "No". The three latter alternatives were classified as low emotional support. If two or three items were low, emotional support was considered low.

Instrumental support (one item) reflected the individual's access to advice, information, practical services, and material resources from other persons. This item was measured in the same way as the three emotional support items. The three latter alternatives were classified as low instrumental support.

The reliability and validity of the four psychosocial variables have been assessed in several other studies.[24 25] The different items showed a good or acceptable validity and reliability. The test-retest stability was high. The κ coefficients for the social support variables social participation and social anchorage were 0.70 and 0.66, respectively. The κ coefficients for the emotional and instrumental support variables were 0.57 and 0.47, respectively. The construct validity analysed by Cronbach's α was highest for emotional support (0.63) and social participation (0.61), while social anchorage scored the lowest (0.40). The analysis of construct validity indicated that the different indices measure different aspects of the psychosocial environment.

Nicotine consumption in the form of *oral snuff* is a common habit in Sweden with a prevalence of approximately 15–20%.[26 27] The prevalence of snuff intake (yes/no) was assessed.

Statistics

Three groups of baseline intermittent smokers that either had remained intermittent smokers, had become daily smokers, or had stopped smoking at the one year follow up were compared to the reference population in a logistic regression model according to sociodemographic, psychosocial, and snuff consumption characteristics. A multivariate logistic regression model was used to assess differences in psychosocial conditions, adjusting for age, sex, country of origin, marital status, education, and snuff consumption. The statistical analysis was performed using the SPSS software package.[28]

RESULTS

Table 1 shows that the proportions of daily and intermittent smokers at baseline were very similar among men and women. The proportion of never smokers was much higher among women (44.6%) than among men (28.1%). On the

Table 1 Prevalence (%) of smoking, sociodemographic, and psychosocial variables. The Malmö shoulder-neck study

	Men		Women		Total	
	n	%	n	%	n	%
Smoking status						
Regular/daily smoker	1606	24.8	1944	24.1	3550	24.4
Intermittent smoker	334	5.1	365	4.5	699	4.8
Stopped smoking	2725	42.0	2160	26.8	4885	33.6
Never smoked	1821	28.1	3593	44.6	5414	37.2
(Missing)	(3)		(4)		(7)	
Age						
45-49 years	826	12.7	1024	12.7	1850	12.7
50-54 years	1608	24.8	2027	25.1	3635	25.0
55-59 years	1501	23.1	1809	22.4	3310	22.7
60-64 years	1566	24.1	2004	24.8	3570	24.5
65-69 years	988	15.2	1202	14.9	2190	15.0
(Missing)	(0)		(0)		(0)	
Country of origin						
Sweden	5615	86.6	7047	87.4	12662	87.0
Other country	871	13.4	1014	12.6	1885	13.0
(Missing)	(3)		(5)		(8)	
Marital status						
Married	4674	72.1	5053	62.7	9727	66.9
Unmarried	696	10.7	646	8.0	1342	9.2
Divorced	942	14.5	1587	19.7	2529	17.4
Widow/widower	173	2.7	769	9.5	942	6.5
(Missing)	(4)		(11)		(15)	
Education						
University degree	841	13.0	974	12.1	1815	12.5
Medium	1370	21.1	1128	14.0	2498	17.2
Basal level	4268	65.9	5941	73.9	10209	70.3
(Missing)	(10)		(23)		(33)	
Social participation						
High	4492	69.2	5537	68.6	10029	68.9
Low	1997	30.8	2529	31.4	4526	31.1
(Missing)	(0)		(0)		(0)	
Social anchorage						
High	4687	73.4	5910	75.9	10597	74.7
Low	1702	26.6	1878	24.1	3580	25.3
(Missing)	(100)		(278)		(378)	
Emotional support						
High	4243	65.7	5804	72.4	10047	69.4
Low	2211	34.3	2213	27.6	4424	30.6
(Missing)	(35)		(49)		(84)	
Instrumental support						
High	4162	64.3	5857	72.9	10019	69.0
Low	2313	35.7	2182	27.1	4495	31.0
(Missing)	(14)		(27)		(41)	
Snuff consumption						
Yes	451	7.0	36	0.4	487	3.4
No	6031	93.0	8007	99.6	14038	96.6
(Missing)	(7)		(23)		(30)	
Total	6489		8066		14555	

other hand, the proportion of individuals that had stopped smoking was much higher among men (42.0%) than among women (26.8%). The distribution according to age, country of origin, social participation, and social anchorage did not differ between men and women. Men were married to a somewhat higher extent than women, and women were divorced and widows to a higher extent than men. A higher proportion of women had high emotional support and high instrumental support. On the other hand, a higher proportion of women also had only a basal level of education. Only 0.4% of all women were snuff consumers, compared to 7.0% of all men.

The prevalence of daily smoking decreased from 23.8% to 21.7% ($p < 0.001$) at the one year follow up among the 86% that participated at both the baseline and the one year follow up, while the prevalence of intermittent smoking increased from 4.8% to 5.4% ($p < 0.001$). The proportion that had stopped smoking increased from 33.7% to 35.1% ($p < 0.001$), while the proportion of never smokers remained at 37.7% (not shown in tables).

A 59.9 % majority of all baseline intermittent smokers remained intermittent smokers at the one year follow up, while 15.9% had become daily smokers and 19.2% had

Table 2 Distribution of sociodemographic and psychosocial characteristics according to smoking status of baseline intermittent smokers at one year follow up. The Malmö shoulder- neck study

	Intermittent/ daily (n=95) (%)	Intermittent/ intermittent (n=358) (%)	Intermittent/ stopped (n=145) (%)	Reference population (n=11909) (%)
Age				
45–49 years	12.6	15.6	20.0	12.3
50–54 years	23.2	31.8	30.3	24.2
55–59 years	26.6	23.2	15.9	22.9
60–64 years	31.6	17.9	20.7	25.0
65–69 years	6.3	11.5	13.1	15.6
(Missing)	(n=0)	(n=0)	(n=0)	(n=0)
Sex				
Men	47.4	48.6	46.9	44.0
Women	52.6	51.4	53.1	56.0
(Missing)	(n=0)	(n=0)	(n=0)	(n=0)
Country of origin				
Sweden	88.3	87.2	85.4	88.4
Other country	11.6	12.8	14.6	11.6
(Missing)	(n=0)	(n=0)	(n=0)	(n=5)
Marital status				
Married	60.0	63.7	59.3	67.8
Unmarried	15.8	8.4	12.4	9.0
Divorced	18.9	23.5	23.4	16.6
Widow/widower	5.3	4.5	4.8	6.6
(Missing)	(n=0)	(n=0)	(n=0)	(n=7)
Education				
University degree	15.8	14.0	17.4	12.6
Medium	16.8	19.3	20.8	17.4
Basal level	67.4	66.7	61.8	70.0
(Missing)	(n=0)	(n=1)	(n=1)	(n=20)
Social participation				
High	56.8	76.5	76.6	70.2
Low	43.2	23.5	23.4	29.8
(Missing)	(n=0)	(n=0)	(n=0)	(n=0)
Social anchorage				
High	78.0	74.5	76.1	75.4
Low	22.0	25.5	23.9	24.6
(Missing)	(n=4)	(n=9)	(n=3)	(n=269)
Emotional support				
High	63.2	64.6	69.2	70.2
Low	36.8	35.4	30.8	29.8
(Missing)	(n=0)	(n=2)	(n=2)	(n=53)
Instrumental support				
High	63.2	69.7	75.0	69.1
Low	36.8	30.3	25.0	30.9
(Missing)	(n=0)	(n=1)	(n=1)	(n=24)
Snuff consumption				
Yes	9.5	11.5	9.0	3.0
No	90.5	88.5	91.0	97.0
(Missing)	(n=0)	(n=1)	(n=0)	(n=17)
Total	100.0	100.0	100.0	100.0

stopped smoking. An interesting 5.0% of all baseline intermittent smokers stated that they had never smoked at the one year follow up. This group was regarded in the following analyses as baseline intermittent smokers that had stopped smoking (not shown in tables).

Tables 2 and 3 show that the long term intermittent smokers (intermittent/intermittent) were significantly younger and had a significantly higher level of social participation than the reference population. The transitional intermittent smokers that had become daily smokers (intermittent/daily) had low social participation to a significantly higher extent (odds ratio (OR) 1.79, 95% confidence interval (CI) 1.19 to 2.69) than the reference population. The transitional intermittent smokers that had stopped smoking (intermittent/stopped) were younger and unmarried to a significantly higher extent than the reference population. They also had a significantly lower proportion of persons with basal level education (OR 0.69, 95% CI 0.49 to 0.97) than the reference population. The odds ratios of being a snuff user were higher in all the three baseline intermittent smoker groups compared to the reference population.

Table 4 shows that the long term intermittent (intermittent/intermittent) smokers still had a significantly lower proportion of persons with low social participation compared to the reference population after adjustment for age, sex, country

Table 3 Odds ratios and 95% confidence intervals of sociodemographic, psychosocial, and snuff consumption characteristics among the three groups of intermittent smokers at baseline compared to the reference population at baseline. The Malmö shoulder- neck study

	Intermittent/daily	Intermittent/ intermittent	Intermittent/stopped
Age 55–69/45–54 years	1.03 (0.68 to 1.57)	0.64 (0.51 to 0.78)	0.57 (0.41 to 0.78)
Sex Men/women	1.14 (0.76 to 1.72)	1.20 (0.97 to 1.48)	1.12 (0.81 to 1.56)
Country of origin Other/Sweden	1.00 (0.53 to 1.89)	1.12 (0.82 to 1.54)	1.30 (0.81 to 2.07)
Marital status Not married/married	1.40 (0.93 to 2.12)	1.20 (0.96 to 1.49)	1.44 (1.03 to 2.01)
Education Basal level/ medium+university	0.88 (0.58 to 1.36)	0.86 (0.69 to 1.07)	0.69 (0.49 to 0.97)
Social participation Low/high	1.79 (1.19 to 2.69)	0.72 (0.56 to 0.92)	0.72 (0.49 to 1.06)
Social anchorage Low/high	0.95 (0.64 to 1.42)	1.04 (0.82 to 1.34)	0.96 (0.65 to 1.42)
Emotional support Low/high	1.37 (0.90 to 2.09)	1.29 (1.03 to 1.61)	1.04 (0.73 to 1.49)
Instrumental support Low/high	1.30 (0.86 to 1.98)	0.97 (0.77 to 1.22)	0.74 (0.51 to 1.09)
Snuff consumption Yes/no	3.40 (1.70 to 6.81)	4.22 (3.00 to 5.94)	3.20 (1.79 to 5.71)

Table 4 Odds ratios and 95% confidence intervals of psychosocial characteristics among the three groups of intermittent smokers at baseline compared to the reference population at baseline. The Malmö shoulder-neck study

	Intermittent/daily	Intermittent/ intermittent	Intermittent/stopped
Social participation Low/high	1.79 (1.17 to 2.75)	0.73 (0.56 to 0.94)	0.74 (0.50 to 1.12)
Social anchorage Low/high	0.79 (0.47 to 1.31)	1.00 (0.78 to 1.29)	0.90 (0.61 to 1.34)
Emotional support Low/high	1.10 (0.72 to 1.69)	1.25 (0.99 to 1.56)	0.98 (0.68 to 1.42)
Instrumental support Low/high	1.30 (0.85 to 1.99)	0.96 (0.76 to 1.21)	0.71 (0.48 to 1.04)

*Adjusted for age, sex, country of origin, marital status, education, and snuff consumption.

of origin, marital status, education, and snuff consumption in the multivariate logistic regression analysis. In contrast, the odds ratio of low social participation among transitional intermittent/daily smokers was 1.79 (95% CI 1.17 to 2.75) compared to the reference population in the multivariate analysis.

The exclusion of the baseline intermittent smokers that reported that they had never smoked at the one year follow up from the intermittent/stopped group yielded the same results as those presented in tables 3 and 4 for the intermittent/ stopped group.

DISCUSSION

A 60% majority of all baseline intermittent smokers had remained intermittent smokers, 16% had become daily smokers, and 24% had stopped smoking at the one year follow up. The long term intermittent smokers and the transitional smokers who had stopped smoking were young, unmarried, highly educated, and snuff consumers to a higher extent than the reference population. They also seem to have more psychosocial resources, especially social participation, than the total population. In contrast, the social participation of the baseline intermittent smokers that had become daily smokers was poorer than in the reference population.

The present results could be biased by selection bias, misclassification, and confounding.

A comparison with another investigation conducted in the city of Malmö during the same time period with a higher participation rate (71%) showed a good correspondence in the same age groups concerning socioeconomic status, smoking, and social participation.[21] Some studies have shown that non-participants differ from study participants in terms of

smoking habits.[29 30] The smoking prevalences in these studies have been shown to be somewhat higher among non-participants. This is confirmed in our study by the finding that the prevalence of daily smoking at baseline was 24.4% among all baseline participants, but only 23.8% among those 86% of the baseline participants who participated both at baseline and at the one year follow up. However, we do not find any plausible reason for assuming that the tendency of non-participation would be higher for intermittent smokers compared with daily smokers. Accordingly, the difference between the one year follow up participants and the non-participants in our study are probably not biased to any important extent by selection.

The validity of items assessing smoking has previously been analysed several times. The results have consistently shown that self reported tobacco smoking is a valid and reliable way to measure smoking habits in a population.[9 31–35] The test-retest stability of the smoking item within two weeks was very high, the κ coefficient indicating an extremely high reliability. Differential misclassification is not likely to have been present. Non-differential misclassification seems to be a problem of less importance in this study, since non-differential misclassification tends to attenuate true differences, and the main results of this study show clear differences between different long term and transitional intermittent smoker groups and the reference population. The reliability and validity of the psychosocial variables showed an acceptable validity and reliability,[34] although the generally not very high Cronbach α coefficients of the psychosocial index variables are to some extent a limitation of this study.

Age, sex, country of origin, marital status, education, and snuff consumption could be confounders of the associations between the psychosocial variables and long term and transitional intermittent smoking. Adjusting for these variables, however, only marginally affected the estimates.

The 7% prevalence of snuff consumption among men may be regarded as low compared to the prevalence sometimes reported for Sweden.[26 27] However, other unpublished data from Scania in southern Sweden reveal the same prevalence of snuff use in this part of Sweden.

The longitudinal study design may be considered the most important strength of this study, because it makes it possible to follow the smoking history of the individual long term and transitional intermittent smokers for at least somewhat more than a year.

The 45–69 year age restriction is to some extent a limitation, since younger smokers (those who recently started smoking) are probably more likely than older smokers to exhibit changes in smoking patterns.

Despite the very high reliability of the smoking item, 30 baseline intermittent smokers reported at the one year follow up that they had never smoked. There is no certain explanation for this phenomenon. One possible explanation could be that intermittent smokers that have never smoked daily do not regard themselves as ever-smokers when they quit, because they have a much weaker identity as smokers than daily smokers during their smoking career. This notion is supported by the fact that only two out of 217 baseline daily smokers that had stopped smoking reported that they had never smoked at the one year follow up.

Previous studies have suggested that intermittent smokers could be either long term intermittent smokers—that is, in a long term stage (more than one year) of intermittent smoking—or in transitional stages from daily smoking to smoking cessation or from non-smoking to daily smoking.[1] Intermittent smokers appear to be younger, more highly educated, and have higher occupational status than daily smokers.[1 6] Their level of social participation is also higher than among daily smokers, and more similar to the level of social participation among non-smokers. However, this study has shown that the level of social participation differs between the long term intermittent smokers (intermittent/intermittent), and the transitional intermittent/daily and the intermittent/stopped groups. The long term intermittent smokers seem to have a lower proportion of individuals with low social participation compared to the reference population. Such a tendency, although not significant, was also observed for the transitional intermittent/stopped group. In contrast, the baseline transitional intermittent smokers that had become daily smokers had a significantly higher proportion of individuals with low social participation.

Social participation may be a factor that protects against the transformation of intermittent smokers into daily smokers. There are at least two mechanisms that can explain this statistical pattern. Firstly, social participation—that is, many different contacts with different forms of social life—may be a psychosocial asset for the individual intermittent smoker that works as a barrier against the development into daily smoking. The development to daily smoking might otherwise be facilitated by, for example, psychological, social or economic stress. Secondly, high levels of social participation may also be viewed as a source of knowledge, innovation, and transmission of certain values that affect smoking behaviour. The values transmitted may of course theoretically either be such values that affect the intermittent smoker to become a daily smoker, to remain an intermittent smoker, or to stop smoking. However, the generally declining trends in smoking in Sweden and other western countries during the past decades would imply that high levels of social participation generally would serve to facilitate the continuation of intermittent smoking or smoking cessation, rather than the initiation of daily smoking. The theory of diffusions of innovations suggests that some segments of the population adopt to changes in society earlier than others.[36] One non-material resource that could explain the decision of an intermittent smoker to stop smoking or remain an intermittent smoker in contrast to becoming a daily smoker may be a high level of social participation as defined in this study.

The finding that all the groups of intermittent smokers have much higher proportions of individuals with snuff consumption partly contradicts the notion that intermittent smokers may be less nicotine addicted than daily smokers. Snuff consumption is a specifically Swedish phenomenon. This may to some extent affect the estimations of the proportion of all intermittent smokers that are long term intermittent smokers compared to other western countries. Snuff consumption is comparatively high in Sweden compared to many other western countries, and the use of oral snuff is a very particular trait

What this paper adds

Intermittent (non-daily) smokers differ from daily smokers because they are younger, more highly educated, have higher socioeconomic position, and are less nicotine addicted. They also have better social networks and higher social participation than daily smokers. Intermittent smokers are either in the uptake phase of smoking, long term intermittent smokers, or former daily smokers in the process of smoking cessation. Most previous studies concerning intermittent smokers are cross sectional studies. This longitudinal study in southern Sweden shows that 60% of all baseline intermittent smokers had remained intermittent smokers at the one year follow up, while 16% had become daily smokers, and 24% had stopped smoking. The baseline intermittent smokers that had become daily smokers at the one year follow up had significantly higher risks of low social participation at baseline than the reference population, while the baseline intermittent smoker group that had remained intermittent smokers after a year had significantly lower risks of having low social participation than the reference population.

that characterises snuff consumption in Sweden. However, the vast majority (approximately 90%) of the intermittent smokers in all the three long term and transitional intermittent smoker groups do not use snuff, a fact that indicates that no far reaching inferences should be drawn from these findings.

CONCLUSION

The majority of intermittent smokers are long term intermittent smokers. The study results indicate that long term intermittent smokers have both sociodemographic and psychosocial characteristics—that is, high levels of social participation—that significantly differ from both transitional intermittent smokers that initiate daily smoking and the reference population. The results further support the notion that long term intermittent smokers are a specific group of smokers with other characteristics than daily smokers.

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