



Original Research Article

## Socioeconomic Factors Associated With Smoking in Saudi and Non-Saudi Smokers

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### ABSTRACT

**Background and aims:** Socioeconomic differences in smoking have been well established. While previous studies have mostly relied on one socioeconomic indicator at a time, this study examined socioeconomic differences in smoking between Saudi and non - Saudi smokers by using several indicators that reflect the different dimensions of socioeconomic position.

**Methods:** A survey was made using a questionnaire which includes six socioeconomic indicators: education, occupational, social status, economic conditions as well as the duration of smoking and the number of cigarettes consumed per day. Their associations with current smoking were examined by logistic regression models.

**The results:** The tested socioeconomic indicators were strongly associated with smoking. When the indicators were examined simultaneously their associations with smoking attenuated, especially when education and occupational status were considered together.

**Conclusions:** Smoking was associated with educational, social as well as economic and occupational dimensions of socioeconomic disadvantaged. Attempts to reduce smoking among the socioeconomically disadvantaged population need to target the several dimensions of socioeconomic position.

**Key words:** Saudi smokers, Non-Saudi smokers, Socioeconomic variations

### INTRODUCTION

The health consequences associated with smoking which affect smokers are life threatening and far-reaching. <sup>(1)</sup> The health of low socioeconomic level individuals are greatly affected by smoking due to disparities in health and difficult access to health care services. <sup>(2)</sup>

Smoking prevalence is higher among disadvantaged groups where disadvantaged smokers may face higher exposure to

tobacco's harms. <sup>(3)</sup> Individuals of low socioeconomic tend to, have poorer general health outcomes than individuals with higher education and incomes, have higher prevalence of oral diseases and are more likely to have co-occurring oral health complications. <sup>(4)</sup>

Various explanations for the relationship between socioeconomic differences and smoking have been put forward. These include lack of knowledge

and psychosocial stress due to an unfavorable social position and poor social conditions. These explanations may relate differently to the various indicators that have been used to measure socioeconomic position. <sup>(1,4)</sup> Educational, occupational status and income as well as other measures of social living conditions have all been found to be inversely associated with smoking. While each of these indicators is likely to reflect one's position in socioeconomic hierarchy, they all also have specific characteristics. <sup>(5)</sup>

The impacts of socioeconomic factors on health have been found in all countries and there is an increasing interest in making international comparisons of their pattern and size. The results of these comparisons lead on to new questions about socioeconomic gradients in specific risk factors for disease, such as smoking. Until now only few studies have compared the magnitude of socioeconomic differences in smoking between countries. <sup>(6,7)</sup>

All studies in Saudi Arabia describing the prevalence of smoking among different age groups showed higher prevalence of smoking among the Saudi population. Identifying of risk related factors associated with high prevalence of smoking among smoker is a very important issue for planning the prevention and cessation programs. <sup>(4,5)</sup>

The Hajj in Makkah, Saudi Arabia, attracts nearly 1.5 million overseas pilgrims from all parts of the world each year, with an addition of 0.5 million pilgrims from the host country. <sup>(8)</sup> Makkah city is considered a meeting place for all Muslims with different nationalities especially during the Hajj season. This makes the international comparison more relevant and easier to identify the relationship between socioeconomic status and smoking.

## **MATERIALS AND METHODS**

### ***Subjects***

A smoker Saudi pilgrim was defined as a native or expatriate resident from Saudi Arabia who performed the Hajj. A smoker non - Saudi pilgrim was defined as a traveler from other countries who performed the Hajj in 2011.

A questionnaire was distributed during haj to assess different variables related to smoking on pre - selected (3480) smoking male individuals, (1320) were Saudi and (2160) were non – Saudi of 5 different nationalities (723 Egyptians, 472Syrians,433Yemenis, 401 Sudanese, and 221Jordanians)

### ***Survey procedure***

The questionnaire was delivered in three defined areas (Mena, Mozdalifa, and Arafat) where the pilgrims gathered. The demographic variables include, age, gender, nationality, socioeconomic status, occupation, social status and the frequency of smoking and its duration.

***Smoking status*** was determined by questioning them on what type of smoking they use, whether it was cigarettes, hookah or others.

***Educational level*** was measured by questioning them on whether they completed general or vocational education. The education level itself was divided into five groups corresponding to (1) Illiterate (2) basic education, (3) secondary education, (4) higher education (university degree) and (5) postgraduate education. *Occupation* and the age at which they started smoking with the number of cigarettes per day were also accounted for. *Social status* was divided into Single, Married and Divorced/ separated.

***The frequency of smoking*** was divided into two categories 20 -30 or more than 30 cigarettes per day. Regarding the duration of smoking was defined by the date at which they started to smoke.

***Validity and reliability of questionnaire:***

The questionnaire was pre tested before the study was started; it took about 15 minutes to fill. The reliability of the questionnaire was tested after 2 weeks of the study by redistributing it to 30 people. The reliability of the two sets of responses was compared statistically using weighted Kappa. The Kappa statistics ranged from 0.90 to 0.95.

### **Statistical methods**

The statistical analysis was carried out using statistical package for social science software, (SPSS) version 17 (Chicago Inc.). A chi-square test was used to test the differences in any categorical variables, comparison between the percentages of the current smokers in different groups. Z- test used for comparing between the Saudi and non - Saudi smokers regarding each variable. (t - test) was used to test the significant difference between the numerical data. Logistic regression analysis was used to examine how several socioeconomic indicators were simultaneously associated with smoking among Saudi and non Saudi smokers.

## **RESULTS**

In total, 3480 smoking pilgrims were recruited to the study, of whom 1320(37.9%) Saudi Arabian residents and 2160 (62.1%) were of other nationalities.

The age of the study population ranged from 20 to 69 years, with a mean age (38.9). Saudi smokers mean age was (34.7), significant differences between all age groups was found ( $X^2 = 9.123, p > 0.0001$ ). Among the non- Saudi smokers, mean age group was (42.9) with significant difference between the different age groups ( $X^2 = 7.364, p > 0.0001$ ) Table 1,2.

The highest prevalence of smoking among Saudi was (23.6%), being in the age group 30 - 40 years, while among non - Saudi was (33.8%) in the age group 40 - 50. The overall prevalence of smoking was

(65.5%) among Saudi and was (76.4%) among non - Saudi being at age 30 – 60 years. The odds of smoking among non - Saudi was 6 times more than Saudi people ( $z = 6.362, p > 0.0001$ ).

Smoking prevalence was higher among the married people than among those in other social -status categories it was (51.7%) among Saudi and (55.7%) for non – Saudi people by (OR = 2.77, 95% CI = 1.89 – 2.97,  $p < 0.0002$ ).

Current smoking was significantly associated with level of education, among Saudi and non - Saudi ( $X^2 = 6.532, 8.231$  respectively;  $p < 0.0001$ ). Smoking prevalence was higher among those who had basic education and illiterate people, the prevalence was nearly equal among Saudi and non - Saudi smokers (65%) with (ORs = 1.95, and 2.05, respectively;  $p < 0.0001$ ).

Smoking prevalence was higher among manual laborers in both Saudi and non – Saudi smokers (57.1% and 56.2% respectively) with highly significant differences among the other occupations in both groups ( $X^2 = 12.437, 14.508$  respectively;  $p < 0.0001$ ). Compared with semi- professionals and non - workers (ORs = 3.04, 1.13, and 2.83, respectively;  $p < 0.0001$ ).

Regarding economic difficulties in relation to smoking, significant differences with the three categories was found in both Saudi and non - Saudi smokers ( $X^2 = 3.459, 4.113$  respectively;  $p < 0.05$ ). The high prevalence of economic disabilities appears as occasional or frequent nearly the same in the two groups (72.2% and 72.5% respectively) with (ORs 1.94, 2.02 respectively;  $p < 0.05$ ).

Most smokers (63.3%) smoked more than 30 cigarettes per day, and (36.7%) smoked 20–30 cigarettes per day and the mean was (36.6) table 2. Among Saudi people (54%) had smoked for 10 years or less, and (46%) had smoked for 10 years or

more; mean (SD) duration of smoking was 11.6 (4.42) years. Regarding the non - Saudi people, (63%) had smoked for 10 years or less, and (37%) had smoked for 10 years or more; mean (SD) duration of smoking was 12.8 (7.32) years. A significant difference

was found as regards the frequency of smoking and the duration between Saudi and non-Saudi smokers (t=7.54, 5.38 respectively; p<0.0001).

Table 1: Distribution of the basic characteristics of the study population by nationality

Demographic and socioeconomic character	Saudi smokers		Non - Saudi smokers		Total		OR	95% CI
	n	%	n	%	n	%		
<b>1. Age</b>								
20 – 30	203	15.4	313	14.5	516	14.8		1.00
30 – 40	311	23.6	471	21.8	782	22.5	2.70	1.93 – 3.11
40 – 50	271	20.5	729	33.8*	1000	28.7	3.51	2.43 - 3.59
50 – 60	297	21.1	453	20.9*	750	21.6	2.09	1.92 - 2.89
60 and over	238	18	194	8.9*	432	12.4	2.22	1.82 - 2.72
<i>Chi-square (X<sup>2</sup>)</i>	<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>			
<b>2. Social status</b>								
Single	357	27	391	18.1*	748	21.5		1.00
Married	683	51.7	1256	58.1*	1939	55.7	2.77	1.89 – 2.97
Divorced/ separated	280	21.3	513	23.8*	793	22.8	1.86	1.73 - 1.91
<i>Chi-square (X<sup>2</sup>)</i>	<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>			
<b>3. Education</b>								
Higher	197	14.9	338	15.6	535	15.4		1.00
Secondary	271	20.5	431	20	702	20.2	0.78	0.66 – 0.94
Basic	358	27.1	609	28.2	967	27.8	1.95	2.61 -- 2.03
Illiterate	494	37.5	782	36.3	1276	36.6	2.05	1.91 - 2.98
<i>Chi-square (X<sup>2</sup>)</i>	<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>			
<b>4. Occupation</b>								
Manager and professionals	153	11.6	286	13.3	439	12.6		1.00
Semi- professionals	315	23.9	469	21.7	784	36.4	1.13	1.96 – 2.07
Manual laborers	754	57.1	1215	56.2	1969	56.7	3.04	2.09 - 3.19
Nonworkers	98	7.4	190	8.8	288	8.3	2.83	1.64 - 2.87
<i>Chi-square (X<sup>2</sup>)</i>	<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>			
<b>5. Economic difficulties</b>								
No difficulties	367	27.8	593	27.5	960	27.5		1.00
Occasional difficulties	475	36	811	37.5	1286	37	1.94	1.61 - 1.98
Frequent difficulties	478	36.2	759	35	1237	35.5	2.02	1.89 – 3.08
<i>Chi-square (X<sup>2</sup>)</i>	<i>P &lt; 0.05</i>		<i>P &lt; 0.05</i>		<i>P &lt; 0.05</i>			
<b>5. Number of cigarettes per day</b>								
20 – 30	490	37.1	786	36.4	1276	36.7		1.00
More than 30	830	62.9	1374	63.6	2204	63.3	3.04	1.90 - 4.19
<i>Chi-square (X<sup>2</sup>)</i>	<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>		<i>P &lt; 0.0001</i>			

\* Significance difference between Saudi and non - Saudi smokers by z -test

OR : odds ratio

CI : Confidence interval

Table 3 : The multivariate logistic regression analysis of variables related to smoking among the Saudi and non – Saudi smokers, Age was used a constant

continuous variable in the model , it showed a 11 % decrease in the odds ratio of smoking by increasing of the age. Education and occupation were powerful predictors for

smoking with a highly significant increase of odds among the lower categories. (OR=3.11 and 3.6 respectively  $P < 0.0001$ ). Regarding the social and economic difficulties there was one fold increase in the

smoking prevalence among the married persons over the other social status and smokers with frequent economic status over the other categories.

**Table 2: Comparison between the mean age, frequency of smoking and the duration of smoking among Saudi and non – Saudi smokers.**

Variable	Saudi smokers (n=1320)	Non – Saudi smokers (n= 2160)	Total
	Mean ± SD	Mean ± SD	Mean ± SD
Age	34.7 ± 12.63	42.9 ± 14.91*	38.9 ± 16.21
Frequency of smoking	32.6 ± 14.32	40.2 ± 19.76*	36.6 ± 14.10
Duration of smoking	11.6 ± 4.42	12.8 ± 7.32*	12.2 ± 7.11

\*Significance difference between the two groups ;  $p < 0.001$

**Table 3: Themultivariate logistic regression analysis of socioeconomic variables related to smoking among the Saudi and non – Saudi smokers**

Variable	B	SE	OR	CI	p
Age*	-0.117	0.012	0.11	0.09 – 0.86	$P < 0.05$
Education	2.801	1.932	3.11	1.92 – 3.47	$P < 0.0001$
Occupation	1.993	0.961	3.06	2.05 – 3.22	$P < 0.0001$
Social status	0.214	0.089	1.89	1.17 – 2.25	$P < 0.01$
Economic difficulties	0.145	0.029	1.27	0.97 – 1.87	$P < 0.01$

B = Coefficient of regression

SE = Standard error

OR = odds ratios

## DISCUSSION

Smoking is a major public health problem that is clearly socioeconomically related. Low socioeconomic status is the single greatest predictor for smoking. Characteristics that describe low socioeconomic status populations are individuals with basic education, unemployed and having economic disabilities. (9)

Inequalities in socioeconomic status underlie many health disparities in the world, including oral health. Occupational status, income and education are intrinsically related and often serve as a measure for each-other. In general, the population groups that suffer the worst oral health status are also those that have the highest poverty rates and the lowest education. At the same time, a high level of education increases the opportunity to engage in oral health-promoting behaviors. (4,10)

There are several indicators that can be used in the evaluation of socioeconomic

status. The most important indicators are occupational status, level of education, economic difficulties and social status. Each indicator covers a different aspect of social stratification and it is therefore preferable to use all four instead of only one. (11)

Few previous studies have analyzed socioeconomic differences in smoking by simultaneously taking into account several different indicators of socioeconomic position. In this study we examined socioeconomic differences between Saudi and non - Saudi smokers by using educational level, occupation, social and economic indicators with the frequency of smoking per day. (4,5,11,12)

The results of this study show significant inversely relationship between smoking and socioeconomic indicators. This association was broadly similar among Saudi and non - Saudi smokers. Married smokers showed higher significant difference among both Saudi and non- Saudi in comparison with other social status (51.7% and 58.1%) in both groups

respectively. Illiterate smokers are (37.5%) of all Saudi similarly they are (36.3%) of all non- Saudi smokers, significant difference is found when compared with the other levels in the same group. In this study manual laborers, constitute more than half of the smokers (57.1% and 56.2%) in Saudi and non - Saudi smokers respectively, significant difference is found regarding the other occupational levels. Similar results were found in Australia and many other countries, smoking behavior are inversely related to socioeconomic status, with disadvantaged groups in the population being more likely to take up and continue smoking. (9,13)

Occupational status is relevant because it determines people's place in the social hierarchy while information in education is used to distinguish people occupying a high position in the social hierarchy from those with a low position. In this study smoking behavior is clearly stratified by occupational level, with increasing occupational prestige correlating with a decreased likelihood of smoking. (14,15)

Smoking increased gradually from the higher to the lower socioeconomic groups, when studied separately, all socioeconomic indicators (education, social status, occupation and economic conditions) showed a strong association with smoking. **Smoking rates vary by education level, (15.4%) among highly educated smokers and increase to reach (26.8 % and 36.6%) among basic and illiterate smokers.** Regarding the occupational level manual laborer showed high level of smoker rate (56.7%), (55%) of the examined smokers were married and (63.3%) were smoking more than 30 cigarettes per day.

Examining several socioeconomic indicators simultaneously attenuated their associations with smoking. In the logistic regression models, education and occupation

showed highly relationship ( $P < 0.0001$ ). Other factors when ranked to their associated social status and economic difficulties show also significantly high level ( $P < 0.01$ ).

## CONCLUSION

The link between socioeconomic status and health, including oral health, is well established. Smoking was associated with educational, social as well as economic and occupational dimensions of socioeconomic disadvantage. Attempts to reduce smoking among the socioeconomically disadvantaged need to target several dimensions of socioeconomic position.

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