

ASSOCIATION OF OCCUPATIONAL STRESS FACTORS ON NICOTINE DEPENDENCE AMONG PATIENTS VISITING DENTAL CARE UNIT OF INDO-TIBETIAN BORDER POLICE FORCE STATION IN INDIA

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ABSTRACT

Background. Tobacco use is the foremost preventable cause of death and disease in the world today and work strain might be related with nicotine dependence by its provoking effect.

Objective. To assess the association between occupational stress and nicotine dependence.

Material and methods. A cross sectional survey was conducted among 200 subjects visiting a satellite dental clinic of Swami Devi Dyal Hospital and Dental College, Barwala, Panchkula, India. Nicotine dependence was measured using the Fagerstrom Test for Nicotine Dependence (FTND). The extent of the stress factors experienced at work was assessed using the Effort-Reward Imbalance scale (ERI). *Chi-square* test and multiple logistic regression analysis were employed for statistical analysis. Confidence level and level of significance were set at 95% and 5% respectively.

Results. The results of bivariate analysis revealed association of occupational stress with age, marital status, educational status, level of nicotine dependence, frequency of cigarette smoking and religious attendance. However, multivariate analysis elicited the significant association of occupational stress with only two variables, level of nicotine dependence and frequency of smoking.

Conclusion. Occupational stress was found to be associated with nicotine dependence in the present study implying a need of other tranquil measures to be incorporated for the relief of work related stress.

Key words: nicotine dependence, occupational stress, smoking

INTRODUCTION

Tobacco use is a serious public health challenge in several regions of the world. It has assumed the dimension of an epidemic resulting in enormous disability, disease and death [13]. It is a multi-dimensional addiction that includes psychological, physiological and behavioural dependence on nicotine [17]. Globally, the total number of tobacco-attributable deaths from ischaemic heart disease, lung cancer and other diseases is projected to rise from 5.4 million in 2004 to 8.3 million in 2030 [7].

In India an estimated 65% of all men and 33% of all women use some form of tobacco. Tobacco related cancers in India accounts for 42% of all male deaths and 18.3% of all female deaths. The prevalence of smoking

among men and women differs substantially: 35% of men and 3% of women smoke, while both use smokeless tobacco products to approximately the same extent [9]. Various administrative measures were taken to prohibit tobacco smoking in public places and regulate the sale of tobacco products and their advertisements [10].

Nicotine dependence and the degree of that dependence are determined by individual and psychosocial factors as well as combinations of these factors [2]. Smoking has been used as a coping strategy for dealing with work stress [15, 23]. Therefore the degree of cigarette consumption shed light on the potential stress experienced at work.

“The Fagerstrom Test for Nicotine Dependence” is an internationally recognized and statistically validated instrument for assessing the degree of nicotine

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dependence in smokers. By using this test it is possible to obtain more detailed information about survey participants smoking behaviour than simply asking them to provide their smoking status [1].

The effort-reward imbalance model provides a theoretical approach to assessing the psychosocial stress experienced at work as measured by the Effort-Reward Imbalance (ERI) scale [20, 24]. The model claims that an imbalance between high efforts and low rewards may cause a state of emotional distress [12]. A possible relationship between reducing job stress and successful smoking was reported by some investigators. Therefore workplace smoking cessation programs should take into account of the influence of job stress on nicotine dependence. However, there are few reports that deal with influence of job stress on nicotine dependence of smokers at the workplace.

Hence, this study was conducted to determine whether there is an association between the experiences of occupational stress and nicotine dependence measured by the Fagerstrom Test for Nicotine Dependence among patients visiting dental care unit of Indo Tibetan Border Police (ITBP) Force station at Panchkula, district Haryana, India.

MATERIAL AND METHODS

Study design, study population, study area and study duration

A cross sectional descriptive study was conducted among 200 patients visiting dental care unit at Indo Tibetan Border Police Force station, Panchkula, district Haryana in the March 2015.

Ethical clearance, official permission and informed consent

The protocol of the study was approved by the ethical and review board of Swami Devi Dyal Hospital and Dental College, Panchkula, Haryana, India. Official permission to conduct the study was obtained from higher authorities of Indo Tibetan Border Police Force station, Panchkula. Written Informed consent was obtained from all the study participants.

Inclusion criteria

Subjects with habit of smoking since last six months were included in the study.

Exclusion criteria

Subjects who were uncooperative and underwent any medical treatment from last six months were excluded from the study.

Study Proforma

Sociodemographic information of subjects was obtained. Nicotine dependence was measured using the Fagerstrom Test for Nicotine Dependence (FTND). It consists of six questions regarding the degree of cigarette consumption and the inability to abstain from nicotine use. Each response was given a score and the total score ranges from 0 to 10 [11, 22].

The occupational stress was measured using the German version of the Effort Reward Imbalance and Ill Health (ERI) scale which consists of three subscales: "Effort", "Reward", and "Overcommitment". To evaluate the effort-reward imbalance experienced by study participants, only the scores of effort and reward scales were needed [19].

The effort-reward imbalance model defines stressful experiences at work as an imbalance between high effort expended and low reward received. "Effort" is evaluated by measuring work demands. Three transmitters are considered to be sources of a "reward": money, esteem, and career opportunities. The response options for the "effort" scale are: "Disagree," "Agree, but I am not at all distressed," "Agree, I am very distressed". The "reward" scale include 11 items assessing the extrinsic components of occupational rewards and contains questions pertaining to opportunities for advancement, employee appreciation, salary and job security. Participants with no superiors have the options to respond with "Not applicable". The ERI analysis was conducted as follows: If the participants disagreed with a statement, their response was assigned a value of 0. If the participants agreed with a statement but did not experience any stress, their response was assigned a value of 1. The greater the level of stress experienced, the greater the value up to 4. The ERI is, therefore, a five-point Likert scale. When interpreting the values, the higher the sum score of the "effort" and "reward" subscales, the greater the level of occupational stress. Values over 1 indicate an imbalance between effort and reward. The reliability and validity of the "effort," "reward," and "Over commitment" subscales as well as of the "effort-reward ratio" have been demonstrated in many studies. The internal consistency and validity of these scales in our study was estimated to be 0.84 to 0.85 for effort, 0.80 to 0.92 for reward [19].

Pretesting of questionnaire

A pilot study of the questionnaire was carried out on 30 patients who were not the part of the study and visited dental care unit for dental treatment. Problems encountered during this period were noted and appropriate modifications were made taking into account the comments and suggestion received by the responder as a whole. The reliability of questionnaire was analysed using *Cronbach's alpha* which was found to be

acceptable (0.82). Face validity indicates whether the instrument appears to be assessing the desired qualities. When face validity was assessed, it was observed that 92% of the participants found the questionnaire to be easy. Mean content validity ratio was calculated as 0.87 based on the opinions expressed by a panel of total six academicians.

Data collection

All the eligible subjects visiting the dental care unit at Indo Tibetan Border Police Force station, Panchkula, district Haryana during the month of March 2015 were informed and explained about the study and were asked to fill the questionnaires. Confidentiality and anonymity of the respondents were assured. A response rate of 100% was obtained.

Statistical analysis

The data was thoroughly checked and errors were corrected before the data analysis. All analysis was done using the statistical package of social sciences 17.0 software (SPSS Inc., Chicago IL). *Chi-square* test was applied and logistic regression model was calculated using all socio demographic variables. All reported probability values (p values) are based on two-sided tests and compared to a significance level of 5%.

RESULTS

A total of 200 subjects participated in the cross-sectional survey. The mean age of initiation of cigarette smoking was $19.1 \pm (6.25)$.

Table 1 depicts the occupational stress among study subjects who were smokers and visited the dental care unit at Panchkula district, Haryana. The level of stress is directly proportional to age, as the age advances the level of stress also increases. The higher level of stress was reported among the age group of 55 years and above. A statistically significant difference was observed among married and unmarried subjects with unmarried individuals showing higher level of stress ($p < 0.001$). 84.6% of subjects who were unmarried had more stress than married subjects (47.9%). Considering the educational status, higher level of stress was found among those who were 12th Grade qualified (86.4%) than the subjects who were graduates (72.1%) followed by the subjects who were Post-graduates (48.6%). Based on the official status, the higher level of stress was reported among constables (77.4%) as compared to officers (62.5%) and head constables (62.1%). Out of 138 subjects (85.5%) who smoked more than 5 cigarettes per day had stress. Subjects who visited a religious place less than once a week were having higher level of stress (77.3%).

Table 1. Distribution of study subjects by occupational stress

Variables	No stress		Stress		χ^2	P-value	Total n (%)
	n	%	n	%			
Age groups (years)							
18 - 24	14	63.6	8	36.4	8.57	0.001*	22 (11)
25 - 34	37	39.4	57	60.6			94 (47)
35 - 44	8	22.3	28	77.7			36 (18)
45 - 54	6	16.7	30	83.3			36 (18)
55 & above	1	8.3	11	91.7			12 (6)
Marital status							
married	50	52.1	46	47.9	30.4	0.011*	96 (48)
unmarried	16	15.4	88	84.6			104 (52)
Educational qualification							
12 th Grade Qualified	6	13.6	38	86.4	19.2	0.05*	44 (22)
Graduates	24	27.9	62	72.1			86 (43)
Post- Graduates	36	51.4	34	48.6			70 (35)
Official status							
Constables	14	22.6	48	77.4	4.41	0.353	62 (31)
Head constables	22	37.9	36	62.1			58 (29)
Officers	30	37.5	50	62.5			80 (40)
Frequency of smoking							
>5 cigarettes/day	20	14.5	118	85.5	69.0	0.031*	138 (69)
<5 cigarettes/day	46	74.2	16	25.8			62 (31)
Religious attendance							
<Once a week	29	22.7	99	77.3	17.2	0.022*	128 (64)
> Once a week	37	51.4	35	48.6			72 (36)
Total	66	33.0	134	67.0			200 (100)

Test applied: *Chi-square* test, *indicates statistically significant difference.

Table 2. Level of nicotine dependence among study subjects

Variables	Level of nicotine dependence, n (%)			χ^2	p-value
	Very low/Low (0-4)	Medium (5)	High / Very high (6-10)		
Age groups (years)					
18 - 24	14 (63.6)	8 (36.4)	0 (0.0)	37.7	0.001*
25 - 34	21(22.3)	71 (75.6)	2 (2.1)		
35 - 44	10 (27.8)	23 (63.9)	3 (8.3)		
45 - 54	5 (13.9)	25 (69.4)	6 (16.7)		
55 & above	0 (0.0)	9 (75.0)	3 (25.0)		
Marital status					
Unmarried*	14 (13.5)	81 (77.9)	9 (8.6)	15.5	0.001*
Married	36 (37.5)	55 (57.3)	5 (5.2)		
Educational qualification					
Grade 12 Qualified	2 (4.6)	36 (81.8)	6 (13.6)	29.9	0.001*
Graduates	16 (18.6)	64 (74.4)	6 (7.0)		
Post-graduates	32 (45.7)	36 (51.4)	2 (2.9)		
Official status					
Constables	2 (3.2)	52 (83.9)	8 (12.9)	68.2	0.001*
Head constables	4 (6.9)	48 (82.8)	6 (10.3)		
Officers	44 (55.0)	36 (45.0)	0 (0.0)		
Occupational stress (E/R>1)					
Stress (E/R>1)	26 (19.4)	96 (71.6)	12 (9.0)	8.10	0.017*
Without stress	24 (36.4)	40 (60.6)	2 (3.0)		
Frequency of smoking					
>5 cigarettes/day	13(9.4)	111(80.5)	14 (10.1)	59.6	0.001*
<5 cigarettes/day	37(59.4)	25(40.3)	14 (7.0)		
Total	50 (25.0)	136 (68.0)	14 (7.0)		

*Unmarried refers to being single or ever married but divorced or separated.

Test applied: *Chi* square test, *indicates statistically significant difference.

Table 2 depicts the level of nicotine dependence among study subjects. The level of nicotine dependence is directly proportional to age as the nicotine dependence increases with the increase in age. The high level of nicotine dependence was reported among the age group of 35-44 years and 45-54 years. Considering the marital status, a statistically significant difference was observed among married and unmarried subjects with high level of nicotine dependence (8.6%) among unmarried. Based on the educational qualification, the high level of nicotine dependence (13.6%) was seen among the subjects who qualified in Grade 12 followed by graduates and post-graduates. Based on the official status, constables (12.9%) and head constables (10.3%) had high level of nicotine dependence.

A statistically significant difference was seen among the subjects who visited the religious place less than once a week and more than once a week regarding alcohol and smoking use.

Table 3 shows the results of multiple logistic regression analysis which reveals the significant association of level of nicotine dependence and frequency of smoking with occupational stress. Those with occupational stress had greater nicotine dependence and more frequent habit of smoking.

Table 3. Odds ratio (OR) and 95% confidence interval (CI) for occupational stress according to multiple logistic regression

Independent variables	Occupational stress OR (95% CI)
Age group: < 30 years / > 30 years	0.150 (0.110-1.595)
Marital status: unmarried/married	2.510 (1.764- 12.277)
Educational status: Grade 12 / Graduate and above	1.511 (0.083-1.584)
Occupational status constable / officers	3.789 (2.533- 35.604)
Frequency of smoking : <5/>5	0.816* (0.613- 2.513)
Level of nicotine dependence: low or medium / high	1.287* (0.89-2.345)
Religious attendance: Yes / No	0.544 (0.213-1.445)

* indicates statistically significant difference

DISCUSSION

Stress is an important factor influencing the efficacy and satisfaction of individual in modern day occupational settings. This study investigates the influence

of occupational stress factors on nicotine dependence among patients visiting dental care unit of ITBP Force station, Panchkula, District Haryana. In our study highest level of work stress was found among the age group of 55 years and above which is consistent with the study done by *Gershon et al.* [5] who found that the most important risk factors associated with perceived work stress among police officers in the US aged ≥ 50 years were maladaptive coping behaviours (e.g. excessive drinking or problem gambling) and exposure to critical incidents (e.g. shooting).

Rank also impacted significantly on the experience of occupational stress. Constables (compared with other ranks) more frequently experienced stress because of job demands, crime-related stressors and lack of support. Furthermore, the fact that members with the rank of Inspector or higher less frequently experienced crime-related stress than constables can be explained by the fact that they are less involved with operational work [6].

In our study, the higher level of stress was found among the subjects who were unmarried as compared to married subjects. Increased stress levels associated with increased working hours indicate an area where stress awareness and management training may be able to target with good impact [14].

In our study, the percentages of participants who smoked the first cigarette within 30 minutes after they woke up (71%) and participants reluctant to give up first cigarette in the morning (55.2%) were also higher than those of general population which is in consistent with the study done by *Wang et al.* [25] with 75% participants who smoked first cigarette within 30 minutes and 52.8% participants who were reluctant to give up first cigarette.

It was found in the present study that level of nicotine dependence increases as the age increases. Level of nicotine dependence was found to be directly proportional to the age of the participants [18].

In the present study it was found that subjects who were highly qualified tends to show less nicotine dependence. Higher level of education was a protective factor against nicotine dependence may be explained by the fact that those with a higher level of education are aware of the risks of smoking and belong to the group of people among whom smoking is less common [21].

In the present study, subjects who were unmarried reported higher level of nicotine dependence than married individuals. A possible explanation for the finding that being married is a protective factor against nicotine dependence is the fact that people who are in relationship tend to take more care of each other [4].

The findings our study reported that being religious is a protective factor against nicotine dependence. These findings correspond to those of *Blay et al.* [3], who found that those who visited church regularly reduced

the odds of being a tobacco user by 51%. Our findings were in line with the other military international studies. *McLaughlin et al.* [16], evaluated outpatients at a military medical center and found that compared to the general US population, a higher percentage of military outpatients attends religious services once a week or more, which was also found in our study. *Fontana and Rosenheck* [8] also evaluated military veterans and found that religious faith was an important predictor of mental health services use. It is therefore possible to assert that religious affiliation is associated with the decrease in frequency of tobacco consumption.

The limitations of this study include cross-sectional design, small sample size and use of self-administered questionnaires which could be biased as there are probability that the individuals over or under estimate their responses. Social desirability also seemed to play a major role in the response behaviour of the participants. The number of independent variables studied for their association with nicotine dependence had to be limited. An excess of parameters in the data would have lead to unstable regression coefficient estimates.

Finally, although several possible confounding factors were controlled in the analyses, there are other important factors that we were not able to take into account in this study. For, example many work related factors such as smoking behaviour among colleagues can also have an effect on the relation between work stress and smoking.

CONCLUSIONS

The findings of our study reported that not being religious, and being unmarried and having a lower level of education are significant risk factors for nicotine dependence. This study suggests an association between occupational stress and nicotine dependence and implies that smoking cessation programmes may benefit from taking into account the modification of stressful condition of work environment.

Conflict of interest

The authors declare no conflict of interest.

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