

NICOTINE DEPENDANCE IN LIGHT OF STRESS: UNSEEN ENEMY IS ALWAYS THE MOST FEARSOME!

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ABSTRACT:

Context: The estimated number of tobacco users both smoked and smokeless forms is escalating at alarming rates in South-east Asian countries especially India. Likewise neuro-psychiatric disorder is an unheralded public health crisis worldwide. Perceived stress may be regarded as fearsome unseen enemy executing backstage role in tobacco addiction.

Aims: To assess the nicotine dependence and stress in tobacco chewers. Further to investigate correlation between stress and nicotine dependence among patients visiting in dental school in India.

Methods and Material: This prospective, cross sectional study was based on self administered questionnaires. The study population included 35 patients with tobacco chewing habit. Perceived stress was measured by the Perceived Stress Scale (PSS-10). The Fagerström Test for Nicotine Dependence- Smokeless Tobacco (FTND-ST) was used to measure nicotine dependence. Further correlation between perceived stress and nicotine dependence was analysed.

Results: The data so obtained was tabulated and subjected to statistical analysis using the statistical package of social sciences 25.0 software (SPSS Inc., Chicago IL). Chi-square test was applied and binary logistic regression model was calculated using all socio demographic variables. In the present study, the subjects with moderate stress had a positive association with nicotine dependency

Conclusions: This study illustrate that perceived stress is associated with nicotine dependence. Chewing has been found to act as a stress reliever as well as being associated with uncontrollable social and economic stressors disproportionately affecting all.

KEYWORDS: Perceived stress, Nicotine dependence, Motivational interviewing, Tobacco addiction, Fagerström Test Nicotine Dependence- Smokeless Tobacco (FTND-ST) , Perceived Stress Scale (PSS-10).

INTRODUCTION:

Tobacco abuse is a serious health challenge around the world. It has transformed into an epidemic resulting in enormous disability, disease and death. The tobacco epidemic is one of the biggest health threats today. It kills about 8 million people a year, including around 1.2 million deaths from exposure to

second-hand smoke. In 2020, 22.3% of world population used tobacco, 36.7% of men and 7.8% of the women.

The tobacco situation in India is complicated than any other country in the world with availability of diverse smoking and smokeless tobacco products. According to the Global Adult Tobacco Survey, the prevalence of tobacco use among males in India is 48% compared with 20% among females. It is estimated that more than one-third (35%) of adults in India use tobacco in some form or the other.²

Tobacco is foremost cause of preventable mortality and morbidity in the majority of developing countries. It is associated with wide spectrum of diseases such as cancers, cardiovascular diseases, strokes, and pulmonary diseases. Nicotine is highly addictive, stimulant alkaloid present in tobacco. Nicotine

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dependence comprises tolerance, sensitization, physical dependence, and psychological dependence.³

The United Nations, WHO and the World Bank have called the existing prevalence rate of neuro-psychiatric disorder approaching 1 in 4 individuals worldwide as 'unheralded public health crisis'.⁴ Improving mental health is of critical importance to the nation's health, and to the management of long-term health conditions. Perceived stress may be linked to addiction through several mechanisms. One proposed mechanism of Nicotine dependence is by its influence on self control. People who would like to quit, but are exposed to high levels of psychological stress, may have an insufficient capacity to control their cravings. Therefore the degree of nicotine dependence elucidate perceived stress.¹

SUBJECTS AND METHODS:

This cross sectional, descriptive study, designed in accordance with Helsinki's guidelines, was conducted in the Oral Medicine and Radiology Department of a dental school in India, after obtaining ethical clearance from the institutional ethical committee. This study was designed to assess the nicotine dependence and stress in tobacco chewers. Further correlation between stress and nicotine dependence in tobacco chewer was analysed. A total of 35 patients with tobacco chewing habit were given two self administered Questionnaires. Patients willing to participate and ready for follow-up visits were only included. A prior written informed consent was also obtained and confidentiality was assured. The questionnaire assessed the nicotine dependence and stress in patients separately. The Nicotine dependence was measured using the Fagerström Test for Nicotine Dependence (FTND) -Smokeless Tobacco (FTND-ST).⁵ Stress was assessed using the Perceived Stress Scale (PSS-10).^{6,7}

Patients aged 18 years or above with tobacco chewing habit history of 1 year or more were included in the study. Patients with multiple habits like smoking, alcohol, drugs were excluded. Patients who were mentally unstable or cognitively impaired were

excluded. A structured questionnaire was used to collect the following information: (i) socio-demographic variables: age, gender, marital status, education, monthly household income, number of people living together; (ii) health-related variables: perceived health, cessation advice by any medical professional, severe/chronic illness, mental illness; (iii) tobacco related variables: age started tobacco, years of tobacco chewing, cohabitation with another chewer, number of times chewing per day, previous quit attempt, number of previous quit attempts, time of last attempt, reason to quit, high-risk situation; (iv) psychosocial variables: self-perceived stress, self-perceived depression, difficulty and confidence in quitting. Thereafter, each participant was given 10 minutes time to fill the two questionnaires FTND-ST and PSS-10. Completed forms and the questionnaires were thoroughly validated. The data so obtained was tabulated and subjected to statistical analysis using the statistical package of social sciences 25.0 software (SPSS Inc., Chicago IL). Chi-square test was applied and binary 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%.

All patients received counselling, and pharmacotherapy was prescribed if needed. An average of four face-to-face counselling sessions were conducted over the first 8-week intensive treatment phase by doctors who were all trained in tobacco cessation counselling. Phone follow-up and counselling were also offered during the treatment phase and between. The stage of change theory⁸ and motivational interviewing techniques⁹ were adopted. The medications included nicotine replacement therapy (NRT) and non-NRT. The former included nicotine patches, gum, lozenges, and inhalers. Oral medications included varenicline (12 weeks, 1mg, twice per day) and bupropion (12 weeks, 150mg, twice per day). Medications were prescribed according to the patients personal preference and clinical conditions.



RESULTS:

The study comprised of total 35 adult patients (30 males and 5 females) with habit of tobacco chewing. The mean age of the patients was 35.9 years. The data analysis was done using the statistical package of social sciences 25.0 software (SPSS Inc., Chicago

IL). Chi-square test was applied and binary 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%.

Table 1 illustrates the stress among study subjects using perceived stress scale who were tobacco chewers and visited our dental care unit. About 65% of the study subjects in various age groups were found to be moderately stressed. Overall about 37% of the stressed subjects were in the age group of 25-34 years.

VARIABLES AGE GROUPS	PSS-10 (n %)			X 2	p-VALUE	TOTAL (n%)
	LOW(0-13)	MODERATE(14-26)	HIGH (27-40)			
18-24	2 (5.7%)	4 (11.4%)	0 (0.0%)	2.70	0.952	06 (17.2%)
25-34	5 (14.2%)	7 (20.0%)	1 (2.8%)			13 (37.2%)
35-44	2 (5.7%)	5 (14.2%)	0 (0.0%)			7 (20.0%)
45-54	1 (2.8%)	4 (11.4%)	0 (0.0%)			5 (14.2%)
55 & above	1 (2.8%)	3 (8.5%)	0 (0.0%)			4 (11.4%)
Total	11 (31.4%)	23 (65.8%)	1 (2.8%)			35(100%)

TABLE 1- DISTRIBUTION OF STUDY SUBJECTS BASED ON PSS-10.

Table-2 depicts the nicotine dependence among the study subjects who were tobacco chewers and visited our dental care unit. The p-value was found to be statistically significant in the various age groups of the nicotine dependent subjects. About 11% of the study subjects had low nicotine dependency further 20% of the study subjects had moderate nicotine dependency and about 68% of the study subjects had high/very high nicotine dependency. Finally 37% of the nicotine dependant subjects were found to be in the age group of 25-34 years.

VARIABLES AGE GROUPS	PSS-10 (n %)			X 2	p-VALUE	TOTAL (n%)
	LOW(0-13)	MODERATE(14-26)	HIGH (27-40)			
18-24	1 (2.8%)	4 (11.4%)	1 (0.0%)	21.9	0.005*	06 (17.2%)
25-34	0 (0.0%)	1 (2.8%)	12 (34.2%)			13 (37.2%)
35-44	3 (8.5%)	1 (2.8%)	3 (8.5%)			7 (20.0%)
45-54	0 (0.0%)	1 (2.8%)	4 (11.0%)			5 (14.2%)
55 & above	0 (0.0%)	0 (0.0%)	4 (11.0%)			4 (11.4%)
Total	04 (11.4%)	07(20.0%)	24 (68.5%)			35(100%)

*Statistically significant

TABLE 2-DISTRIBUTION OF NICOTINE DEPENDENCE AMONG STUDY SUBJECTS.

Table-3 describes the correlation of stress in nicotine dependent study subjects. About 11% of nicotine dependant subjects had low stress levels. Further 20% of nicotine dependant subjects had moderate stress and 68% of nicotine dependant subjects had high/very high stress. Overall 65% of the total nicotine dependent subjects were moderately stressed.

VARIABLES PSS	Nicot Depend (n%) (FTND-ST)			X2	p-VALUE	TOTAL (n%)
	VERY LOW/LOW(0-4)	MEDIUM(5)	HIGH/VERY HIGH (6-10)			
LOW	1 (2.8%)	3 (8.5%)	7 (20.0%)	0.975	0.914	11 (31.4%)
MODERATE	3 (8.5%)	4 (11.4%)	16 (45.7%)			23 (65.7%)
HIGH	0 (0.0%)	0 (0.0%)	1 (2.8%)			1 (2.8%)
Total	04 (11.4%)	07(20.0%)	24 (68.5%)			35(100%)

TABLE 3- DISTRIBUTION OF NICOTINE DEPENDENCE AMONG STUDY SUBJECTS.



Table 4 shows the results of binary logistic regression analysis which reveals the significant association of level of nicotine dependence with stress. Odds ratio (OR) between nicotine dependence and Perceived Stress Scale with 95% confidence interval (CI) for stress according to binary logistic regression was found to be statistically significant. Those with nicotine dependence and habit of tobacco chewing had 1.2 times greater probability of having stress compared to a normal individual.

VARIABLES	REGRESSION COEFFICIENT	p- VALUE	ODDS RATIO	p-VALUE	95% CONFIDENCE INTERVAL
PSS	0.203	0.802	1.225	0.251	5.98
AGE	0.510	0.536	1.665	0.331	8.37
GENDER	-1.662	0.122	0.190	.023	1.56

* Statistically significant

TABLE 4- LOGISTIC REGRESSION MODEL FOR NICOTINE DEPENDENCE (FTND-ST) WITH PSS-10 AGE AND GENDER.

DISCUSSION:

Tobacco and Psychological stress are considerable health challenges world faces today. The number of tobacco users is uprising on alarming rates in the South-East Asian countries like India, Pakistan, Bangladesh and Thailand. Nicotine dependence is determined by a single or combination of factors like individual, genetic and psychosocial factors. Consequently, psychological stress plays a crucial role in initiation and extent of tobacco chewing.

Nicotine dependence can be determined by Fagerstrom Test for Nicotine Dependence (FTND). It is an economical, non-invasive method to determine nicotine dependence. It helps the clinician determine the degree to which a patient is nicotine dependent.⁵ The Fagerstrom Test for Nicotine Dependence-Smokeless Tobacco (FTND-ST) is a modified form of Fagerstrom Test for Nicotine Dependence (FTND) used to acquire the magnitude of nicotine dependence among smokeless tobacco users.⁵ High levels of nicotine dependence among tobacco users could probably be due to perceived stress. Failures, unemployment, bad company, professional, financial or family, health problems are just few reasons when a person is entrapped into viscous circle of addiction. Subsequently, tobacco cessation becomes complicated and thus leads to physical dependence, psychological dependence and many disease and disorders.²

Motivational interviewing (MI) is a cognitive-behavioural technique that aims at patient identification and behavioural changes that put them

at risk of developing health problems or may be preventing optimal management of a chronic condition.⁹

MI is based on the principle of Transtheoretical model also known as the Stages of change model.⁸ This model identifies a cycle of change that people swivel through, sometimes up to seven times, before effecting permanent change. The steps include pre-contemplation, when the individual is not considering change; contemplation, when they are favourably disposed to change but have not made concrete plans or adopted any action; planning, when strategies have been selected but not yet utilised; and action, when attempts have been made to; and finally the maintenance phase, when people make deliberate attempts to continue with the change programme. This model also differentiates between a lapse (a temporary return to the previous behaviour) and a relapse (a permanent return to the behaviour being changed).^{8,9}

Perceived stress is an important factor influencing the efficacy and satisfaction of individual in modern day conditions. Perceived stress is described as "the feelings or thoughts that a person has about how much stress they are under over a given period of time".¹⁰ Perceived stress has been found to be associated with greater odds of smoking in several cross-sectional studies.^{11,12}

Present study is distinctive for the reason that very few studies are currently available that correlates perceived stress and smokeless tobacco.

Perceived stress was evaluated by the Perceived



Stress Scale (PSS).^{6,7} PSS is most extensively used psychological instrument to determine the perception of stress. It assesses the extent to which situations in one's life are considered as stressful. It is a 10-point scale devised to approximate how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also known as PSS-10 includes a number of direct questions about current levels of experienced stress.^{6,7}

This study explored the influence of perceived stress on nicotine dependence on various parameters. In our study the level of stress was not proportional to age. As stress may be found in any individual regardless of age group. Few studies earlier do quote increased stress with increased age^{13,14} but in our study increasing age predispose to stress this correlation was not established. Most of the study subjects with tobacco chewing habit were moderately stressed in our study. Furthermore there was a positive association of nicotine dependence and age of the study subjects in our study. In other words the nicotine dependency tends to increase with increasing age. In the present study the subjects with moderate stress had a positive association with nicotine dependency. It is consistent with findings of other studies done earlier.^{15,16,17} Multiple logistic regression analysis revealed significant association of level of nicotine dependence with stress. Hence, those with stress had greater nicotine dependence and profound habit of tobacco chewing. Odds ratio (OR) between nicotine dependence and PSS with 95% confidence interval (CI) for stress according to multiple logistic regression was found to be statistically significant.

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 underestimate their responses. The number of independent variables studied for the association with nicotine dependence had to be limited. An excess of parameters in the data would have led to unstable regression coefficient estimates.

Further studies facilitating professional trained

interviewers and counsellors with larger sample size and more parameters may be incorporated to attain more appropriate result. It is proposed that every health care institution must have deaddiction centre operated by well trained professionals, counsellors assisted with audio and visual aids. Thus, underlying psychological stress which is the basis of nicotine dependence could be dealt in further earnestly. Therefore, this study must be carried out on a larger scale with a bigger sample size to create awareness and educate the people regarding perceived stress playing an imperative role in nicotine dependence.

CONCLUSION:

This study illustrates that perceived stress is associated with nicotine dependence. Chewing has been found to play an important role as a stress reliever associated with uncontrollable social and economic stressors disproportionately affecting all irrespective of age gender or class. Our research shows that psychosocial factors such as the inability to control important things in life and emotional isolation seem to be important mediators for the relationship between stress and tobacco dependence. Stress is a fundamental concept for understanding both life and evolution. Thus, stress and tobacco are the major challenges of the modern world. When considering policy implications, in order to decrease tobacco related morbidity and mortality, it is crucial to consider emotional conditions and reduce levels of stress. Thus taking seriously the psychological considerations we should intervene based on evidences, findings and recommendations put forward in this study.

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