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Research Article

Tobacco Use and Perceived Stress Among Male College Students in Bangalore, India

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Background: More than 250 million individuals use tobacco in some form on a daily basis in India and adolescents make up a significant proportion of that number. The period of adolescence is critical in the initiation of smoking or tobacco use as well as its progression from experimentation to dependency. In this study, the role of psychological stress was explored with respect to cigarette consumption and level of addiction or dependence.
Methods: A total of 183 male college students (mean age= 19.8 years) from Bangalore, India completed the questionnaire booklet which included a Cigarette use screening form, the Perceived Stress Scale and the Autonomy over Smoking Scale. Of the 183 participants, there were 85 (46.2%) current smokers and 98 (53.7%) nonsmokers, and their scores on the perceived stress scale were compared using analysis of variance and independent samples *t* tests. The relationship between levels of stress and dependence on tobacco (loss of autonomy) was also explored using Pearson's product moment correlation (*r*).
Results: There was no significant difference between current smokers and nonsmokers on perceived stress ($t_{[181]}$ = -1.26, p >0.05), The same result was extended when the group of nonsmokers was divided into three (Never smokers, experimental smokers and former regular smokers) and the differences in scores were tested again between all four groups ($F_{[3, 179]}$=.642, p >0.05). There was, however, a significant positive correlation between level of dependence on tobacco and perceived stress (r=.743, p <0.01).
Conclusion: The study found that there was no difference in perceived stress levels between smokers and nonsmokers, although there was a positive relationship between the level of perceived stress and level of tobacco dependence (loss of autonomy) among the current smokers.

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Introduction

The use of tobacco kills more than one million people each year in India, which accounts for roughly 10 percent of all deaths in the country (WHO, 2023). The Global Adult Tobacco Survey (GATS) and Global Youth Tobacco Survey (GYTS) estimate that there are more than 270 million individuals in India who use tobacco in some form daily, and it makes up around 30-35 percent of the population with a significant proportion of adolescents and teenagers taking up tobacco use every year (TISS & MHFW, 2018; Pahari et al., 2023). India is also the third largest producer of tobacco products worldwide, and while tobacco cigarettes are mostly common in urban spaces, the larger proportion of individuals from rural areas still use local products such as *beedis* and chewing tobacco (Chadda & Sengupta, 2002; Joshi, 2006). The need to curb tobacco

use remains one of the most pressing social issues in India and the focus has shifted towards preventative measures aimed at younger age groups, when the habit is most likely to start.

The period of adolescence remains critical in tobacco use initiation as the mean age of daily tobacco use is estimated to be 18.7 years, with more than 25 percent of adolescents using tobacco for the first time before 15 years of age (WHO, 2018). In India, the rates of tobacco use among adolescents is estimated to be above 20 percent, with the rates of smoking among high school and college going males being as high as 55 percent (Khubchandani et al., 2017; Saddichha & Khess, 2020; Pahari et al., 2023). During this period, an array of factors such as parental smoking, socio economic independence, availability of tobacco products, peer pressures, perceptions and attitudes towards tobacco, and emotional-affective states among adolescents and teenagers influence their likelihood of initiating tobacco use (Thakur et al., 2010; ASH, 2023). However, first time use or experimentation does not necessarily lead to dependence or addiction, and individuals often progress through stages of preparation, experimentation and regular use before they reach dependence (Flay et al., 1999). Henceforth, the years before adulthood remain a precarious period when the forces leading to a lifelong habit are set into motion and individuals often become dependent on tobacco as well as other psychoactive substances before they even reach adulthood (Verma et all., 2023).

In terms of exploring the forces leading to adolescents experimenting with substances, the differential development of the emotional and cognitive systems during adolescence are frequently highlighted (Steinberg, 2010). Adolescents are considered to be more influenced by the affective aspects of situations, and they are mostly egocentric and naïve in their view of reality. While initial experimentation with substances such as tobacco has been known to originate from factors such as sensation seeking or social influences, a significant proportion of experimentation progressing into regular use is attributed to adolescents' efforts to deal with various negative emotional states (Seo et al., 2008). This includes mood and anxiety related disorders as well as adjustment related difficulties at school or problems within families and adolescents' have a greater tendency towards self-medication without any clue about repercussions of future dependence (Audrain-McGovern et al., 2009; Nayak & Mishra, 2018).

Psychological stress is the situation in which the demands of a situation exceed an individual's ability to cope with it (Folkman et al., 1986). Among various psychological factors implicated in tobacco use, the nature of stress and coping mechanisms reveal a kind of reasoning behind the repetitive use of tobacco as well as other psychoactive substances. Generally, tobacco users experience higher levels of stress and exhibit defective coping strategies in terms of using tobacco or cigarettes to relax or deal with stress (Parrott, 2000; White, 2004). Stresses associated with family, academics, etc. also impact the intensity of smoking in individuals, which reveals smoking as a coping or recuperating method for stressful situations (Liu, 2003; Kouvonen et al., 2005). The issue is further exacerbated by the fact that once insight is achieved towards one's dependency on tobacco, it further becomes a source of stress for individuals. It has been reported that coping with stress during attempts at smoking cessation involves two separate sources of stress; coping with difficult life situations as well as the temptations to use tobacco again or the withdrawal symptoms associated with it (Minami et al., 2011). Psychological stress and tobacco use has a multi layered and often complex relationship, which requires an exploration of its roots for proper illumination. A clear understanding of the mechanisms of stress leading to tobacco use can be regarded as the first logical step to ensure the prevention of the same.

In this study, the nature of tobacco use and psychological stress was explored in a group of adolescents and young adults between the ages of 18 and 22. The group of male college going Indian youths probably represents the most vulnerable of all the groups in India owing to the period of relative autonomy of college education leading to the gradual entry into adulthood and coupled with the financial liberty specific to urban affluent backgrounds. During the time period of college education, two separate mechanisms are in motion with relation to tobacco use, specifically the increased rates of experimentation of tobacco among a large proportion of youths as well as the progression of tobacco use towards dependency among youths who started using tobacco at a much earlier point (Flay et al., 1999). The inquiry was also specific to male youths, owing to the stark differences in rates of tobacco use along with other substances as well as general risk taking and non-normative behaviors between the genders in India. The study was primarily aimed to provide answers to two central questions relating to stress and tobacco dependence, which were

- Q1. Is there any difference in psychological stress experienced between groups of tobacco/cigarette users and non-tobacco users?

- Q2. Is there any relationship between psychological stress and level of tobacco/nicotine dependency or addiction?

Methods

Sample

A total of 183 male college students between the ages of 18 and 22 years participated in this research study. Age, gender and educational enrollment were taken as criteria for inclusion in the study in order to ensure a homogenous sample. Out of the 183 participants, there were a total of 98 nonsmokers and 85 current smokers. Current cigarette smokers were identified based on a cigarette use screening form that assessed two important parameters of smoking status; frequency of use (at least one cigarette per day for six months), and recent use (at least one cigarette within 48 hours prior to the administration of the questionnaires). The screening form was also significant in distinguishing between three categories of participants within the nonsmoker group; those who had never smoked a cigarette in their lifetime, those who had experimented with smoking at least a couple of times, and those individuals who smoked cigarettes regularly in the past (at least one cigarette per day for a period of six months) but were currently not smoking. Participants who used other psychoactive substances along with tobacco on a daily basis were excluded from the study. All participants signed an informed consent form before answering the standardized questionnaires.

Materials

The participants for the study were taken from undergraduate colleges in Bangalore, India. They were administered a questionnaire booklet which included a socio demographic form, an informed consent form, a cigarette use screening form and two psychometric tools that assessed level of dependence on cigarettes and perceived stress. A brief description of the same is given below:

i. *Cigarette use screening form.* The screening form was devised particularly for the purpose of the study, and it included questions relating to the nature and frequency of current and past cigarette use. It also included questions pertaining to the use of tobacco products besides cigarettes as well as the use of other psychoactive substances such as alcohol, cannabis and opiates.
ii. *The Autonomy over Smoking Scale (AUTOS)* (DiFranza et al., 2009): The instrument assesses the extent of loss of control experienced by current smokers over their smoking habit. The term 'autonomy' is often used alternatively to 'nicotine dependence' and the scale is primarily used to assess the level of dependence on three domains of psychological dependence, withdrawal symptoms and cue induced cravings. The scale consists of 12 statements relating to smoking, and respondents provide the degree to which the statements apply to them on a 4 point rating scale.
iii. *Perceived Stress Scale (PSS-14)* (Cohen et al., 1983): The PSS consists of 14 items on a 5-point rating scale that assess the degree to which participants appraise situations as stressful within the last one month. The scale provides a global measure of perceived stress and measures the extent to which respondents perceives their lives as being unpredictable, uncontrollable or overloaded (Leung et al., 2010).

Statistical Analysis

The raw data was tabulated and analyzed using the Statistical Package for Social Sciences (SPSS) (version 20). In order to test for the difference in perceived stress between the groups of smokers and nonsmokers, a *one way Analysis of Variance (ANOVA)* was used with four levels of the independent variable (current smokers, never smokers, experimental smokers and former smokers). A post hoc *independent samples t-test* was also employed to test for the difference in scores between smoker group and the combined nonsmokers group. In order to test the relationship between the level of nicotine dependence and perceived stress, the *Pearson's product moment correlation (r)* was used for the two sets of scores obtained from the PSS-14 and AUTOS. The level of significance for the parametric tests was set at $p < 0.05$, and inferences from the statistical analyses were drawn accordingly.

Results

A total of 183 male participants between the ages of 18 and 22 years were recruited in the research study on the relationship between level of nicotine/tobacco dependence and perceived stress. The average age of the participants was 19.85 years (SD= 1.13) and all of them were enrolled in educational institutions at undergraduate level at the time of the study. Based on their responses on the cigarette use screening form, the participants were grouped as either current smokers or nonsmokers (Table 1). Within the

nonsmokers group, participants were also further differentiated as either never smokers, experimenters or former smokers (Table 1).

Cigarette use status		N (%)	Total (%)
Current Smokers		85 (46.3%)	85 (46.3%)
Non Smokers	Never smoked in lifetime	43 (23.5%)	98 (53.7%)
	Smoked only once or twice (experimented)	29 (15.8%)	
	Former regular smoker	26 (14.2%)	
Total		183 (100%)	183 (100%)

Table 1. *Distribution of sample (N=183) based on smoking status*

In the first part of the data analysis, the scores of the participants on the perceived stress scale were compared between the groups of the smokers and nonsmokers using a one way Analysis of Variance (ANOVA). There were a total of four levels of the categorical variable; i) Current smokers, ii) Never smoked a cigarette, iii) Only experimented with cigarettes, and iv) Used cigarettes regularly in the past. The ANOVA test revealed that there was no significant difference in stress scores between the four groups as indicated in Table 2 ($F_{[3, 179]}$=.642, p >0.05). In further analyzing the scores of the participants on the perceived stress scale, an independent sample t test was also used to test for the difference in scores between the two major groups in relation to smoking status, i.e. current smokers and nonsmokers, It was found that there was a difference in mean scores between current smokers (mean=30.85, SD= 5.05) and nonsmokers (mean= 29.93, SD= 4.78); however, the difference was not significant at p <0.05 ($t_{[181]}$ = -1.26, p =.209) (Table 3).

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	Sum of Squares	*df*	Mean Square	*F*	Sig (*p*)
Between Groups	46.982	3	15.661	.642	.589
Within Groups	4364.930	179	24.385		
Total	4411.913	182			

Table 2. *Results of one way ANOVA on PSS scores based on smoking status*

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Variable	Groups	N	Mean	SD	*df*	*t* value	Sig (*p*)
Perceived Stress	**Current smokers**	85	30.85	5.05	181	-1.26	.209
	Nonsmokers	98	29.93	4.78			

Table 3. *Results of independent samples t-test on PSS scores between smokers and nonsmokers*

Finally, the relationship between stress and nicotine dependence was also explored. For this purpose, the group of smokers has been administered the Autonomy over Smoking Scale in order to obtain a measure of nicotine dependence (or loss of autonomy over smoking). The relationship between the two sets of scores was explored using the Pearson's product moment correlation(*r*) test. It was found that there was a significant positive correlation between perceived stress and nicotine dependence (r=.743, p <0.01) (Table 4). The results indicated that participants who had higher dependence on cigarettes and smoking were more likely to appraise situations as more stressful and vice versa. The same significant positive correlation was also obtained between the perceived stress scores and the three components on nicotine dependence, i.e. psychological dependence (r=.832, p <0.01), withdrawal symptoms (r=.784, p <0.01) and cue induced craving (r=.671, p <0.01) (Table 4).

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Variables	Nicotine Dependence	Psychological dependence	Withdrawal symptoms	Cue induced craving
Perceived Stress	.743*	.832*	.784*	.671*

Table 4. *Results of Pearson's product moment correlation between perceived stress and nicotine dependence (N=85)*

** p <0.01*

Discussion

In this research study, a total of 183 male college students between the ages of 18 and 22 years were administered standardized psychometric scales measuring two variables; perceived stress and nicotine dependence (autonomy over smoking). It was found that there were no significant differences in perceived stress between groups of smokers and nonsmokers (Table 3). Similar results were obtained when the group of nonsmokers was further divided into three subgroups based on their smoking status and tested for difference in perceived stress (Table 2). However, there was a significant positive relationship between level of nicotine dependence and perceived stress among the smokers group who were administered a nicotine dependence scale along with the perceived stress scale (Table 4).

One of the most significant results obtained from the research study was the lack of significant differences in levels of perceived stress between groups of smokers and nonsmokers, which is in contrast to existing literature in the same field (Liu, 2003; White, 2004; Kouvonen et al., 2005). In order to interpret the implications of the same, it is important to highlight the multifaceted nature of stress as a concept, and also the limitations of the measures employed in the study, particularly the PSS-14, which conceptualizes stress on a temporal timeline of events in terms of the most recent month (Cohen et al., 1983). It is entirely plausible that the range of stressors associated with the specific group of college going, urban male youths is similar across individuals; however, the nature in which individuals cope with the same differs based on personal dispositions as well as resources available, with some individuals turning towards substance for relief while others employ healthier coping strategies. Differences in coping strategies along with stress among smokers and nonsmokers have also been explored by studies which have found significant differences across both (White, 2004; Minami et al., 2011). Hence, the study is limited since it explores only a minor part of a larger system of psychological stress and its associated behaviors and cognitions.

The study also found that there was a positive relationship between level of dependence on tobacco and perceived stress; such that individuals wither higher dependency (higher loss of autonomy) appraised greater levels of stress and vice versa. The second significant finding of the study lends itself to greater speculation with varying existing interpretations available in literature as explanations for the same. In substance terminology, 'addiction insight' refers to a point of inward cognizance of the nature of one's own dependence on any substance and is often associated with negative reactions such as stress. Hence, higher levels of stress can be attributed to the nature of the use of substance itself and the complications of cravings and withdrawals during attempts at cessation (Minami et al., 2011). For individuals at the higher end of the dependency spectrum, high levels of stress can also be associated with the direct physical health impacts of having used the substance for extended periods of time. In the present study, the group of smokers can also be considered fairly young and subsequently still at a very early stage towards dependency compared to adults who might have been using tobacco for decades.

Implications

The study highlights the fact that tobacco or cigarette use remains a very real and grim issue implicating millions of Indian youths of all regions and backgrounds. Despite decades of public information initiatives and attempts at legislative controls, the threat of tobacco still remains very real, apparent from the fact that roughly half of the individuals who fit the demographics of the study turned out to be regular tobacco users, and three fourths had used it at some point. The study further gives impetus to the growing need for readdressing the substance use problem given the fact that more than 20 percent of adolescents use tobacco on a daily basis and a greater section of youths

hold inaccurate ideas regarding nature of substances or are ambivalent towards risks of addiction (Gajalakshmi & Kanimozhi, 2010; Ballal et al., 2016). The trends in tobacco use in India is also changing at an alarming pace despite widespread control efforts, with decrease in age of initiation of tobacco use and also higher rates of use among females (Narain et al., 2011; Verma et al., 2023). It further highlights the need for change in approach in terms targeting influential factors such as peer groups, but also conceptualizing the portrayal of tobacco as not only a source of physical affliction, but also the anguish and risks of tobacco addiction or dependency (Aryal et al., 2013).

Conclusion

The use of tobacco, particularly among young individuals remains one of the most pressing issues in India at present, and despite decades of macro level efforts, the problem has only transformed and further digressed. This research study was an attempt to explore the nature of individual factors, specifically psychological stress in the initiation or repeated use of tobacco or cigarettes leading to a state of dependence. Although the study was not able to find discernable differences in appraisal of stressful situations between current smokers and nonsmokers, there was, however, a significant relationship between stress and level of dependence (loss of autonomy) on tobacco. Thus, this research study only further highlights the gravity of the substance epidemic prevalent in India and the need for an urgent realignment of options focused on prevention of tobacco use among adolescents, rather than treatment of tobacco dependence as adults later in life.

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Declarations

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