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FACTORS ASSOCIATED WITH SMOKING INTENSITY IN ADULT MALE SMOKERS

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ABSTRACT

Background: Smoking is an epidemic and matter of public health concern. Often smokers as well as other members of the society are unaware of the harmful effects of smoking and very few have knowledge in regards to the factors that contribute to the behavior of smoking. Such knowledge if known can help the society and policymakers to develop support systems and strategies to help smokers to quit smoking and develop a healthy lifestyle. **Aim:** The aim of the study was to observe the factors prevalent and associated with intensity of smoking. **Materials and Method:** This cross-sectional study was carried out from July 2006 to June 2007 with 75 male smokers as participants (age 20-50 years) who were divided in to 3 groups of light smokers (2-9 cigarettes smoked/day), moderate smokers (10-19) cigarettes smoked /day) and heavy smokers (20 or more cigarettes smoked/day). The socio-demographic features like age, body mass index (BMI), occupation, education level, monthly family income and marital status and also the age of onset of smoking, number of years of smoking were analyzed to report the factors more prevalent among the smokers. Statistical analysis was done using IBM SPSS Statistics for Windows, Version 26.0. [Armonk, NY; IBM Corp]. Data were expressed as frequency, percentage and mean±SD. *p* value was obtained from †One way ANOVA and Chi Square test. **Results:** Those smokers who were service holders were heavy smokers (84% of the participants), smoking 20 or more cigarettes per day (*p* 0.005). Those with monthly family income of less than Taka 15000 had a higher intensity of smoking (76%) compared to those whose monthly income was equal to or more than Taka 15000 (24%). The forest plot diagram revealed occupation to be a factor for moderate to heavy smoking. **Conclusion:** The findings of the study reveal certain factors that may influence intensity of smoking among smokers. Determining such factors may help develop policies to rehabilitate smokers and improve their quality of life.

Keywords: Smoking, Packs/day, Intensity, Factors, Prevention, Policy, Rehabilitation

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INTRODUCTION

Smoking is an epidemic which places a burden on the health of individuals, economy and is one of the major causes of preventable morbidity and mortality worldwide. In 2019, use of tobacco accounted for 15.4% of all cause mortality[1]. Smoking is known to be a primary cause for diseases like chronic obstructive pulmonary disease, cardiovascular disease, certain cancers and neurological disease[2]. Second hand smoking has been related to twelve and a half million demises each year that mostly occurs in under 10 years age children[3].

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In Iran, the daily smoking prevalence is 9.7% (0.9% of female and 19.6% of male). The high percentage in male may be due to having risky behavior; job, family and society related hurdles[4]. There are 3 categories of smokers: light, moderate and heavy smokers[5].

Heavy smokers are more prone to the harmful effects of smoking like poor life quality and face much difficulty in quitting this habit of smoking[6]. Light smokers are also more likely to develop cardiovascular and respiratory illnesses in comparison to those who do not smoke[7]. In order to implement policies to control tobacco usage, identification of factors that influence the smoking intensity like differences in socio-demographic condition, smoking habit type, smoking onset age need to be done[8]. The age of onset of smoking can be a significant determinant for making prediction of pattern of smoking as well as associated consequences related to health[9]. A study done by Nash et al. noted a significant association between age of smoking onset and mortality after 70 years age, that is, smokers at present with onset of smoking at a younger age were at a greater risk of demise in comparison to those who began smoking at an older age[10] . Several studies have reported that early smoking onset age may be a factor for prediction of intensity of smoking in future[11,12]. Among the socio-demographic factors, occupation may also play an important role in influencing the intensity of smoking. Kouvonen et al. observed that employees with high strain in job, imbalance between effort and reward, and high job demand were related to higher intensity of smoking [13].

Individuals hailing from low socioeconomic status are also prone to higher smoking intensity due to factors like life stress, targeted tobacco marketing, lack of awareness of harm of smoking, access to cigarettes, lower support from society to quit smoking[14-16]. A study on 4 country survey (smokers from Australia, Canada, UK, and US) which included 6321 adult current smokers from wave 1 and wave 2 of International Tobacco Control Project observed that smokers of low socioeconomic status were more likely to gain smoker friends and less likely to loose smokers as friends[17].

Numerous research have been carried out around the globe for identifying the risk factors related to smoking in adult[18-22]. However, limited studies have placed focus on investigation of factors related to smoking intensity[11-13,17,23-27]. However, little information on this association is available in Bangladesh. Also since smoking intensity may aggravate various systemic diseases and death, it is necessary to build public awareness regarding the detriment of life due to early smoking in particular during the vulnerable age of adolescence[28]. Therefore, in order to build awareness and to promote knowledge to prevent smoking at early age as well as to encourage a more balanced occupational environment, and paying attention to the vulnerable group belonging to low socioeconomic condition this study was carried out. Our findings may be used by policymakers to make and implement plans to lower intensity of smoking by putting focus on such factors.

MATERIALS AND METHOD

Study design
Cross sectional study was done.

Study place
Dhaka Medical College, Bangladesh in the department of Physiology.

Study period
July 2006 and ending in June 2007.

Study Population

The population under study consisted of 75 apparently healthy individuals in the age group of 20 to 50 years having history of smoking a minimum of 2 or more cigarettes per day for 5 years or more .The

recruits of the study hailed from different parts of Dhaka city.

Selection criteria

The criteria for inclusion and exclusion for this research work has been displayed in Table 1.

Table 1: Criteria for selection of participants into the research:

Criteria of inclusion into the research for both A_1 and A_2 group	Criteria of exclusion from the research for both A_1 and A_2 group
Age of participants selected between 20 years and 50 years	The research excluded individuals with having any systemic disorder including any cardiovascular or respiratory disease
BMI of participants selected ranged between 18.4 and 24.9 Kg/m^2	Subjects with history of drugs such as diuretics, cardiac glycosides and beta blocker

Sampling Technique

Purposive sampling method was applied.

Data collection

The questionnaire was constructed and was translated to Bangla for the ease of understanding the questions by the study participants. After the application of exclusion criteria, 75 participants were selected for this study. The variables that were considered included those related to demography (age, residence, marital status, education level, monthly household income and occupation),smoking behavior, economic status.The study subjects were asked question 'At what age did you start smoking?' to determine the age of onset of smoking, number of years of smoking and the intensity of smoking was determined using the question 'How many cigarettes do you currently smoke each day?' Based on this answer the participants were divided into 3 groups: 2-9 cigarettes/day (light smoker), 10-19 cigarettes/ day (moderate smoker), and 20 or more cigarettes/day (heavy smoker).

Ethical approval

Ethical approval for this study was taken from Research Review Committee and Ethical Review Committee of Dhaka Medical College Dhaka-1000, Bangladesh

Impact of this research work

This research work may help policy makers to promote preventive measures by planning and implementing initiatives to reduce smoking intensity by focusing on these factors
and disseminate public awareness about the factors associated with smoking intensity.

Statistical analysis plan

The completed questionnaire data were compiled, appropriately sorted, and analyzed using Statistical Package for Social Sciences [(SPSS) IBM Corpfor Windows, Version 21.0. Armonk, NY].

RESULTS

There were 75 male participants, 25 were light smokers, 25 were moderate and 25 were heavy smokers. The mean age of light smokers, moderate smokers and heavy smokers were 31.36±6.52 years,30.92±6.92 years ,and 33.64±6.97 years respectively. The mean BMI of the light, moderate and heavy smokers were 21.37±2.98kg/m^2, 22.73±3.09 Kg/m^2, and 21.45±3.24 Kg/m^2respectively. The age , BMI, marital status and place of residence showed no

statistical difference between the groups (Table 2). Occupation of the subjects effected the smoking intensity significantly (p 0.005) and it was observed that a major portion of smokers were service holders with 84% being heavy smokers indicating work stress as a contributing factor for smoking intensity. Those with household monthly income of less than taka 15000 Bangladeshi Taka (BDT) were heavy smokers (76%) while among those with a household income of BDT 15000 or more 24% were heavy smokers suggesting a link between financial condition and smoking intensity (Table 2). The duration of smoking was statistically significant factor for smoking intensity (p0.053) with duration of smoking incase of light, moderate, and heavy smokers was 9.76±5.44 years, 8.28±2.37 years, and 11.20±4.11 years respectively. Age of onset of smoking for light, moderate and heavy smokers was 21.80±5.57years, 22.36±5.38 years and 22.00±4.12 years respectively. Among them, heavy smokers were found to smoke 22.20±2.27 sticks per day (Table 3).

Our study revealed that age >31 years was 1.826 (95%CI:0.925 to 3.603; p=0.072), BMI>22.17kg/m^2 was 1.556 (95%CI:0.789 to 3.068; p=0.190), age of onset of smoking >21 years was 0.649 (95% CI:0.336 to 1.256; p=0.191), duration of smoking >9.5 years was 4.516 (95% CI:1.613 to 12.638; p=0.003), smokes >15 sticks/day was 1.000 (95%CI:0.527 to 1.898; p=1.000), passive smoking was 0.617 (95% CI:0.324 to 1.176; p=0.139), urbanization was 0.746 (95% CI:0.371 to 1.503; p=0.402), below HSC was 2.000 (95%CI: 0.851 to 4.700, p=0.083), occupation including, driver, service holder, labor, mason; rickshaw puller was 7.250 (95%CI: 2.167 to 24.258; p<0.001), married was 1.357 (95% CI:0.592 to 3.114; p=0.453) and monthly income ≤15000 BDT was 0.899 (95% CI:0.295 to 2.739; p=0.851) times increased risk of development of heavy smoker than light or moderate smoker. Among them duration of smoking and occupational stress were identified as significant independent factors for heavy smoking (Figure 1).

Table 2: Socio-demographic variable of the study subjects (N=75)

Variable	Group A (n_1=25)	Group B (n_2=25)	Group C (n_3=25)	p value
†Age (Years)	31.36±6.52	30.92±6.92	33.64±6.97	0.322
†BMI (kg/m^2)	21.37±2.98	22.73±3.09	21.45±3.24	0.225
Resident				
Rural	11 (44%)	10 (40%)	8 (32%)	0.675
Urban	14 (56%)	15 (60%)	17 (68%)	
Marital status				
Married	20(80%)	16(64%)	20(80%)	0.324
Unmarried	5(20%)	9(36%)	5(20%)	
Educational status				
Illiterate	0(0%)	0(0%)	1(4%)	
Primary	3(12%)	6(24%)	5(20%)	0.425
Secondary	11(44%)	11(40%)	14(56%)	
HSC and above	11(44%)	9(36%)	5(20%)	
Occupation				
Business	1(4%)	6(24%)	1(4%)	
Service	12(48%)	9(36%)	21(84%)	0.005
Student	1(4%)	0(0%)	0(0%)	
Others	11(44%)	10(40%)	3(12%)	
Monthly income (BDT)				
<15000	16(64%)	21(84%)	19(76%)	0.262
≥15000	9(36%)	4(16%)	6(24%)	

Data were expressed as frequency, percentage and mean±SD. p value was obtained from †One way ANOVA and Chi Square test

Table 3 : Distribution of the study subjects according to smoking status (N=75)

Smoking status	Group A (n_1=25)	Group B (n_2=25)	Group C (n_3=25)	*p* value
Age of Onset	21.80±5.57	22.36±5.38	22.00±4.12	0.925
Duration of smoking	9.76±5.44	8.28±2.37	11.20±4.11	0.053
Stick's/day	5.32±1.80	14.64±2.39	22.20±2.27	<0.001
†Passive smoking				
Yes	9 (36%)	10 (40%)	14 (56%)	0.321
No	16 (64%)	15 (60%)	11(44%)	

Data were expressed as frequency, percentage and mean±SD. *p* value was obtained from One way ANOVA and †Chi Square test

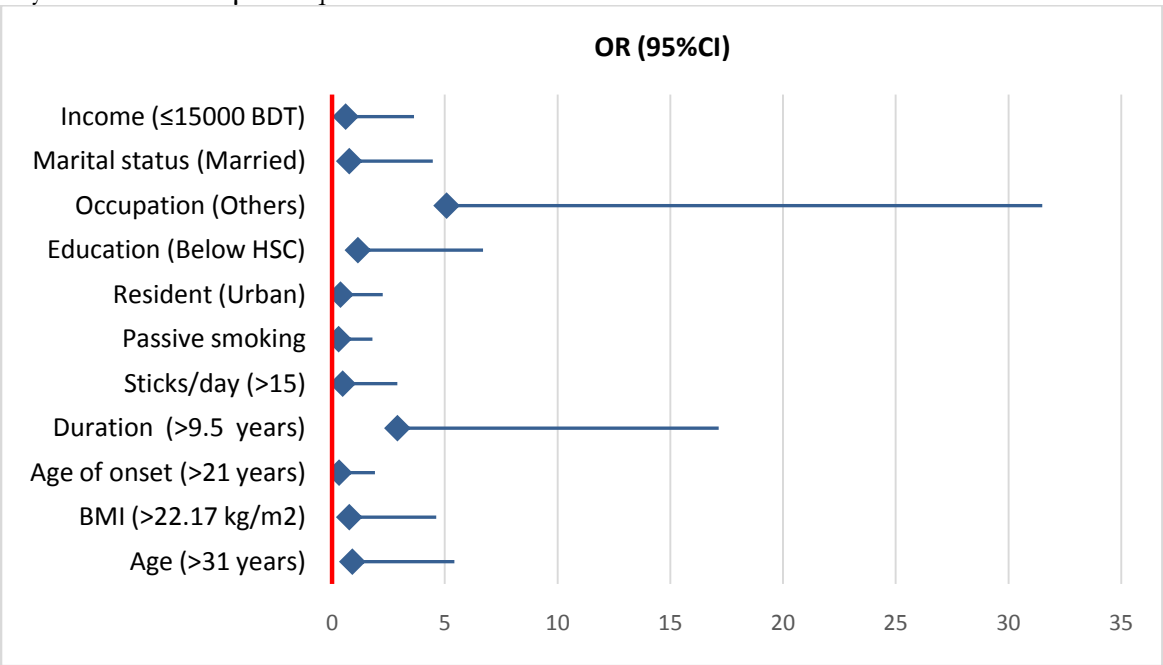

Figure 1: Forest plot showing the association of intensity of cigarette smoking (heavy vs light and moderate smokers) and different independent variables

DISCUSSION

This study was performed to assess the factors influencing the intensity of smoking. Factors affecting smoking intensity include occupation, family monthly income and number of years of smoking. The age of onset was found to correlate with intensity of smoking in a study done by Manoochehri et al. They noted early age of onset of smoking was linked to higher intensity of smoking. They suggested that this factor may be of predictive value for smoking intensity[29]. Although in our study such link could not be established, we observed a strong association between duration of smoking with intensity of smoking.

This difference in the findings of age of onset may be due to the disparity in sample size since Manoochehri et al. performed the study with 913 male subjects while this study included 75 male subjects. Also Manoochehri et al performed the study on Iranian subjects while this study was done in Bangladeshis. The difference in socio-cultural background may also have influenced the outcome of the study.Piamonte also noted early initiation of smoking was related to higher intensity of smoking which indicates towards a longer duration of smoking leading to higher smoking intensity[30].

Occupation of service holder was found to significantly affect the smoking intensity which is similar to the findings of Kouvenon et al. in which they observed job stress aggravated smoking behavior. They suggested high strain of job, high demand effort-reward imbalance lead to higher propensity to smoking[13]. Another study done by Tashiro et al. observed occupational stress promoted smoking tendency. They noted physical burden and irritation at work to be related to smoking intensity. They advised restriction of smoking at workplace and to develop support system and groups to help smokers to quit smoking and promote healthy work environment[23].

Another factor that was found to influence smoking was the monthly family income in this study. Among those hailing from lower socioeconomic condition with monthly family income of less than Taka 15000, 76% were heavy smokers while 24% of those with monthly family income of Taka 15000 or more were heavy smokers. Robles et al observed that financial strain contributed to smoking behavior and noted that financial strain, depressive mood pertaining to low financial condition were linked to smoking[31]. They suggested that individuals with financial strain should be given smoking intervention and also additional therapy to manage depression in such individuals .On the other hand smoking may also contribute to financial strain since cost of tobacco in heavy smokers places financial burden on the individual and his family, thus the individual falls into the cycle between smoking and financial constraint. This association was observed between smoking behavior and financial stress among low income smokers by Widome et al. They reported that paying for housing, difficulty living on one's income and paying for food were common among low income group and cigarettes smoker per day predicted stress related to financing for food, living on one's income and housing ($p<0.05$)[32]. Villanti et al did not report household income as a significant predictor for smoking [33]. Difference in targeted community investigated may have caused this discrepancy.

LIMITATIONS

As this is a cross-sectional study, the temporal relationship between cause and effect could not be assessed. Since the subjects (community-recruited daily cigarette smokers) were selected purposively, the outcomes may be subject to some level of bias. The study did not assess the level of nicotine dependency. Such limitations may be attributed to the time and financial constraints of the study.

RECOMMENDATION

Large scale prospective studies need to be carried out for determining the directional relation of these factors. In future a multi-method assessment approach may be employed to cross-index the relations' nature noted in present study.

CONCLUSION

Smoking is detrimental to both individual and society as a whole. Such habit harms the health, finances and quality of life of the smokers as well as their family and friends. Those hailing from low income group often fall in to the vicious cycle of smoking and further financial burden.Determining the factors that aggravate smoking can help raise public awareness and to take up policies that would help smokers to quit smoking and develop a healthy lifestyle that would lead to a life of prosperity and well being.

CONFLICT OF INTEREST

There is no conflict of interest.

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