ROLE OF SOCIOECONOMIC STATUS AND LITERACY LEVELS TOWARDS USAGE OF TOBACCO PRODUCTS AND ITS DEPENDENCY- A RETROSPECTIVE ANALYSIS

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ABSTRACT:

Socioeconomic status (SES) and literacy level is a major determinant of tobacco use but little is known whether SES affects nicotine dependency or not. Socioeconomic status (SES) is strongly related to smoking behaviour. The association is so strong that smoking is regarded as a marker for deprivation and one can identify disadvantaged groups by simply observing their smoking prevalence. The main objective is to examine the effect of socioeconomic status (SES) on nicotine dependence. A retrospective study was conducted using case records of patients attending private dental college from July 2019- March 2020 . A total of 201 case sheets of patients who had the habit of tobacco use with recorded nicotine dependence score and their income and educational status were retrieved. The study included two measures of SES - education and income using the Modified Kuppuswamy scale(revised version february 2019). Nicotine dependencies are assessed using Fagerstrom nicotine dependence scale. Descriptive statistics, chi-square test was used to analyze the data. More prevalence of literate participants(78.6%) and middle income smokers(<25000) (43.78%) are more prevalent among the study population . No statistically significant association was found between education and nicotine dependence scale($p = 0.750$); income and nicotine dependence ($p=0.432$) . Chi-square tests were used for association and descriptive statistics were used. Nicotine dependency shows insignificant variations across different indicators of SES- income and education among patients attending private dental college in Chennai.

KEYWORDS: Education; Fagerstrom; income; nicotine dependence; socioeconomic status

INTRODUCTION:

Smoking is well known as the single most preventable cause for death and disability in the world. The WHO (World Health Organization) estimates that the number of smokers is expected to increase from 1.3 billion to 1.7 billion worldwide by 2025 (Newacheck *et al.*, 2003) with particularly serious health effects in developing countries. Despite India having a high prevalence of smoking (Frank *et al.*, 2003), there is a low rate of attempting to quit smoking among current smokers. In several metro cities in India, nicotine dependence has become a significant health problem (Harini *et al*., 2019).
A good understanding of prevalence and determinant of tobacco dependence is vital for facilitating the development and implementation of effective tobacco control interventions. Many studies have identifies

that individual level of SES like age, sex, education, income, occupation are important determinants of nicotine dependence (Siahpush *et al.*, 2006; Roberts *et al.*, 2013). However little evidence is available about the association between SES and nicotine dependency. Less evidence states that lower socioeconomic status have more prevalence of dental caries.It is also proved that lower socioeconomic status participants do not care for pits and fissures which leads to food dislodgement and improper maintenance of oral hygiene , leads to dental caries (Prabakar *et al*.,2018a ;Prabakar, *et al*.,2018).Sometimes fluoride stains are misunderstood as smoking stains, and treatment of bleached enamel with neutral fluoride can contribute to increased enamel staining on cigarette smoke.
The reasons for disparities may include early exposure to smoking, social pressure to smoke, lack of knowledge, stress and it depends on the individual how they accept the factors(Symvoulakis *et al.*, 2016). Smokers with low and middle socioeconomic status have higher smoking related adverse health outcomes (Maes *et al.*, 2004; Gallus *et al.*, 2005) while the need for smoking cessation in the individuals is a major public health concern, it has been argued that decreasing smoking prevalence among the smokers should also be considered as a poverty reduction strategy (Kannan *et al.*, 2017). Socioeconomic factors such as primary education and low social class, as well as gender , age and smoking were found to be associated to a significant degree with greater prevalence of periodontal disease (Mathew *et al.*, 2020; Khatri *et al.*, 2019).

Collectively SES has been characterized in related to tobacco use, age at initiation and tobacco cessation. Moreover, it is the nicotine in tobacco that is ultimately responsible for tobacco use being a leading cause for preventable mortality worldwide.Lower education but not income was associated with higher Fagerstrom nicotine dependence score.Previously our team had conducted numerous clinical trials (Neralla *et al.*, 2019; Pratha *et al*., 2019) and lab animal studies and invitro studies (Prabakar *et al*.,2018b; Mohapatra *et al.*, 2019 ;Pavithra *et al*., 2019;Prabakar *et al*., 2016 ;Samuel *et al*., 2020;Kumar *et al*., 2017;Kumar *et al*., 2017) over the past 5 years. Now we are focussing on epidemiological surveys. The idea for the survey stemmed from the current interest in our community. Hence, the current study aims to determine how SES is associated with nicotine dependency. SES determinant variables like education and income are taken into consideration in this study to get a vivid idea.

MATERIALS AND METHODS:

The present retrospective study was conducted by reviewing patient records from July 2019-March 2020 visiting our University Hospital. Among them 201 case records of patients aged 18-75 years with the habit of tobacco use were retrieved.

Ethical approval:

Ethical approval was obtained from the Institutional Review Board (IRB) of the University to use the data from case records (SDC/SIHEC/2020/DIASDATA/0619-0320). Informed consent was obtained from the patient at the time of screening procedure. Case sheets with informed consent were included in the study.

Screening:

The screening for each subject included a detailed record of patients demographic details such as name, age, gender, mobile number, residential location, oral health status and oral health practice

Inclusion and exclusion criteria:

Participants who are current smokers and participants who have given consent during the time of treatment were included. Participants who are former smokers; that is greater than one year of abstinence from habit were not included in the study.

Examiner calibration:

Each patient was examined by each single well trained examiner (Interns / postgraduate student) at the time of screening.

Measures of nicotine dependence:

Patients' level of nicotine dependence was assessed using the Fagerstrom test for nicotine dependence (FTND) (Fagerström *et al.*, 2012) scale which measured psychological tobacco dependence. This FTND consists of six items. The total scores range from 0 to 10 with higher scores showing greater dependence. 0-2 score interprets low dependence ; 3-5 score interprets medium dependence; 6-7 score interprets high dependence; >8 scores interprets very high dependence. Patient’s income and educational status (literacy

level) were also recorded from case sheets using the modified Kuppuswamy scale, commonly used to measure SES in urban and rural areas. This scale was devised by Kuppuswamy in 1976 and consists of a composite score which includes the education and occupation of the Family Head along with income per month of the family.

Statistical analysis:

The frequency and percent of categorical variables were calculated to describe the demographic characteristics of participants. Analysis was done using Statistical Package for Social Sciences (SPSS) version 23.0. Independent variables are age , gender,education and income whereas dependent variable was nicotine dependency. Statistical tests like chi-square association were used to determine the association for education, income and nicotine dependence. P values <0.05 were considered significant.

RESULTS AND DISCUSSION:

The findings showed that smoking and nicotine dependency were highly prevalent. Among 201 participants, everybody is willing and they have given informed consent. Response rate is 100%. Figure I depicts the distribution of age among study subjects 18-30 years is 38.80%, 31-45 years is 32.83% and above 45 years is 28.35%. Mean nicotine dependency score is 2.104. Figure II represents distribution of study subjects based on education - literate (78.6%) and illiterate (21.3%).Most of the smokers are educated. Figure III pie chart represents income distribution among study subjects. 21.39% have low income , 43.78% have middle income and 34.83% have high income. Middle income smokers are more in the study. Most of the smokers have middle income status.

In the study population, no statistically significant association was found between individual educational level and nicotine dependency. Statistically significant association was found between educational level and nicotine dependence in other studies (Leon *et al.*, 2002 ;Furberg *et al.*, 2005). Living in communities with higher overall educational levels was associated with decreased risk of nicotine dependence (Abrams and Niaura, 2003;Kraft, Svendsen and Hauknes, 1998; Abrams and Niaura, 2003). In contrast with other studies, our study has no association and so the main factor among higher educated persons with more nicotine dependency is theri stress.This results is consistent with the study results conducted by Cail et al (Cai *et al.*, 2012). but differed from Western studies where individuals having lower income have higher dependency scores (Boyle *et al.*, 2000). Perhaps, persons with higher income are more likely to purchase more tobacco products and eventually they consume more.

Socioeconomic status(SES) is strongly associated with smoking behaviour. Nicotine dependence, self-efficacy to quit and intention to quit are strong predictors of the propensity to quit and successful cessation. However, the association of SES with these variables have been the subject of few investigations. From the present study, figure IV and V depicts that no statistically significant association is found between education and nicotine dependence (p=0.750) and also income and nicotine dependence (p=0.432).

Higher levels of dependence among middle and lower SES (education) may be due to association of social disadvantage and stress (Boyle *et al.*, 2000; Bohadana *et al.*, 2003). In many studies, they have found a relationship between income and smoking dependence using Heaviness of Smoking Index (HSI). The HSI uses two items for Fagerstrom, the number of cigarettes per day and time to smoke the first cigarette. This was surprisingly given that the time to first cigarette has been recognized as one of the strongest predictors of nicotine dependence. This suggests that stronger physiological dependence on the negatively reinforcing effect of nicotine, rather than stronger physiological dependence marked by early morning withdrawal symptoms. It is surprisingly noted that high income participants have more nicotine dependency because of the stress in their life and no financial stress is present to get cigarettes.

Addiction is loss of control over drug use. Evidence suggests that the majority of smokers in the general population are highly dependent on tobacco (Pennanen *et al.*, 2014). Despite being highly motivated to quit smoking, literate smokers (educated) being aware of threat to health, many regular smokers are unsuccessful to quit attempts.

Exposure to stress and psychological differences:

Low SES smokers are more likely to be restless or depressed as a reason for relapse than high SES smokers.It has been argued that in various countries the SES indicators show the greatest disparity in smoking outcome in education. However, the extent to which education works as an indicator of SES as a mechanism, as told by differences in delay discounting and self control discussed, is ambiguous.

Limitation:

Results cannot be generalized. In this population and with regard to smoking exposure, we have taken into consideration only two variables of socioeconomic status (education and income).

The sample population is very low. Prevalence of nicotine dependency was based on self reporting and therefore may be subjected to recall bias

CONCLUSION:

This study shows a high prevalence of smoking and nicotine dependence among educated people and middle income participants. Additionally, it does not show statistically significant difference and both education and income have positive correlation with nicotine dependency. These findings highlight that the need for tobacco cessation interventions should be targeted on both educated and uneducated. It also breaks the fact that only low SES have high dependence and even high SES smokers have high dependence. In this population, with regard to education and income, higher SES have high dependence and literate people have high dependence than illiterate.

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CONFLICTS OF INTEREST: Nil

REFERENCES:

[1] Abrams, D. B. and Niaura, R. (2003) The Tobacco Dependence Treatment Handbook: A Guide to Best Practices. Guilford Press.

[2] Bohadana, A. et al. (2003) 'Gender differences in quit rates following smoking cessation with combination nicotine therapy: Influence of baseline smoking behavior', Nicotine & Tobacco Research, pp. 111–116. doi: 10.1080/1462220021000060482.

[3] Boyle, P. et al. (2000) 'Characteristics of smokers' attitudes towards stopping: survey of 10,295 smokers in representative samples from 17 European countries', The European Journal of Public Health, pp. 5–14. doi: 10.1093/eurpub/10.suppl_3.5.

[4] Cai, L. et al. (2012) 'Patterns and socioeconomic influences of tobacco exposure in tobacco cultivating rural areas of Yunnan Province, China', BMC Public Health. doi: 10.1186/1471-2458-12-842.

[5] Frank, J. W. et al. (2003) 'Socioeconomic gradients in health status over 29 years of follow-up after midlife: the Alameda county study', Social Science & Medicine, pp. 2305–2323. doi: 10.1016/j.socscimed.2003.08.003.

[6] Furberg, H. et al. (2005) 'The types of regular cigarette smokers: a latent class analysis', Nicotine & tobacco research: official journal of the Society for Research on Nicotine and Tobacco, 7(3), pp. 351–360.

[7] Gallus, S. et al. (2005) 'Tobacco dependence in the general population in Italy', Annals of Oncology, pp. 703–706. doi: 10.1093/annonc/mdi153.

[8] Harini, G. and Leelavathi, L. (2019) 'Nicotine Replacement Therapy for Smoking Cessation-An Overview', Indian Journal of Public Health Research & Development, p. 3588. doi: 10.5958/0976-5506.2019.04144.5.

[9] Kannan, S. S. D. et al. (2017) 'Awareness and attitude towards mass disaster and its management among house surgeons in a dental college and hospital in Chennai, India', Disaster Management and Human Health Risk V. doi: 10.2495/dman170121.

[10] Khatri, S. et al. (2019) 'Retention of moisture-tolerant fluoride-releasing sealant and amorphous calcium phosphate-containing sealant in 6–9-year-old children: A randomized controlled trial', Journal of Indian Society of Pedodontics and Preventive Dentistry, p. 92. doi: 10.4103/jisppd.jisppd_173_18.

[11] Kraft, P., Svendsen, T. and Hauknes, A. (1998) 'Intention to stop smoking among Norwegian smokers: the role of nicotine dependence, type of cigarettes, and age at onset of daily smoking', Addictive behaviors, 23(1), pp. 133–137.

[12] Kumar, R. P., Pradeep Kumar, R. and Preethi, R. (2017) 'Assessment of Water Quality and Pollution of Porur, Chembarambakkam and Puzhal Lake', Research Journal of Pharmacy and Technology, p. 2157. doi: 10.5958/0974-360x.2017.00380.8.

[13] Kumar, R. P., Pradeep Kumar, R. and Vijayalakshmi, B. (2017) 'Assessment of Fluoride Concentration in Ground Water in Madurai District, Tamil Nadu, India', Research Journal of Pharmacy and Technology, p. 309. doi: 10.5958/0974-360x.2017.00063.4.

[14] Leon, J. de et al. (2002) 'The Association Between High Nicotine Dependence and Severe Mental Illness May Be Consistent Across Countries', The Journal of Clinical Psychiatry, pp. 812–816. doi: 10.4088/jcp.v63n0911.

[15] Maes, H. H. et al. (2004) 'A twin study of genetic and environmental influences on tobacco initiation, regular tobacco use and nicotine dependence', Psychological Medicine, pp. 1251–1261. doi: 10.1017/s0033291704002405.

[16] Mathew, M. G. et al. (2020) 'Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial', Clinical oral investigations. doi: 10.1007/s00784-020-03204-9.

[17] Mohapatra, S. et al. (2019) 'Assessment of Microhardness of Enamel Carious Like Lesions After Treatment with NovaMin, Bio Min and Remin Pro Containing Toothpastes: An in Vitro Study', Indian Journal of Public Health Research & Development, p. 375. doi: 10.5958/0976-5506.2019.02832.8.

[18] Neralla, M. et al. (2019) 'Role of nutrition in rehabilitation of patients following surgery for oral squamous cell carcinoma', International Journal of Research in Pharmaceutical Sciences, pp. 3197–3203. doi: 10.26452/ijrps.v10i4.1622.

[19] Newacheck, P. W. et al. (2003) 'Disparities in Adolescent Health and Health Care: Does Socioeconomic Status Matter?', Health Services Research, pp. 1235–1252. doi: 10.1111/1475-6773.00174.

[20] Pavithra, R. P., Preethi Pavithra, R. and Jayashri, P. (2019) 'Influence of Naturally Occurring Phytochemicals on Oral Health', Research Journal of Pharmacy and Technology, p. 3979. doi: 10.5958/0974-360x.2019.00685.1.

[21] Pennanen, M. et al. (2014) 'Smoking, nicotine dependence and nicotine intake by socio-economic status and marital status', Addictive Behaviors, pp. 1145–1151. doi: 10.1016/j.addbeh.2014.03.005.

[22] Prabakar, J., John, J., Arumugham, I. M., Kumar, R. P. and Srisakthi, D. (2018) 'Comparative Evaluation of Retention, Cariostatic Effect and Discoloration of Conventional and Hydrophilic Sealants - A Single Blinded Randomized Split Mouth Clinical Trial', Contemporary clinical dentistry, 9(Suppl 2), pp. S233–S239.

[23] Prabakar, J., John, J., Arumugham, I. M., Kumar, R. P. and Sakthi, D. S. (2018a) 'Comparative Evaluation of the Viscosity and Length of Resin Tags of Conventional and Hydrophilic Pit and Fissure Sealants on Permanent Molars: An Study', Contemporary clinical dentistry, 9(3), pp. 388–394.

[24] Prabakar, J., John, J., Arumugham, I. M., Kumar, R. P. and Sakthi, D. S. (2018b) 'Comparing the Effectiveness of Probiotic, Green Tea, and Chlorhexidine- and Fluoride-containing Dentifrices on Oral Microbial Flora: A Double-blind, Randomized Clinical Trial', Contemporary clinical dentistry, 9(4), pp. 560–569.

[25] Prabakar, J., John, J. and Srisakthi, D. (2016) 'Prevalence of dental caries and treatment needs among school going children of Chandigarh', Indian Journal of Dental Research, p. 547. doi: 10.4103/0970-9290.195683.

[26] Pratha, A. A., Ashwatha Pratha, A. and Prabakar, J. (2019) 'Comparing the effect of Carbonated and energy drinks on salivary pH- In Vivo Randomized Controlled Trial', Research Journal of Pharmacy and Technology, p. 4699. doi: 10.5958/0974-360x.2019.00809.6.

[27] Roberts, B. et al. (2013) 'Prevalence and psychosocial determinants of nicotine dependence in nine countries of the former Soviet Union', Nicotine & tobacco research: official journal of the Society for Research on Nicotine and Tobacco, 15(1), pp. 271–276.

[28] Samuel, S. R., Acharya, S. and Rao, J. C. (2020) 'School Interventions–based Prevention of Early-Childhood Caries among 3–5- year- old children from very low socioeconomic status: Two- year randomized trial', Journal of Public Health Dentistry, pp. 51–60. doi: 10.1111/jphd.12348.

[29] Siahpush, M. et al. (2006) 'Socioeconomic variations in nicotine dependence, self-efficacy, and intention to quit across four countries: findings from the International Tobacco Control (ITC) Four Country Survey', Tobacco control, 15 Suppl 3, pp. iii 71–5.

[30] Symvoulakis, M. et al. (2016) 'The association between tobacco use and perceptions of tobacco price strategies within primary care patients in rural Greece', Tobacco Prevention & Cessation. doi: 10.18332/tpc/62129.

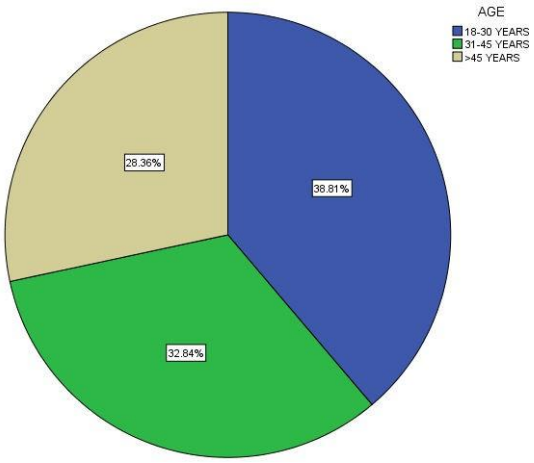

Figure I : Pie chart representing the distribution of age among study subjects. 18-30 years is 38.8%, 31-45 years is 32.8% and above 45 years is 28.3%. Blue colour represents the age group 18-30 years, green colour represents the age group 31-45 years and sandal colour represents > 45 years age group. Most of the participants (38.8%) belong to the age group 18-30 years.

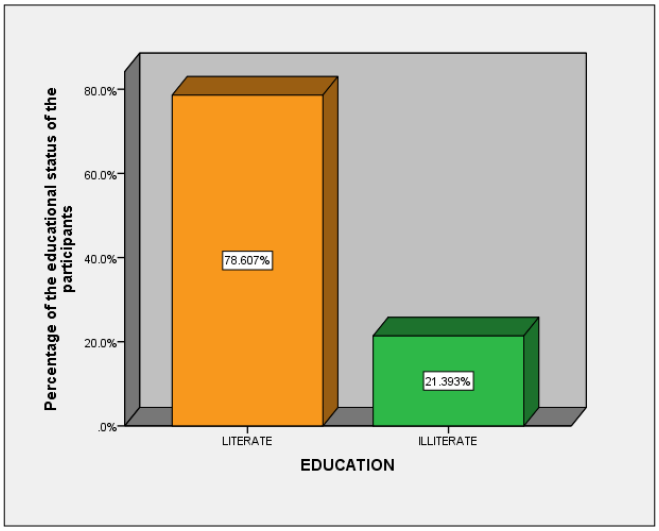

Figure II: Simple bar graph illustrating distribution of study subjects based on education - literate (78.6%) and illiterate (21.3%). Most of the smokers are educated. X axis represents whether they are educated or not. Y axis represents the percentage of the participants belonging to the groups. Orange coloured bar

represents the percentage of literate participants and green coloured bar represents the percentage of illiterate participants. More prevalence of literate participants(78.6%) were noted.

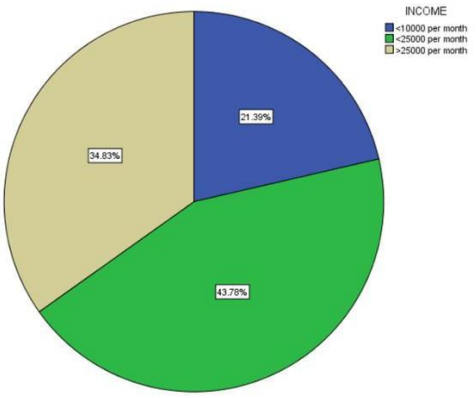

Figure III: Pie chart represents income distribution among study subjects. 21.39% of participants have low income, 43.78% of participants have middle income and 34.83% of participants have high income. Blue colour represents the percentage of the participants earning <10000 per month, green colour represents percentage of participants earning <25000 per month and sandal colour represents the percentage of participants earning >25000 per month. Smokers of the Middle income category (43.78%) were more prevalent among the study population.

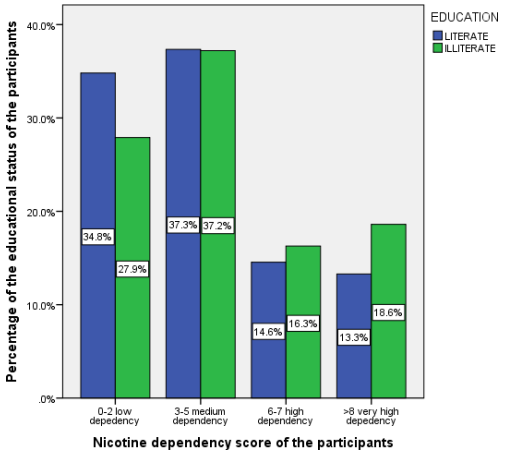

Figure IV: Clustered bar graph represents association between education and nicotine dependence scale. X axis represents the nicotine dependency scores of the participants and Y axis represents the percentage of educational status of the participants. Literate participants (18.6%)(blue) have more prevalence of very high nicotine dependency scores(>8) compared with illiterate participants(13.3%)(green). No statistically significant association was found between education and nicotine dependency scores using chi-square test (chi-square value - 1.212 , df = 3, p = 0.750).

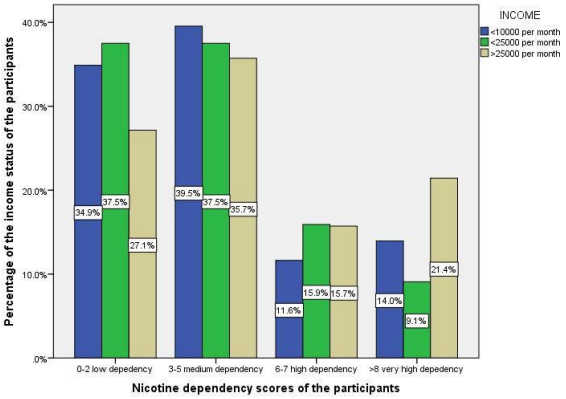

Figure V: Clustered bar graph represents association between income and nicotine dependence scale. X axis represents the nicotine dependency scores and Y axis represents percentage of income of the participants. Participants earning >25000 per month (sandal) have high prevalence of medium dependency scores(35.7%) and participants earning <25000 per month(green) and <10000 per month(sandal) have

high prevalence of low and medium dependency scores. Chi-square test was done to determine the association between income and nicotine dependency scores, however no statistical significance difference was observed (chi-square value - 5.921 , df = 6 , p = 0.432) .