

ORIGINAL ARTICLE

Level of physical activity and its relationship with tobacco use among youth: a cross-sectional survey in North India

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Abstract

Background: Tobacco use and physical inactivity are major risk factors for NCDs. Adequate physical activity keeps one healthy but sedentary life style may contribute to other unhealthy practices like tobacco use. There is a need to identify if and how the two risk factors are interrelated so as to address them more strategically. **Objectives:** To assess the level of physical activity and to identify its association with tobacco use among college going youth in Chandigarh. **Material & Methods:** Data on physical activity and tobacco use was collected from 500 students aged 18-24 years studying in different professional and nonprofessional colleges of Chandigarh in year, through a multistage stratified random sampling technique. We used semi-structured, self-administered questionnaires-namely 78 item Global Adult Tobacco Survey (GATS) for assessing tobacco use status and GPAQ (Global Physical Activity Questionnaire) for assessment of physical activity. Binary logistics regression analysis was done to find association between tobacco use and physical activity. Odd's ratio & 95% confidence interval (C.I.) was calculated. **Results:** Of the 500 individuals studied, 12.8% (n=64) were physically inactive, 10% (n=50) were active and 76.2% (n=381) were highly active. Females (15.8%) were more inactive as compared to males (12.1%). Highly active respondents were seen more in 18-20 years age group (77.6%) as compared to 21-22 years age group (76.1%). The odds of consuming tobacco is significantly lower among physically active respondents as compared to inactive respondents. **Conclusions:** Our findings indicate a significant relationship between physical activity and tobacco use among youth. Promotion of physical activity may be a useful educational tool for reducing tobacco use.

Keywords

Physical Activity; Prevalence; Tobacco

Introduction

Tobacco use is an important modifiable risk factor for major non-communicable diseases (NCDs). (1) Globally, more than 1.1 billion people use tobacco which is significantly more among males than

females. This alarming number represents about one-third of the global population aged 15 years and above. (2) The problem is of particular concern in India, where tobacco-related mortality is highest. According to Global Adult Tobacco survey (GATS-2) 2016-17, current tobacco users in India among the

youth aged 15-24 years is 12.4% with a relative reduction of 33% as compared to GATS-1. (3, 4) People who start using tobacco at an early age are more likely to develop serious health complications. (5)

In India, according to ICMR-INDIAB study, 54.4% population surveyed were found to be physical inactive. (6) Recently, India's performance was fairly poor in the concurrent preparation of Report Cards on the physical activity of children and youth among 38 countries of the world (7)

Growing evidence reveals a bidirectional relationship between tobacco use and physical activity. A systematic review on smoking and physical activity revealed a definitely negative association between each other (8), while another systematic review reveals that exercise seems to have a protective effect against smoking as well as a supportive effect on smoking cessation treatments. (9)

Aims & Objectives

To assess the relationship of tobacco use and physical activity among college going youth in Chandigarh, India.

Material & Methods

Study Type: Cross-sectional study, *Study Population:* College-based survey conducted among youth population, *Study Area:* Union Territory of Chandigarh, India. Chandigarh has total population of 1.1 million with 97.2% population residing in urban or slum settings. (10) As per GATS-1, the tobacco use among adult population is 14.3% in Chandigarh with current users contributing to maximum i.e. 11.9%.³ The prevalence of physical inactivity in Chandigarh in individuals aged 20 and above is 66.8%. (6), *Study Duration:* October 2014-December 2015, *Sample Size Calculation:* A Sample size of 500 students was calculated based upon the prevalence of tobacco use among youth in Chandigarh as 20%(p) (11), 95% confidence interval, 5% alpha error(r) and effect size of 2. The sample size was calculated using formulae

$$n = (1.96^2 * p * (1-p)) / r^2$$

Inclusion Criteria:

- College going students up to age of 30 years.
- Those present at the time of data collection.

Exclusion Criteria:

- The colleges and students who didn't give consent for participation in study.
- Students with age 30 years and above

Strategy for collection: Multistage stratified random sampling technique was used in the study, where all colleges were divided into two strata-professional and non-professional. A total of 10 colleges (2 from each stream-medical, engineering and law, science, arts & commerce and others) were enrolled randomly. One class was selected randomly from each selected college, and 50 students were randomly selected by proportionate selection from each section of class. The field investigator (FI) visited the selected colleges and was explained about need, objectives and methodology for the study. The FI is a qualified public health professional and was trained in data collection methods. The respondents were briefed up about the study objectives and were encouraged to clarify doubts before or during filling up the questionnaire. The filled questionnaire was anonymously collected in a box. We used semi-structured, self-administered questionnaires-namely 78 item Global Adult Tobacco Survey (GATS) for assessing tobacco use status and GPAQ (Global Physical Activity Questionnaire) for assessment of physical activity.

Ethical Approval: The necessary approval from Institutes Ethical Committee of Post Graduate Institute of Medical education and Research (PGIMER) Chandigarh, and administrative permissions from Directorate of Education and Principals of selected colleges were taken.

Data Analysis: The data entry was followed by coding and cleaning of data and analysis using SPSS- version 21. Chi-square test was applied for categorical variables, while binary logistic regression analysis was done to find association between tobacco use and physical activity. Odds ratio (ORs) and 95 % CIs was calculated. P value of less than 0.05 was considered statistically significant.

Results

A total of 500 students aged 18-24 years from professional and nonprofessional colleges of Chandigarh participated in the study. Majority (76.8 %) were males, belonged to age group of 18-20 years (50%), lives in nuclear family (71.2%), and Hindu religion (66.6%). Current tobacco-users were 20.2% and physical inactivity level was 12.8%. (Table 1) The socio-demographic profile along with tobacco use and level of physical activity of respondents is shown in (Table-1) The females (15.8%), youth in age group of 21-22 years (13.8%) and residing in urban area (14%) were

statistically more physically inactive as compared to their counterparts. To check the relationship between socio demographic factors and physical activity status among respondents, binary analysis was carried out using logistic regression. The odds of highly physical active was 1.8 times higher among males as compared to females (p value <0.05). Also, students belonging to non-professional group had significantly higher odds (OR=1.73) of being highly physical active as compared to professional group (p value <0.05). However, there was no significant difference in pattern of physical activity with any other socio demographic variable ([Table 2](#)).

Tobacco use determinants among youth

Similarly, to check the relationship between socio demographic factors and tobacco use status of the respondents, binary analysis was carried out using logistic regression ([Table 3](#)). The odds of using tobacco was significantly (OR=2.4) higher in higher age group (23-24 years old) as compared with lower age group (18-20 years old). Students belonging to Sikh religion had significantly lower odds (OR= 0.30) of being tobacco users as compared to Hindu students. Also, the odds of using tobacco was seen lower (OR=0.2) in respondents with family history of tobacco use as compared to respondents with no family history. No significant relation was seen between other socio demographic factors and tobacco use.

Relationship of physical activity and tobacco use among youth

[Table 4](#) show the relationship between physical activity and tobacco use. Results showed that non-tobacco users were physically more active (89.4%) as compared to tobacco users (80%) The inactivity level was more among tobacco users (20%) as compared to non-tobacco users (10.6%).

To check the relationship between tobacco use and physical activity status of the respondents in study population, binary analysis was carried out using logistic regression. It was observed that odds of consuming tobacco was significantly (OR=0.48) lower in physically active respondents as compared to inactive respondents (p value <0.05) ([Table 4](#)). In males, current tobacco users have significantly lower odds (OR=0.48) of engaging in physical activity as compared to nonusers. (p value <0.05).

Discussion

The present study was an attempt to assess the level of physical activity and its relationship with tobacco

use. We found that there was almost one eighth of participants were physical inactive and almost one fifth of the participants were exposed to tobacco. Both these variables had shown significant inverse association with each other in the study.

The increasing prevalence of physical inactivity is one of the real public health challenges for India. Similar to findings of our study, there is a staggering figure in published literature that showed a high level of physical inactivity among people in India which imply a huge population at risk for developing non-communicable diseases. Three surveys conducted in India- the WHO Modified STEPS Survey (GPAQ) in 2003–2005, the World Health Survey (IPAQ) in 2003 and the IPAQ Short Form (2003) had shown similar results with high prevalence rates of “sufficiently active” respondents (84, 88 and 77% respectively).(12) However, the results are in contrast to ICMR-INDIAB study that showed much higher prevalence of inactivity level in Chandigarh.6 Thus, with the current level of physical inactivity as found in the study, over 2 crores population aged 18-24 years have chance of being physical inactive.

Another finding that was observed in the study was significant difference in physical activity level among males and females, with females showing lower odds of involving in physical activity. This is in accordance with other studies, which have reported high level of physical activity in males as compared to females. (13) Also, the prevalence of physical inactivity was higher in respondents belonging to urban area as compared to rural area. Increased amenities and increased availability of mechanized transport and household appliances in urban areas may be the factors contributing to higher level of physical inactivity among them. Similar results of increased sedentary behaviour among urban residence have been reported in other studies conducted in different cities of India. (14, 15) Physical activity level in respondents also differed with the colleges they were studying. The respondents studying in non-professional colleges were significantly more active as compared to students studying in professional colleges. High pressure of studies in professional colleges as compared to non-professional may have attributed to decreased physical activity among them.

The significant inverse relationship between tobacco use & physical activity observed in our study is supported by number of studies including the studies conducted in 21 countries of Europe and in United

States where a lower likelihood of smoking was associated with regular physical exercise. (13) A study conducted in India had shown an increased prevalence of smoking among the individuals who didn't do exercise in leisure time as compared to individuals who did exercise in their leisure time. (16) Several hypotheses including psychological, behavioural and physiological factors have been proposed to support this inverse relationship. The possible explanation made by physiological theories is the fact that exercise and smoking stimulate same nerve endings in central nervous system. (17,18,19) In addition, clustering of health behaviour occurs, that is, involving in one positive behaviour (PA) increases the likelihood of getting involved in another (non-smoking). Moreover, due to reduced cardio-respiratory fitness, the ability of tobacco users to engage in PAs and exercise may get impaired. (20, 21) In the present study, the inverse tobacco-PA relationship was significant in males and non-significant in females. Similar results were found in Greece (22) but are in sharp contrast to the review conducted by Kaczynski *et al*, where in a negative smoking-PA relationship was found especially in females.(20) This study also assessed respondents attitude towards tobacco use and physical activity where almost one fourth of tobacco users (27%) believed that engaging in physical activity may help them in quitting tobacco use while less than half (41%) believed that it will reduce the frequency of tobacco use. Meta-analysis of studies published from 2006 to 2011 to examine short bouts of exercise on cigarette cravings suggested that exercise is effective in reducing both desire and strength of desire to smoke. (23) Thus there is need to sensitise youth about the effect of physical activity on their tobacco use behaviour and promoting physical activity as an educational tool to curb tobacco use.

The following are the strengths of the study. First, the validated and recognized measures like GATS and GPAQ scale were used. GPAQ was chosen to assess physical activity which has been previously validated in 9 populations including Asian Indians and found to be reproducible and replicable 1. (24) Second, limited literature was found in India among youth population to find association between tobacco use and physical activity. Thus, this study provides a baseline for researchers and policy makers to carry out interventions to curb tobacco use. Third, the random selection of the subjects from homogeneous and a well-defined target population

along with high participation rate added strength to the results of this study. Finally, the study follows STROBE guidelines for reporting observational study.

Conclusion

The overall prevalence of tobacco use among college going youth was 20.2% with significantly more among males and level of physical inactivity was 12.8% with significantly more inactivity level in females and professional group. A significant relationship between tobacco use and physical activity among youth was observed with odds of consuming tobacco significantly 0.48 times lower in physical active respondents as compared to physical inactive respondents.

Recommendation

The incorporation of interventions related to physical activity at community and various settings (schools, offices etc) should be promoted in order to reduce health risk behaviour including tobacco use. Regular physical activity and counselling for discouraging tobacco use should be integrated with academic curriculum of school and colleges which will help us achieve Goal 3 of Sustainable Development Goal 2030

Limitation of the study

There were few limitations of the study. First, the data was restricted to college going youth which underscores the prevalence of health risk behaviors among youth not enrolled in school. Being a cross-sectional nature of study, causal association between physical activity and tobacco use could not be established. It is recommended that cohort studies linking physical inactivity and tobacco use should be undertaken for establishing causal association. Moreover, being a sensitive nature of study and reporting by a self-reported questionnaire, a result may be biased (social desirability bias) due to underreporting of tobacco use behavior and physical activity.

Relevance of the study

There is significant inverse relationship between physical activity and tobacco use. Promoting physical activity may act as preventive tool to curb tobacco use among youth.

Authors Contribution

Concepts: SG; Design: DM, SG, SKP; Literature search: DM; Data acquisition: DM; Data analysis: DM; Statistical analysis: DM; Manuscript

preparation: DM; Manuscript editing: DM, SG, SKP; Manuscript review: SG, SKP; Guarantor: SG.

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Tables

TABLE 1 SOCIO-DEMOGRAPHIC PROFILE OF COLLEGE GOING YOUTH OF CHANDIGARH, INDIA

Variable	Number (%) (N=500)	
Gender	Female	116 (23.2)
	Male	384 (76.8)
Age group (in years)	18-20	250 (50)
	21-22	117 (23.4)
	23-24	133 (26.6)
Religion	Hindu	333 (66.6)
	Sikh	140 (28)

	Others	14 (2.8)
	Muslim	9 (1.8)
	Christian	4 (0.8)
Caste	General	419 (83.8)
	Schedule Cast	38 (7.6)
	Other Backward Class	26 (5.2)
	Schedule Tribe	17 (3.4)
Residence	Urban	406 (81.2)
	Rural	93 (18.6)
	Slum	1 (0.2)
Tobacco use	Non-tobacco users	373 (74.6)
	Tobacco-users	101 (20.2)
Anyone in family use tobacco	Ex-users	26 (5.2)
	No	411 (82.2)
	Yes	89 (17.8)
Physical activity level	Low	64 (12.8)
	Active	50 (10)
	Highly active	381 (76.2)
	Non-responsive	5 (1)

TABLE 2 BINARY LOGISTIC REGRESSION MODEL - DETERMINATION OF PHYSICAL ACTIVITY

		Physical Activity Level			
Variable		Low N (%)	Active N (%)	Highly Active N (%)	OR 95% CI (LL-UL)
Gender	Male	46 (12.1)	32 (8.4)	303 (79.5)	1.79** (1.12-2.89)
	Female (Rf)	18 (15.8)	18 (15.8)	78 (68.4)	-
Professional status	Professional (Rf)	38 (15.3)	31 (12.5)	179 (72.2)	-
	Non-professional	26 (10.5)	19 (7.77)	202 (81.8)	1.73** (1.18-2.694)

***significant at 0.05 level, OR =odd ratio, RF=reference categories and CI =confidence interval*

TABLE 3 BINARY LOGISTIC REGRESSION MODEL DETERMINATION OF TOBACCO USE

Variable		Non Tobacco users N (%)	Tobacco users N (%)	OR 95% CI (LL-UL)
Gender	Male (Rf)	267 (74.2)	93 (25.8)	-
	Female	106 (93)	8 (7)	0.2** (0.1-0.5)
Age group	18-20 yrs. (Rf)	207 (84.5)	38 (15.5)	-
	21-22 yrs.	85 (78.0)	24 (22.0)	1.4 (0.7-2.6)
	23-24 yrs.	81 (67.5)	39 (32.5)	2.4** (1.3-4.3)
Residence	Urban (Rf)	314 (88.9)	74 (19.1)	-
	Rural	59 (68.6)	27 (31.4)	1.5 (0.8-2.8)
Religion	Hindu (Rf)	242 (75.9)	77 (24.1)	-
	Sikh	118 (88.7)	15 (11.3)	0.30** (0.1-0.5)
	Other	13 (59.1)	9 (40.9)	0.7 (0.2-2.1)
Caste	General (Rf)	325 (80.8)	77 (19.2)	-
	Other	48 (66.7)	24 (33.2)	1.4 (0.7-2.8)
Anyone in family use tobacco	No (Rf)	327 (83.6)	64 (16.4)	-
	Yes	46 (55.4)	37 (44.6)	0.2** (0.1-0.4)

***significant at 0.05 level, OR =odd ratio, RF=reference categories and CI =confidence interval*

TABLE 4 RELATIONSHIP OF PHYSICAL ACTIVITY AND TOBACCO USE AMONG YOUTH

Tobacco use/ Physical Activity Level	No	Yes	OR 95% CI (LL-UL)
Inactive (Rf)	39 (10.6)	20 (20)	-
Active	330 (89.4)	80 (80)	.486** (0.27-0.88)

**Exusers (n=26) has been excluded for analysis, **significant at 0.05 level, OR: odd ratio, Rf=reference categories and C.I =confidence interval*