

## Effect of Participatory Health Promotion Initiative on Tobacco Use among Adolescents: A School-Based Quasi-Experimental Pilot Study from Central India

### Abstract

**Introduction:** Prevalence of noncommunicable diseases (NCDs) is increasing rapidly in developing countries like India. The commonly attributable modifiable risk factors of NCDs include raised blood pressure (13%), tobacco use (9%), physical inactivity (6%), and obesity (5%). This quasi-experimental study with a pre-post design was conducted with an objective to assess the effect of Participatory Health Promotion initiative (PHPI) on tobacco use among adolescents. PHPI included distribution of personalized health card, tobacco-tar experiment demonstration, use of body mapping technique to emphasize hazards of tobacco on different body organs, and sensitization in small groups. **Methods:** Baseline tobacco use and health risk assessment were conducted by adapting WHO ASSIST tool among 200 students who were randomly selected from a secondary high school. All students in the school were then exposed to the PHPI. The postmeasurement was done among another 200 randomly selected students after 3 months. **Results:** The number of current tobacco users reduced from 29 (14.5%) in the baseline to 9 (4.5%) in the postmeasurement with a  $P < 0.001$ . Participants with a moderate risk of health hazard due to tobacco use decreased from 21 (72.4%) in the baseline to 5 (55.6%) in the postmeasurement. Students with a higher risk of health hazard because of tobacco use decreased from 6 (20.7%) in the baseline to 1 at the postmeasurement (11.1%). **Conclusion:** The school-based PHPI was effective in reducing the number of tobacco users among the Indian adolescents.

**Keywords:** Adolescent health, behavior change, health promotion, substance use, tobacco use

### Introduction

The second half of the 20<sup>th</sup> century witnessed major health transitions in the world. Among these health transitions, the most globally pervasive change has been the rising burden of noncommunicable diseases (NCDs). NCDs are responsible for a high proportion of deaths and disability in all countries. NCDs accounted for 60% of all deaths worldwide, with 80% of those taking place in developing countries where they take a disproportionate toll during the ages of prime productivity. Based on current trends, NCDs are expected to account for 73% of deaths and 60% of the global disease burden by the year 2020.<sup>[1]</sup> In many developing, NCDs are now comparatively affecting populations at a much younger age, leading to longer duration of morbidity, premature mortality, and increased loss of productivity, thereby affecting overall economic development.<sup>[2]</sup> NCDs contribute

to the triple burden of diseases in India also. In 2004, deaths due to NCDs in India were twice those from communicable diseases. By the year 2025, it is expected that 60% of proportional mortality in India will be because of NCDs.<sup>[3]</sup>

The key to control the global epidemics of NCDs is the primary prevention based on the comprehensive population-wide health promotion programs. The basis of NCD prevention is the identification of common shared modifiable “risk factors” and their prevention and control. The major risk factors for these NCDs are tobacco use, alcohol abuse, a sedentary lifestyle, and an unhealthy diet. As a result, 40%–50% of NCD-related premature deaths are preventable.<sup>[4,5]</sup>

NCDs in adults have been related to the prevalence of risk factors in childhood and adolescence; hence, there is a definite felt need to monitor the prevalence of these risk

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factors in this age group and plan intervention measures for the same as problems originating in adolescence have lifelong health consequences.<sup>[6]</sup>

Tobacco kills >7 million people each year globally.<sup>[7]</sup> In terms of attributable deaths, tobacco use is attributed with 9% of NCD-related deaths only second to raised blood pressure (13%).<sup>[8]</sup> Most tobacco users start smoking or consuming tobacco early in life; therefore, preventing tobacco use should be as early as possible such as during adolescence.<sup>[9,10]</sup> Therefore, we conducted a study with an objective to develop and pilot test a school-based Participatory Health Promotion Initiative (PHPI) against tobacco use among adolescents. We conducted it in a school, as the school provides a positive enabling environment for health promotion.

## Methods

### Study design and participants

This school-based quasi-experimental study with a pre-post design was conducted between June and October 2017 among adolescent students from Class V (5<sup>th</sup> year of school) to Class X (10<sup>th</sup> year of school). Our medical institute conducts a School Health Education Program (SHEP) in 15 different secondary schools of the Wardha district of Maharashtra state in India. Considering the feasibility of implementation, study was conducted in the Kejaji secondary high school at Taroda village where the SHEP is already being conducted. Both boys and girls were included in the study as literature review suggested that tobacco use is common in both sexes, although more common in boys.<sup>[9]</sup>

The sample size was estimated using OpenEpi software. A sample size of 210 adolescents was required assuming a reduction in tobacco use by 20% from a prevalence of 39% with 80% power, 95% confidence level and considering a nonresponse/attrition rate of 15%.<sup>[9]</sup> The school had a total strength of around 600 students from Class V to Class X. An enumeration list of all students from Class V to Class X was prepared based on their attendance register from the school which served as the sampling frame. Two-hundred and ten students were selected randomly from the total cohort of 600 by generating random numbers using the OpenEpi software. 10 students from the randomly selected 210 students were not available during the baseline and therefore 200 was the final sample size. All those who consented for participation were included in the study. All those who were suffering from any chronic illness were excluded from the study. The identity of study participants was kept confidential by assigning them a unique identification number. Socio-demographic data were collected individually by interviewing each participant maintaining confidentiality and privacy.

### Measures

Baseline assessment for tobacco use and health risk assessment were done using the tobacco component from

the World Health Organization The Alcohol, Smoking and Substance Involvement Screening Test (WHO ASSIST) tool.<sup>[11]</sup> The validated WHO ASSIST tool is available in Hindi, and the participants were self-administered the Hindi questionnaire for filling.<sup>[12]</sup> Investigators team was available for explaining the meaning of questions and helping participants in case some question was not clear to any of the participants. Tobacco use was defined in the form of being an “ever user” and “current user.” If someone had consumed/used tobacco in any form or quantity at any point in their life, he/she was considered as an “ever user”. If an “ever user” had consumed/used tobacco in any form or quantity in the past 3 months, he/she was considered as a “current user.” A pretested structured interview schedule was used to collect information pertaining to sociodemographic profile. It included details on age, gender and education of students, education of parents, socioeconomic status, and type of family. After 3 months, once the students were exposed to health promotion intervention, post measurement was done with another 200 students chosen randomly from the enumeration list as depicted in the Study flow diagram [Flow Chart 1].

### Intervention

All students in the school were then exposed to health promotion intervention. Health promotion initiative was participatory in nature and included the following:

- Study participants were communicated individually their health risk through the distribution of personalized health cards based on the findings of the baseline survey
- Mock demonstration of how ‘tar’ from tobacco gets deposited in the body was also done
- A participatory learning and action tool in the form of “body-mapping” was used to emphasize the health effects of tobacco use on different body organs<sup>[13,14]</sup>
- Sensitization of students was done in groups of around 20 participants discussing the benefits of not indulging in tobacco use or quitting tobacco use. The group discussion was in the form of a story of two friends and what is the responsibility of a “true friend.”

### Statistical analysis

Data entry and analysis were done using Epi info software. Filled questionnaires were checked before beginning data entry. Data entry checks were applied while entering data to ensure that no fields were missing and to prevent wrong data entry. Descriptive analysis using frequency, proportion with 95% confidence interval (CI) was done. For comparison between pre- and post-intervention tobacco use, “Z” test of proportions was used.

### Ethical considerations

The study was initiated after approval from the Institutional Ethics Committee (IEC). Written informed consent was obtained from the principal of the school after an in-depth explanation of the participatory health

promotion intervention. Passive consent was obtained from the parents of the students included in the baseline and postmeasurement using a separate consent form. IEC approved consent forms in the local regional language were used for obtaining consent. Verbal assent was obtained from the students at the time of data collection at baseline and postmeasurement. As part of the passive consent process, informed consent form containing the study details was sent with the students for reference of their parents. Any parent who did not want their child to participate in the study was requested to return the duly signed consent form. If they were consenting for their child’s participation, then the parents did not have to return the consent form. Nonreceipt of signed consent form from the parents at the time of seeking verbal assent from the students was considered as their willingness for participation in the study. Study participants who were found to indulge in tobacco use were referred for counseling and/or treatment depending on their severity level.

### Results

Table 1 depicts the sociodemographic profile of the study participants at the baseline and at postmeasurement. Mean age of the participants was  $13.4 \pm 1.6$  and  $13.2 \pm 1.7$  at baseline and postmeasurement, respectively. Males constituted 111 (55.5%) and 107 (53.5%) at baseline and postmeasurement, respectively. Almost all other background

characteristics of the participants were comparable at baseline and postmeasurement, as depicted in Table 1.

Table 2 depicts the details about tobacco use in the study at baseline. The prevalence of ever use of tobacco among the study participants at baseline was 20.5% (95% CI 14.8–26.2). Twentynine (71.7%) students from the 41 ever tobacco users were current users, i.e., they had used tobacco in the past 3 months. Almost all the ever tobacco users indulged in consumption of smokeless tobacco. Locally available product ‘*Kharra*’ was the most commonly consumed product. Around two-third of the current tobacco users experienced a strong daily urge for tobacco use. Around one-fourth of the current tobacco users had faced social or financial problems because of their tobacco use. Similarly, around 1/5<sup>th</sup> of the current tobacco users were not able to perform their desired social role. Around 40% of the ever tobacco users reported that a family member or friend had expressed concern regarding their tobacco use in the past 3 months. Around 30% of the ever tobacco users had made a failed attempt to stop tobacco in the past 3 months.

Table 3 depicts the effect of intervention comparing the current users of tobacco at the baseline and postmeasurement. The number of current tobacco users in the baseline study was found to be 29 (14.5%), which significantly reduced in the postmeasurement study to

**Table 1: Sociodemographic characteristics at the baseline and postmeasurement**

Variable	Categories	Baseline, n (%)	Postmeasurement, n (%)
Age*	Mean age	13.4±1.6	13.2±1.7
Sex	Male	111 (55.5)	107 (53.5)
	Female	89 (44.5)	93 (46.5)
Education	Middle school	87 (43.5)	91 (45.5)
	Secondary school	113 (56.5)	109 (54.5)
Type of family	Nuclear	126 (63)	127 (63.5)
	Joint	74 (37)	73 (36.5)
Family size*	Average family members	5.1±1.7	4.9±1.6
Socioeconomic status	BPL	138 (69)	137 (68.5)
	APL	21 (10.5)	19 (9.5)
	DK	41 (20.5)	44 (22)
Father’s education	Illiterate	4 (2)	4 (2.0)
	Primary	34 (17)	37 (18.5)
	Middle school	26 (13)	23 (11.5)
	Secondary	53 (26.5)	55 (27.5)
	Higher secondary	46 (23)	44 (22)
	Graduate	11 (5.5)	14 (7)
	DK	26 (13)	23 (11.5)
Mother’s education	Illiterate	4 (2)	3 (1.5)
	Primary	15 (7.5)	17 (8.5)
	Middle school	27 (13.5)	26 (13)
	Secondary	73 (36.5)	75 (37.5)
	Higher secondary	52 (26)	50 (25)
	Graduate	11 (5.5)	9 (4.5)
	DK	18 (9)	20 (10)

\*Mean±SD. SD: Standard deviation, BPL: Below poverty line, APL: Above poverty line, DK: Don’t know

9 (4.5%). The 95% CI at baseline (9.6–19.4) and at postmeasurement (1.6–7.4) are not overlapping indicating the significant difference in the proportion of current tobacco users at baseline and postmeasurement. Analysis of these results using Z test of proportions gave a  $P < 0.001$ , which is highly statistically significant. It was also seen that number of tobacco users who were at a high risk of adverse effects because of tobacco use on the basis of score of 27 or more by WHO ASSIST tool had reduced from 6 (20.7%) in baseline to 1 (11.1%) in the postmeasurement.

## Discussion

This school-based quasi-experimental study was conducted with adolescent students from Class V to Class X in the secondary high school at Taroda, Wardha, India. All the students in the school were exposed to health

promotion intervention. A sample of 200 students was selected using simple random sampling separately at baseline (preintervention) and postmeasurement.

In the present study, at baseline, we found that the prevalence of ever tobacco use among the students in the school was 41 (20.5%), with 29 (14.5%) being the current users of tobacco.

The Global Youth Tobacco Survey (GYTS) to estimate tobacco use in adolescents found that, in the age group of 13–15 years old school-going children, the current use of any tobacco product varies from as low as 3.3% in Goa to as high as 62.8% in Nagaland.<sup>[15]</sup> This study results are similar to the findings of the GYTS. In another study from rural Wardha, the overall prevalence of tobacco use was found to be 39%. The difference in finding could be attributed to the study setting as the present study was conducted in a school where the SHEP is already being implemented as compared to the community-based study conducted by Dongre *et al.*<sup>[19]</sup>

We tried to find the effect of the use of PHPI on the tobacco use among adolescents. There was a significant decrease in the usage of tobacco after the intervention. After the intervention, the number of current users of tobacco reduced from 29 (14.5%) to 9 (4.5%). The number of students having moderate health risk and high risk of adverse effects due to tobacco use also reduced in the postmeasurement. Similar results were obtained through school-based health promotion initiative in rural Wardha by Dongre *et al.* who found that the tobacco use reduced from 39.3% to 17.1%.<sup>[16]</sup>

The study showed that an effective intervention strategy could be implemented easily though a school-based approach. Schools are an ideal setting for implementing tobacco cessation programs for adolescents and youths. School-based cessation programs facilitate the prevention of tobacco use initiation and help the users to overcome difficulties that may crop up when they are attempting to quit tobacco.<sup>[17]</sup> Our findings are similar to findings from other studies where either a school-based or a community-based participatory approach was used to reduce the tobacco use. In India, Mobilizing Youth against Tobacco-Related Initiatives project had managed to effectively control the tobacco menace.<sup>[18]</sup>

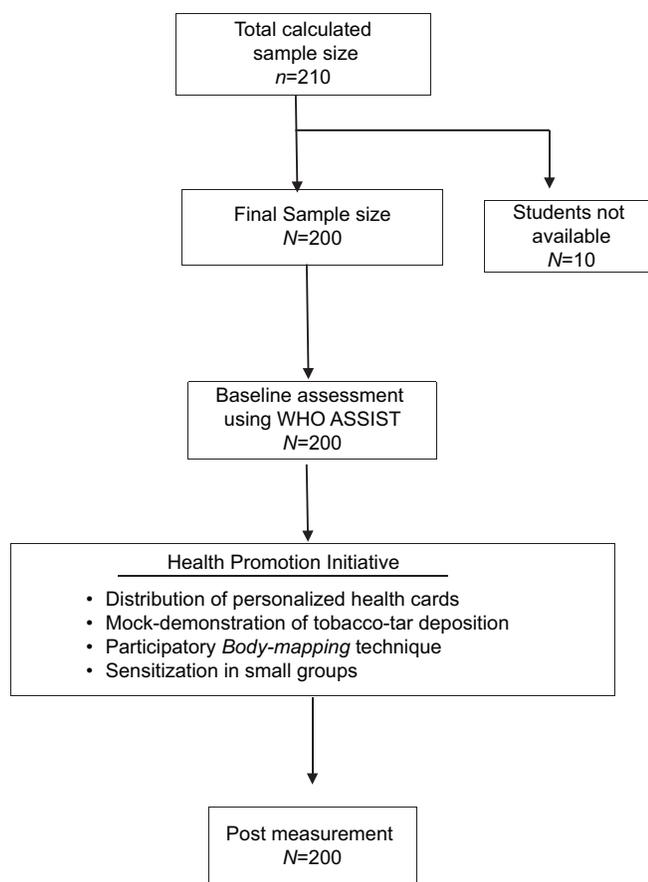
**Table 2: Profile of tobacco use among study participants at baseline**

Variable	Categories	n (%)
Ever used tobacco (n=200)		41 (20.5)
Current users: Tobacco use over past 3 months (n=41)	Not used	12 (29.3)
	Once/twice	6 (14.6)
	Monthly	1 (2.4)
	Weekly	5 (12.2)
Strong desire to use tobacco products (n=29)	Almost daily	17 (41.5)
	Never	4 (13.8)
	Once/twice	1 (3.4)
	Weekly	6 (20.7)
Social/financial problems (n=29)	Almost daily	18 (62.1)
	Yes (at least once)	7 (24.1)
	Never	22 (75.9)
Failed to perform the desired role (n=29)	Yes (at least once)	6 (20.7)
	Never	23 (79.3)
Concern regarding tobacco use (n=41)	Yes, in the past 3 months	16 (39.0)
	Yes, but not in the past 3 months	5 (12.2)
	Never	20 (48.8)
	Failed attempt to stop tobacco use (n=41)	Yes, in the past 3 months
	Yes, but not in the past 3 months	3 (7.3)
	Never	26 (63.4)

**Table 3: Tobacco use at baseline and postmeasurement**

Variable	Category	Baseline, n (%)	Postmeasurement, n (%)	P*
Current tobacco users (n=200)		29 (14.5)	9 (4.5)	<0.001
95% CI for proportion of participants using tobacco	Lower bound	9.6	1.6	
	Upper bound	19.4	7.4	
Health risk due to tobacco consumption as assessed by the WHO ASSIST scores	0-3 (low)	2 (6.9)	3 (33.3)	
	4-26 (moderate)	21 (72.4)	5 (55.6)	
	27+ (high)	6 (20.7)	1 (11.1)	

\*Z-test for proportions (Z=3.4105). CI: Confidence interval, WHO: World health organization, ASSIST: The alcohol, smoking and substance involvement screening test



**Flow Chart 1: Study flow diagram**

Similarly, Perry *et al.* reported that the overall tobacco use among school-going adolescents decreased by 17% after the intervention; however, in the control group, it increased by 68%.<sup>[19]</sup>

The results of the study show that the hazardous use of tobacco among the school students had significantly reduced after the intervention. This was a pilot study to pretest the envisaged health promotion intervention, which was shown to be feasible and effective. In future, this participatory health promotion intervention can be expanded to the other secondary high schools of the Wardha district. The lessons learned from the pilot testing were that taking the written informed consent from the principal of the school after explaining the proposed interventions clearly is pivotal. This helps to get the school authorities on board and get the desired assistance for the implementation of such PHPI. Furthermore, students appreciate participatory methods more as compared to plain health education or health talk. Another important learning was that communicating individual risks makes a difference as “*the feeling that I am vulnerable*” facilitates behavior change rather than the generalized message that tobacco harms. The lessons learned from this pilot are similar to the lessons learned discussed by Goenka *et al.*, who also highlighted that peer-led approach together with increased peer-student

discussion and participation provide better outcome than teacher-led instructions alone.<sup>[20]</sup>

Based on the findings of the present study, it may be proposed that similar participatory health promotion interventional strategies be employed in every school to ensure a rather healthy addictionfree adolescence and adulthood. Furthermore, a similar model of health promotion can be suitably used for reducing mortality and morbidity dues to other common behavioral risk factors.

The strengths of the study were that the health promotion strategies to be used were well-defined before the beginning of the study. The study helped to assess the change in the practice of tobacco use rather than focusing only on the improvement in knowledge as merely having knowledge need not necessarily get translated into the desired prohealth behavior. Standard tools were used to attain the objectives of the study, and the data were collected after proper training because of which it was robust.

### Limitations

Some of the limitations of the study were that the data obtained from the students were self-reported by them. Therefore, underreporting bias cannot be entirely ruled out despite our best efforts.

The study did not ascertain if all the 400 students were different people, and there is a possibility that some students may have participated in the study twice (i.e., the students completed both pre- and post-measures) which may have led to bias. Due to lack of comparison group, it may not be possible to completely attribute the reduction in tobacco use to the intervention only. The study has limited external generalizability as the study was conducted with students from a single school.

### Conclusion

From the study, it can be concluded that tobacco use is an important health problem among adolescents. In this study, the prevalence of ever tobacco use in the adolescent age group was 20.5%. We found that a planned health promotion initiative implemented in a school helped to reduce the proportion of current tobacco users from 29 (14.5%) in baseline to 9 (4.5%) in the postmeasurement. It was also seen that the number of tobacco users who were at a high risk of adverse effects because of tobacco use on the basis of score of 27 or more by the WHO ASSIST tool had reduced from 6 (20.7%) in baseline to 1 (11.1%) in the postmeasurement.

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### Conflicts of interest

There are no conflicts of interest.

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