Original Article

An Informal School–based, Peer-led Intervention for Prevention of Tobacco Consumption in Adolescence: A Cluster Randomized Trial in Rural Gandhinagar

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Abstract

Background: Tobacco use among adolescence is one of the important preventable causes of death as well as a leading public health problem all over the world. The present study was conducted with the objective of studying the effect of peer-led interventions on tobacco use among adolescents. **Materials and Methods:** Twenty schools were randomly selected and ten schools each were identified as cluster for intervention and control groups. A total of 402 students in intervention group and 422 in control group were studied. **Results:** About 48% and 41% of adolescents were consuming smokeless tobacco in any form in the intervention and control groups, respectively. Prevalence of consumption of smokeless tobacco was significantly high among boys as compared to girls. Pan masala was the most common form of consumption. After conducting A Stop Smoking in School Trial-like peer-led intervention, a significant reduction in tobacco consumption of any form was observed in the intervention group (48%–36%) during the follow-up ($Z = 3.2$, $P < 0.01$). A significant reduction in exposure to passive smoking in the intervention group (32%–29%) was also observed. All the students smoking initially had stopped smoking at the end of the follow-up in both the groups. **Conclusion:** It was found that peer-led intervention was effective in reducing the consumption of smokeless tobacco in any form. The rate of reduction was more in the first follow-up as compared to the end of the intervention. Sustained intervention in the form of retraining is needed for the long-term effect.

Keywords: Adolescents, smokeless, smoking, tobacco

Introduction

India, with more than 256 million adolescents, has the highest number of adolescents in the world.[1] Majority of these adolescents in India live in low-resource settings and consume various varieties of tobacco products which make them a highly vulnerable group. Although tobacco use takes time to translate into tobacco-related morbidity and mortality in middle to old ages, evidences have shown that nicotine addiction is established rapidly in adolescence.[2]

India is the second highest consumer of tobacco in the world after China.[3] Global Youth Tobacco Survey (GYTS) conducted all over India and in Gujarat estimated that 14.6% and 19% of students, respectively, currently use any form of tobacco products.[2]

Various strategies have been designed to alleviate tobacco use in India but are challenged by the fact that tobacco is consumed in multiple forms such as smoked and smokeless forms. Most commonly used is pan masala in rural areas of Gujarat which is a low-cost, easily available form of smokeless product containing minimal amount of nicotine but making children addictive and is associated with various health consequences, for example, higher rate of oral cancer in adult age.[4,5,6]

At the same time, they also pose a serious threat to the health and economy of the country if they become addicted to such addictions. The economic cost of treating four major tobacco-related diseases is very high which includes direct as

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well as social costs associated with the disease.[7] It is far easier and economical to wean away the adolescents from the clutches of such addictions by taking suitable preventive measures than to cure such people who are addicted.

Adolescents who are addicted to pan masala are more likely to get addicted to tobacco products in the near future. Keeping this in view, addiction to pan masala was included in the study.

As childhood and adolescence are the periods when experimentation with tobacco products is mostly reported, various interventions in schools, targeting both user and nonuser adolescents, can be a very cost-effective method to prevent the economic burden on the individual as well as the community.

Tobacco use among adolescents is influenced by multiple etiological factors, including individual, sociocultural, and environmental factors.[8] Among the given factors, schools are considered a very valuable setting as there is consistent access to a large number of students for a longer period of time; innovative programs for prevention of tobacco consumption can be initiated by the help of teachers and peer leaders. Evidences from previous studies have indicated that a young person's tobacco uptake behavior is strongly associated with his/her friend's behavior. Peer pressure is often used to explain this finding, however peer influences can also be protective and may influence the adolescents to reduce the prevalence of tobacco uptake through peer education.[9]

With the use of the innovative A Stop Smoking in School Trial (ASSIST)-like peer-led intervention method, students from class 6th–9th standard were targeted and aimed to sustain new norms of preventing tobacco consumption through social networking in schools.

Materials and Methods

In February 2013, 20 schools were selected from a total of 157 government schools of rural Gandhinagar through cluster randomized controlled trial. Very few randomized controlled studies have been conducted in India to study the impact of school-based, peer-led intervention program. In the present study, the sample size was calculated by Cochran's formula.

Assuming the maximum variability, which is equal to 50% (P = 0.5) and taking 95% confidence level with ±5% precision, the calculation for required sample size will be as follows – $P = 0.5$ and hence $q = 1 - 0.5 = 0.5$; $e = 0.05$; $Z = 1.96$.

$$\text{So, No} = \frac{(1.96)^2 \times (0.5)(0.5)}{(0.05)^2} = 384$$

The estimated sample size was 384 with the assumption that the intervention will have 50% effect on the schoolchildren. Considering a few dropouts, the sample size included in the study was 400.

The present study was undertaken on the basis of the ASSIST intervention[10,11] conducted in 29 schools of England and Wales which consisted of training influential students to act as peer supporters during informal interaction outside the classroom to encourage their peers not to consume tobacco in any form with a modification (a stop smokeless and smoking tobacco in school trial) by selecting peer leaders from each class. The modification was done as majority of the students consume smokeless tobacco in India.

In all the twenty schools, each school taken as an individual cluster, randomization was done to select ten intervention and ten control schools. The average number of students selected per school was 40 and 42 from both the intervention and control schools. At every data collection stage, adolescents from each selected school in the relevant age group of participated schools were randomly selected by lottery method.

Baseline data were collected on February 7, 2013, from all the selected schools. From ten intervention schools, two peer supporters were selected from each class and given 1-day training regarding the health hazards of smoking and smokeless tobacco consumption with the view to help other students quit tobacco. The training was given with the help of charts, role-plays, videos, discussions, and participatory lectures. After a month, retraining was done on March 5, 2013, for all the peer leaders of the ten intervention schools using the same method. They were given a diary to maintain day-to-day activities. Subsequently, the data were collected after 6 months and 1 year in August 2013 and February 2014 with a questionnaire that was completed in the classroom from the entire twenty schools.

All participating students were interviewed with a standard set of questions regarding their tobacco consumption behavior.

Results

Out of the total 157 government schools in Gandhinagar (rural), ten schools each in control and intervention groups were selected randomly. A total of 402 students participated from intervention schools and 422 from the control schools After 6 months of the research, students lost to follow-up were 31 (7.3%) in control group and 52 (13%) in intervention group, and after 1 year, it increased up to 53 (20%) in control group and 57 (27.1%) in intervention group.

In the present study, the baseline data comprised 61% boys and 39% girls in the intervention group and 57% boys and 43% girls in the control group. On asking the current history of use of tobacco, 48.8% of the adolescents in intervention and 41% of the students in control groups admitted that they consume smokeless tobacco in some form and was more common among boys than girls in both the groups which was found to be statistically significant in intervention (Z = 6.2, $P < 0.01$) and control groups (Z = 5.1, $P < 0.01$). It was also observed in the baseline data that 46% and 40% of the students consume pan masala in both the intervention and control groups, respectively. Very few students consume gutkha in both the groups. Very few students gave the history of currently

smoking tobacco in both the groups (1%–2%). All the smokers were boys. The frequency of consuming tobacco on daily basis was found to be 49%. The minimum age of initiation of tobacco consumption was found to be 11 years [Table 1].

Majority (71%–80%) of the students admitted that tobacco is consumed by their parents in smoking and smokeless form in both the groups; however, 20%–30% reported that they were exposed to passive smoking in their families [Table 1].

Tobacco (any form) consumption reduced from 48.8% to 38.9% and 36.9% after 6 months and 1 year of the intervention, respectively, and the reduction was found to be statistically significant. A significant reduction was also observed in the first 6 months of follow-up in control group; however at the end of 1 year, the rate of reduction was not significant [Table 2]. The consumption of pan masala reduced significantly from 46.3% to 35.8% after 1 year in the intervention group. Similarly, in the control group, pan masala consumption reduced from 40%, and after 1 year, it reduced to 33.7%. However, this difference was found to be statistically insignificant [Table 2]. Similar observation was made in gutkha consumption also.

As the odds ratio signifies that even though the number of students who were exposed to passive smoking has reduced, the effect is more pronounced after 6 months of intervention. Smoking was very less prevalent and so the effect of intervention could not be seen clearly. At 6-month follow-up, the ratio of being a current tobacco chewer (any form) in intervention group compared to control group was 1.4 (95% confidence interval [CI]: 1–1.8). At 1-year follow-up, the corresponding odds ratio of 1.1 (95% CI: 0.8–1.6) was not significant (P = 0.46), but it suggests attenuated effect of intervention at 6 months which is reduced after 1 year. For the students who consumed pan masala, the odds ratio after 6-month follow-up was 1.4 (95% CI: 1.1–1.9) and the difference was significant, and 1-year follow-up of 1.1 (95% CI: 0.8–1.5) suggests that intervention had beneficial effect after 1-year follow-up.

In the intervention schools, a significant reduction was observed in both the sexes after 1 year of follow-up. Overall, the usage of smokeless tobacco products, such as pan masala and gutkha, reduced after 6 months and 1 year of intervention, respectively. The rate of reduction of tobacco consumption was more in the first follow-up as compared to the end of the intervention.

Table 1: Baseline characteristics of schools and students according to the study

	Intervention, *n* (%)	Control, *n* (%)
Total (*n*=824)	402 (48.8)	422 (51.2)
Boys	247/402 (61)	239/422 (57)
Girls	155/402 (39)	183/422 (43)
Tobacco consumption in any form among students		
Smokeless		
Baseline (any form)	196/402 (48.8)	171/422 (40.5)
Z (*P*)	2.4 (<0.05)	
Pan masala	186/402 (46.3)	169/422 (40.1)
Z (*P*)	1.8 (>0.05)	
Gutkha	19/402 (4.7)	07/422 (1.7)
Z (*P*)	2.5 (<0.05)	
Boys	168/247 (68)	138/239 (57.7)
Girls	28/155 (18.1)	33/183 (18)
Z (*P*)	6.2 (<0.05)	5.1 (<0.05)
Smoking		
Current history of smoking	1/402 (0.2)	6/422 (1.4)
Family history of use of any form of tobacco	317/402 (78.9)	300/422 (71.1)
History of exposure to passive smoking	130 (32.3)	82 (19.4)

Discussion

In both developed and developing countries, public health policy should be focused on tobacco cessation to bring down the huge burden of disease. The present study indicates a high usage of smokeless tobacco products (mostly pan masala) as compared to the GYTS conducted in India[2] and other studies conducted in Nepal[12] among the school adolescents in both intervention and control groups. The difference could be probably due to the fact that, in the present study, students who consume pan masala have been included as tobacco chewers because of pan masala containing a very small amount of nicotine.[5,6]

Boys reported the use of both smokeless and smoking (very few) forms of tobacco products, similar to the study conducted in Delhi.[13] The age of initiation of tobacco products in the present study is 11 years which is similar to a study done by Patel.[14]

The present study also highlights a very important fact that >80% of students who consume smokeless tobacco gave a history of consumption of tobacco (smoking and smokeless forms) in their family in both the groups which is consistent with another study conducted in Delhi and Chennai which clearly indicates that unchecked use of tobacco by the family members provides students an enabling and vulnerable environment leading to increase in the uptake of tobacco.[15]

Few randomized controlled studies under the project MYTRI (Mobilizing Youth for Tobacco-Related Initiatives) in India and few successful peer-led, multicomponent tobacco intervention programs in developed countries have evaluated the long-term impact of school-based tobacco uptake prevention programs in reducing tobacco use in school students.[16-19]

Comparison of current tobacco consumption among intervention and control groups clearly depicts the benefits of (ASSIST) intervention in enhancing tobacco cessation, however adolescents from both the groups attempted cessation and few of them were successful in achieving it. The effect of intervention was more pronounced after 6 months of intervention as compared to 1 year. No intervention was administered in the control group, but wider influence of mass media and effect of our visit for data collection cannot be ruled out. Similar effect was seen in a study conducted by Goenka *et al*. in Delhi.[15]

Table 2: Effect of A Stop Smoking in School Trial intervention on consumption of smokeless tobacco (any form) and pan masala

	Intervention group, *n* (%)	Control group, *n* (%)
Consumption of smokeless tobacco (any form) currently among students		
Baseline		
Yes	196 (48.8)	171 (40.5)
Total	402 (100)	422 (100)
First follow-up		
Yes	136 (38.9)	125 (32)
Total	350 (100)	391 (100)
Z (*P*)	2.8 (<0.05)	2.6 (<0.05)
Second follow-up		
Yes	108 (36.9)	114 (33.7)
Total	293 (100)	338 (100)
Z (*P*)	3.2 (<0.05)	1.9 (>0.05)
Consumption of pan masala currently among students		
Baseline		
Yes	186 (46.3)	169 (40)
Total	402 (100)	422 (100)
First follow-up		
Yes	137 (39.1)	122 (31.2)
Total	350 (100)	391 (100)
Z (*P*)	2.0 (<0.05)	2.7 (<0.05)
Second follow-up		
Yes	105 (35.8)	114 (33.7)
Total	293 (100)	338 (100)
Z (*P*)	2.8 (<0.05)	1.8 (>0.05)

Conclusion

It was found that peer led intervention was effective in reducing the consumption of smokeless tobacco in any form .Hence, it also points toward the need of setting up of school-based cessation services at community level in India which can be a promising approach for the prevention and cessation of tobacco use. For such multi component interventions to be effective and to promote cessation the period of intervention has to be for a longer duration than 1 year and it can be strengthened by retraining the peer leaders 6 monthly for making the ASSIST-like intervention effective. The limitation of the study included a small sample size and loss to follow-up.

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Conflicts of interest

There are no conflicts of interest.

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