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Original Research Article

Awareness, attitudes and practices regarding tobacco and the effectiveness of a school-based educational intervention among rural school children in Maharashtra, India

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ABSTRACT

Background: Tobacco use remains a leading cause of preventable morbidity and mortality worldwide, with adolescents being particularly vulnerable to initiation. In India, rural areas report higher tobacco use prevalence, necessitating targeted interventions. This study evaluates the effectiveness of a school-based educational intervention in improving awareness of tobacco-related health effects among 12 to 16 years old schoolchildren in a rural setting.
Methods: A pre-post educational interventional study was carried out among 236 schoolchildren in a rural area of Maharashtra. Baseline awareness attitudes and practices were assessed using a pre-validated questionnaire, followed by a structured educational intervention incorporating interactive audio-visual aids. Post-intervention assessments were conducted immediately and after three months. Knowledge and attitude changes were analysed using the Wilcoxon signed-rank test.
Results: Baseline knowledge about tobacco was high (94.5%), but misconceptions persisted regarding its health effects and legal regulations. Post-intervention, the proportion of schoolchildren with excellent knowledge (>70% score) increased from 40.7% to 48.7% in the immediate post-test but slightly declined to 45.5% at three months. Similarly, schoolchildren with an excellent attitude towards tobacco prevention improved from 66.9% at baseline to 71.4% at three months. The intervention significantly improved awareness and attitudes ($p<0.05$), but retention declined over time, highlighting the need for reinforcement.
Conclusions: The educational intervention significantly enhanced schoolchildren' knowledge and attitudes toward tobacco use and its health effects. However, knowledge retention declined after three months, underscoring the importance of periodic reinforcement. Integrating structured tobacco education into school curricula and involving parents in awareness programs could enhance the long-term impact.

Keywords: Health education, Interventional study, Substance use, Tobacco

INTRODUCTION

Tobacco is a leading cause of death and disease in India, responsible for about 1.35 million deaths annually.[1] India is the second-largest producer and consumer of tobacco, with 267 million adults (29%) using tobacco, as per GATS 2016-17.[2] The Global Youth Tobacco Survey (GYTS-4) reported that 18.1% of Indian youth aged 13-15 had tried tobacco and 8.5% used it in the past month.[3] Tobacco usage is more common in rural areas, with one-third of rural residents using it compared to one-fifth in urban areas.[2,4] Smokeless tobacco is more prevalent (63%) than smoking forms (24%), with over 40 types used, including paan, khaini, gutka and mishri.[5,6]

Common smoking forms include bidi, cigarette and hookah.[1] Adolescents are particularly at risk, with studies showing a wide range of tobacco use among schoolchildren (10%-41.1%).[7,8] In the state of Maharashtra, 16.7% of youth had tried tobacco and 5.1% reported recent use, with higher rates in rural areas (17.4%) than urban (15.3%).[3] The average age of initiation among youth is 15.5 years, ranging from 11.3 to 19.7 years.[9]

India enacted COTPA in 2003 to curb tobacco use by banning smoking in public places, restricting advertising and mandating pictorial and written health warnings. The government also launched the "School Health Program" to include substance use prevention in school curricula.[10] Despite these measures, tobacco use remains high and initiation age is decreasing.[2,3] School-based educational interventions are promising due to their feasibility, yet there is limited evidence on their effectiveness, especially in rural settings. This study aims to evaluate the impact of school health education on awareness about the health effects of tobacco.

METHODS

We conducted a pre-post interventional study, beginning with a baseline assessment of students' awareness, attitudes and practices, followed by a structured education session. The post-intervention assessments were conducted immediately after the intervention and again at three months. The study was carried out in a rural village in Titwala, located in the Thane district of Maharashtra, India, from September 2022 to December 2023. The study population comprised schoolchildren, both boys and girls, aged 12 to 16 years, studying in grades 7th to 9th.

Maharashtra is one of the top five tobacco-producing states in India, with 16.7% of its agricultural land (1,950 hectares) dedicated to tobacco cultivation.5 One-third of all adults and 13% of adolescents in the state are reported to be using tobacco (MoHFW, 2009 and 2010). Titwala, located in the Thane district within the Konkan region of Maharashtra, was conveniently selected as the study site. The area comprises 12 schools offering classes up to the ninth grade. The schools which had previously conducted awareness sessions on tobacco were excluded.

A sample size of 236 schoolchildren was calculated based on pretest knowledge obtained from a pilot study conducted in the same region. A 10% attrition rate was accounted for. A cluster sampling technique was employed to select participants from three schools. All schoolchildren aged 12 to 16 within the selected clusters were included in the study.

Baseline knowledge was assessed using a pre-validated questionnaire given and explained to the participants in the local language. Confidentiality was maintained. The pre-test was followed by one-hour structured interactive session comprising a 30-minute lecture on the hazards of tobacco, a 15-minute video-based module and distribution of printed informational material, along with a short discussion to address students' doubts and queries. The intervention was designed using guides for school health programs released by the government of India. The IEC materials used were taken from the NTCP (National Tobacco Control Programme) website. The post-test assessment was done immediately after the session and after three months, using the same questionnaire

Statistical analysis

The baseline characteristics of participants and their awareness and attitudes regarding tobacco and its health effects were described using frequencies and percentages. The proportion of children with good to excellent knowledge before and after the intervention was analysed using the Wilcoxon signed-rank test to determine whether the intervention produced a significant change. Children scoring more than 70% were considered to have excellent knowledge, those scoring 50-70% were categorized as having good knowledge and those scoring less than 50% were classified as having poor knowledge.

Ethical consideration

Ethical approval was taken from the Institutional Ethics Committee (IEC no. EC/164/2022). Informed written consent was taken from the parents and assent from the participants after explaining to them the details of the study. Confidentiality and privacy were maintained. Patients were not involved in the design and conduct of this research.

RESULTS

The pre-test study and intervention were conducted on 236 participants; 220 participants were followed up after three months, with 16 schoolchildren lost to follow-up. The sociodemographic features of the participants are explained in table 1. The gender distribution of enrolled participants was comparable (Table 1). The maximum participants (85, 36%) were from 7th grade. Most schoolchildren (111, 47%) belonged to a three-generational family. 43.6% (103) of schoolchildren have at least one tobacco user in their family. Among these, 71.8% (74) of schoolchildren' parents used tobacco. 12.7% (30) of schoolchildren gave a history of ever using tobacco, although none reported using it in the past 30 days.

40.7% (90) of schoolchildren were found to have excellent (scoring more than 70%) baseline knowledge, while 23.3% (55) of schoolchildren were found to have poor knowledge (scoring less than 50%). The majority (94.5%) had heard about tobacco, with all participants (100%) being familiar with "cigarette" and "bidi." "Zarda" was the least recognized form of tobacco (5.5%). A significant proportion (91.9%) had seen someone using

tobacco and 43.6% reported having family members who use tobacco, predominantly parents (71.8%). A strong awareness of tobacco's health risks was observed, with 80.1% acknowledging its deadly effects. Regarding the harmfulness of tobacco forms, 13.6% perceived smoking as more harmful, 21.2% believed smokeless tobacco was worse and 45.3% considered both equally harmful. Health education exposure was limited, with 66% reporting they had not attended a session on tobacco. Social media and movies were the most common sources of information (69.4%), followed by friends (47.5%).

Questions assessing attitudes in children about tobacco use revealed that 74.6% had never wanted to use tobacco, while 10.2% expressed a desire to try it upon seeing friends using it. Additionally, 6.8% felt inclined when family members were seen using tobacco and 8.5% were influenced by portrayals in movies or social media.

Regarding their response to being offered tobacco products, 69.1% stated they would refuse, while 13.1% would accept. In terms of public smoking prohibition, 73.3% supported the ban. 60.6% agreed that they dislike it when the family members smoke and 34.7% feel helpless about this situation.

The changes in knowledge and attitude scores from the pre-test to the two post-tests are presented in table 2. In the knowledge assessment, the proportion of schoolchildren scoring excellent (>70%) increased from the pre-test to post-test 1, followed by a slight decline in post-test 2. Conversely, those scoring poorly (<50%) decreased from the pre-test to post-test 1 and showed a minor rise in post-test 2.

A similar trend was observed in the attitude scores. However, analysis of the median difference between baseline scores compared with both the post-tests (1 and 2), knowledge and attitude showed significant differences ($p<0.05$). The intervention was observed to significantly improve the knowledge and attitudes of students. However, it was observed that the number of children scoring excellent scores had reduced from post-test 1 to post-test 2, highlighting the need for reinforcement.

Table 1: Characteristics of study participants whose baseline knowledge was assessed (n=236).

Variable	Categories	Frequency N (%)
Grade level of students	7th	85 (36)
	8th	81 (34.4)
	9th	70 (29.7)
Sex of student	Male	119 (50.4)
	Female	117 (49.6)
Fathers' education	Primary school	37 (15.68)
	Middle school	14 (5.93)
	Highschool	98 (41.53)
	Graduate and equivalent	87 (36.86)
Fathers' occupation	Unskilled	82 (34.7)
	Semiskilled	47 (19.9)
	Skilled	1 (0.4)
	Semi-professional	61 (25.8)
	Professional	45 (19.1)
Mothers' education	Illiterate	5 (2.1)
	Primary	31 (13.2)
	Middle	9 (3.8)
	High school	109 (46.6)
	Graduate and equivalent	80 (34.1)
Mothers' occupation	Unemployed	114 (48.7)
	Unskilled	56 (23.9)
	Semiskilled	5 (2.1)
	Semi-professional	34 (14.5)
	Professional	25 (10.6)
Type of family	Nuclear	71 (30.1)
	Three generational	111 (47.0)
	Extended	1 (4)
	Joint	53 (22.5)

Table 2: Proportion of students with excellent, good and poor knowledge and attitude towards tobacco use in pre-test (n=236), post-test 1 (n=236) and at post-test 2 (n=220).

Variable	Score	Pre-test (%)	Post-test 1 (%)	Post test 2 (%)	P value*
Knowledge	Excellent (> 70%)	96 (40.7)	115 (48.7)	100 (45.5)	<0.05
	Good (50-70%)	85 (36.0)	82 (34.7)	71. (32.3)	
	Poor (<50%)	55 (23.3)	39 (16.5)	49 (22.3)	
Attitude	Excellent (> 70%)	158 (66.9)	166 (70.3)	157 (71.4)	<0.05
	Good (50-70%)	45 (19.1)	44 (18.6)	36 (16.4)	
	Poor (<50%)	33 (14.0)	26 (11.0)	27 (12.3)	

*The p value was determined using the Wilcoxon signed-rank test comparing pre-test and post-test 2.

DISCUSSION

A large majority of participants (94.5%) were aware of tobacco, with all having heard of cigarettes and bidi. Masheri (75%) and gutka (51.2%) were also widely known, reflecting their prevalence in rural Maharashtra (2,19). Zarda was the least known (5.5%). Raju et al, similarly found high awareness of bidi (97.2%) and gutka (78.4%), with regional variations influencing awareness of products like pan masala (81.6%) and chutta (90.8%).[11] Most participants (91.9%) had witnessed tobacco use, indicating high environmental exposure. About 43.6% of participants reported having family members who used tobacco, indicating a considerable presence of tobacco use within families. Among these, most participants reported that their parents (56.4%) used tobacco, highlighting the influence of parental tobacco use on children. In a study by Gupta et al, in Uttarakhand, a 71% prevalence of tobacco use by schoolchildren's immediate family members was reported.[12] This could be because the overall prevalence of tobacco in Uttarakhand (where this study was carried out) is known to be much higher (35.0%) than that of Maharashtra (5.3%).[2] While 12.7% of participants had tried tobacco, none reported regular use, indicating experimental behavior rather than habitual use.

A significant majority (80.1%) believed that tobacco has detrimental health effects, including carcinogenesis, showing strong awareness of its risks. This is in agreement with studies conducted by Rangey et al (Gujarat) and Balwan et al (Kashmir) and several other studies conducted across the country.[13-16] Notably, 67.6% believed addiction is incurable, showing gaps in awareness of cessation options. In the study, about half the participants recognized passive smoking as harmful, which is significantly lower than studies like Balwan et al where 85.4% acknowledged its risks.[14] Nearly half (49.6%) also mistakenly believed it is legal to buy tobacco under 18. 66% reported that they have never attended a tobacco education session. Social media and films were the primary information sources for most schoolchildren (69.4%). Vinodkumar et al also found social media and parents (54.79%) as key information sources.[17] Attitudes were largely positive, with 66.9% showing excellent prevention attitudes. Most (74.6%) never wanted to try tobacco, 69.1% would refuse if offered and 73.3% supported public smoking bans. This aligns with studies by Rangey et al (Gujarat) and Raina et al (Bangalore), where 82.8% and 92.2% supported anti-tobacco measures, respectively.[13,16] The intervention significantly improved knowledge and attitudes in both immediate and three-month post-tests. Scores declined slightly over time but remained higher than baseline. This finding is supported by studies in Malaysia, Germany and Mangalore, all showing educational interventions improved attitudes and reduced initiation rates among adolescents.[18-20]

The lack of a control group and randomization limits the ability to attribute changes solely to the intervention, which constrains generalizability. However, the consistency of results with similar studies in other regions suggests potential applicability in similar rural school settings. Reliance on self-reported data may introduce social desirability bias. Additionally, the study only assessed short-term outcomes, without measuring long-term retention or behavior change.

Based on the findings of this study, authors recommend regular reinforcement through periodic sessions and integrating tobacco education into school curricula, in line with the Ayushman Bharat School Health Programme. Given the influence of family, parental involvement through workshops or informational outreach is important. Peer-led education may also be effective, as many schoolchildren gain tobacco-related information from friends. Finally, a long-term strategy covering primary to high school is needed for sustained awareness and prevention.

CONCLUSION

The school-based educational intervention significantly improved knowledge and attitudes regarding tobacco use among rural schoolchildren. However, a decline in retention after three months highlights the need for periodic reinforcement. Integrating structured tobacco education into school curricula with parental involvement may ensure sustained impact.

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