

An Experimental Study to Evaluate the Effectiveness of Peer-led Life-Skills Education in Preventing Initiation of Tobacco and Alcohol use Among Adolescents in Pre-university Colleges of Belagavi District, Karnataka

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Abstract:

Background

Adolescence is a critical period for the initiation of tobacco and alcohol use. Evidence shows that peer influence and poor life-skills are major determinants of early substance use. Strengthening life-skills through peer-led education can be an effective preventive approach among adolescents in pre-university settings.

Objectives

To evaluate the effectiveness of peer-led life-skills education in improving knowledge, attitude, and refusal skills, and in preventing the initiation of tobacco and alcohol use among adolescents of selected pre-university colleges in Belagavi District, Karnataka.

Methods

A quasi-experimental pre-test post-test control group design was adopted among 400 adolescents (200 intervention, 200 control) selected from pre-university colleges using stratified random sampling. The intervention consisted of eight peer-led sessions focusing on decision-making, communication, coping with peer pressure, and refusal skills, conducted over eight weeks. Data were collected using a validated self-administered questionnaire on knowledge, attitude, and practice regarding substance use, and the WHO Life-Skills Scale. Statistical analyses included paired and independent *t*-tests, Chi-square tests, and multiple regressions using SPSS version 25.

Results

Post-intervention, the intervention group showed a statistically significant improvement in mean knowledge scores ($p < 0.001$), positive attitude toward substance avoidance ($p < 0.01$), and enhanced life-skills ($p < 0.001$) compared to the control group. The proportion of students initiating tobacco or alcohol use at three-month follow-up was significantly lower in the intervention group (2.5%) than in controls (9.0%).

Conclusion

Peer-led life-skills education was effective in improving awareness, attitudes, and protective + behaviors against tobacco and alcohol initiation among adolescents. Integrating peer-based life-skills training into routine college health programs could serve as a sustainable preventive strategy to curb substance use initiation at an early age.

Keywords: Adolescents; Peer-led education; Life-skills; Tobacco; Alcohol; Prevention; Belagavi

1. Introduction

Adolescence is a transitional period characterized by rapid physical, psychological, and social development, during which individuals are highly susceptible to adopting risky behaviors, including tobacco and alcohol use. Globally, the initiation of substance use during adolescence is a major public health concern, as early onset is associated with increased risk of long-term dependence, mental health disorders, and adverse social outcomes. [1] The World Health Organization (WHO) estimates that more than 25% of adolescent's worldwide experiment with tobacco before the age of 18, while alcohol remains the most commonly used substance in this age group. In India, epidemiological studies indicate that the prevalence of tobacco and alcohol use among adolescents is rising, particularly in urban and semi-urban settings. [2] Reports from Karnataka suggest that nearly 10–12% of pre-university students have experimented with tobacco or alcohol, highlighting the urgent need for preventive interventions in this vulnerable population. Peer influence, inadequate knowledge about the harmful effects of substances, and limited life-skills such as decision-making, assertiveness, and refusal abilities are recognized as significant determinants of early substance use among adolescents. [3,4]

Life-skills education, as defined by WHO, encompasses a set of psychosocial abilities that enable individuals to make informed decisions, communicate effectively, manage stress, and resist peer pressure. Evidence indicates that life-skills interventions, particularly when delivered through peer-led approaches, can enhance knowledge, attitudes, and protective behaviors among adolescents, thereby delaying or preventing initiation of substance use. [5] Peer-led programs are especially effective because adolescents often respond more positively to information and modelling from their peers, creating a supportive environment for behavior change. Despite the documented effectiveness of peer-led life-skills programs in other regions, there is a scarcity of research evaluating such interventions among pre-university students in Belagavi District, Karnataka. Considering the rising prevalence of adolescent substance use in this region and the critical window of intervention during late adolescence, it is essential to implement and evaluate structured peer-led life-skills programs. [6,7]

2. Methodology

Study Design

A quasi-experimental pre-test post-test control group design was adopted to evaluate the effectiveness of peer-led life-skills education in preventing the initiation of tobacco and alcohol use among adolescents. This design allows for comparison of outcomes between intervention and control groups while accounting for baseline characteristics.

Study Setting

The study was conducted in selected pre-university colleges in Belagavi District, Karnataka. Colleges were stratified by urban and rural location to ensure representation of different socio-demographic contexts.

Study Population

Adolescents enrolled in the first year of pre-university courses (approximately 16–18 years old) were eligible for participation. Inclusion criteria were:

Enrolled in the selected colleges and attending classes regularly. Willingness to participate with informed assent (and parental consent for minors). [8]

Exclusion criteria included:

Students with known psychiatric disorders or cognitive impairments that could interfere with participation. Students already participating in similar health promotion programs.

Sample Size and Sampling Technique

A total of 400 adolescents were included, with 200 in the intervention group and 200 in the control group. Stratified random sampling was used to select colleges and students, ensuring proportional representation from urban and rural areas. [9]

Sample size calculation

Based on an estimated baseline initiation rate of 12% and a desired absolute reduction of 6% in the intervention group, with 80% power and $\alpha = 0.05$, the minimum required sample per group was 178. Accounting for potential 10% attrition, 200 participants per group were recruited. [10]

Intervention

The intervention consisted of **eight peer-led life-skills education sessions** conducted over eight weeks (one session per week, 45–60 minutes each). Key components included:

Decision-making skills: Identifying options and evaluating consequences.

Communication and assertiveness skills: Expressing opinions confidently.

Refusal and coping skills: Strategies to resist peer pressure. [11-13]

Problem-solving and stress management: Techniques to handle challenging situations.

Peer leaders were selected from each college (1 peer leader per 15–20 students) and trained for two days by the research team on content delivery, facilitation techniques, and ethical considerations.

Sessions were interactive, including role-plays, group discussions, and scenario-based activities. [14]

Control Group

The control group received the **usual health education** provided in colleges (single health talk on general health topics, no structured life-skills component).

Data Collection Tools

Knowledge and Attitude Questionnaire: **Structured, validated items adapted from WHO Global School-based Student Health Survey (GSHS).**

WHO Life-Skills Scale: Standardized tool assessing decision-making, problem-solving, communication, and refusal skills.

Substance Use Checklist: Self-reported past 30-day tobacco and alcohol use. [15]

Socio-demographic Questionnaire: Age, gender, residence, family background. All tools were pre-tested on a sample of 20 students (not included in the study) to ensure clarity and reliability. Cronbach's alpha for the scales ranged from 0.78 to 0.85.

Data Collection Procedure

Baseline (pre-test): Data on knowledge, attitude, life-skills, and substance use collected from both groups using self-administered questionnaires.

Intervention: Peer-led life-skills sessions conducted in the intervention colleges over eight weeks.

Post-test: Same questionnaires administered one month after the last session.

Follow-up: Substance use initiation assessed at three months post-intervention

Ethical Considerations

Ethical approval obtained from the Institutional Ethics Committee of Government Institute of Medical Sciences and research institute Belagavi, Karnataka. Written informed consent from parents (for minors) and assent from students. Confidentiality and anonymity ensured; participants could withdraw at any time. Referral pathways established for students reporting substance use or needing counselling. [16]

Data Analysis

Data were entered and analyzed using **SPSS version 25.**

Descriptive statistics: mean, standard deviation, frequencies, and percentages.

Inferential statistics: Paired *t*-tests to assess within-group changes. Independent *t*-tests to compare post-test scores between intervention and control groups. Chi-square tests to assess differences in substance use initiation. Multiple regression analysis to control for confounders such as age, gender, and residence. Statistical significance set at **$p < 0.05$**

3. Results

Table 1: Socio-Demographic Characteristics (N = 400).

Variable	Intervention Group (n=200)	Control Group (n=200)	p-value
Age (mean \pm SD)	16.8 \pm 0.6	16.9 \pm 0.5	0.25
Gender (Male/Female)	102/98	105/95	0.72
Urban/Rural	110/90	112/88	0.85
Nuclear/Joint family	140/60	138/62	0.88

Interpretation: Baseline characteristics were comparable between the two groups.

As shown in table 1 The mean age of participants in the Intervention Group is 16.8 years (with a standard deviation of 0.6), while in the Control Group, it's 16.9 years (with a standard deviation of 0.5). The p-value of 0.25 indicates that the difference in age between the two groups is not statistically significant. The distribution of males and females is similar between the two groups, with approximately 51% males and 49% females in each group. The p-value of 0.72 suggests that the difference in gender distribution between the groups is not statistically significant. The proportion of participants from urban and rural areas is similar between the two groups, with around 55% from urban areas and 45% from rural areas. The p-value of 0.85 indicates that the difference in urban/rural distribution between the groups is not statistically significant. The majority of participants in both groups belong to nuclear families (around 70%), while the rest are from joint families. The p-value of 0.88 suggests that the difference in family structure between the groups is not statistically significant.

Table 2: Knowledge Scores.

Time Point	Intervention (Mean \pm SD)	Control (Mean \pm SD)	p-value
Pre-test	6.8 \pm 2.1	6.7 \pm 2.0	0.78
Post-test	11.2 \pm 1.8	7.0 \pm 2.1	<0.001

Interpretation

The intervention group showed a significant improvement in knowledge about tobacco and alcohol after the peer-led life-skills program compared to controls. This table 2 presents a comparison of knowledge scores between an Intervention Group and a Control Group at two time points: pre-test (before the intervention) and post-test (after the intervention).

Pre-test

The mean knowledge score of the Intervention Group is 6.8 (with a standard deviation of 2.1), while the Control Group has a mean score of 6.7 (with a standard deviation of 2.0). The p-value of 0.78 indicates that there is no statistically significant difference in knowledge scores between the two groups at the pre-test stage. This suggests that both groups had similar knowledge levels before the

intervention.

Post-test

The mean knowledge score of the Intervention Group increased to 11.2 (with a standard deviation of 1.8); while the Control Group's mean score remained relatively stable at 7.0 (with a standard deviation of 2.1). The p-value of <0.001 indicates that there is a highly statistically significant difference in knowledge scores between the two groups at the post-test stage. This suggests that the intervention had a significant impact on the knowledge levels of the Intervention Group.

Table 3: Attitude Scores.

Time Point	Intervention (Mean \pm SD)	Control (Mean \pm SD)	p-value
Pre-test	28.5 \pm 4.2	28.2 \pm 4.0	0.60
Post-test	36.8 \pm 3.5	28.4 \pm 4.1	<0.001

Interpretation

Positive attitude toward avoiding substance use significantly increased in the intervention group. This table presents a comparison of attitude scores between an Intervention Group and a Control Group at two time points: pre-test (before the intervention) and post-test (after the intervention).

Pre-test

The mean attitude score of the Intervention Group is 28.5 (with a standard deviation of 4.2), while the Control Group has a mean score of 28.2 (with a standard deviation of 4.0). The p-value of 0.60 indicates that there is no statistically significant difference in attitude scores between the two groups at the pre-test stage. This suggests that both groups had similar attitudes before the intervention.

Post-test

The mean attitude score of the Intervention Group increased to 36.8 (with a standard deviation of 3.5), while the Control Group's mean score remained relatively stable at 28.4 (with a standard deviation of 4.1). The p-value of <0.001 indicates that there is a highly statistically significant difference in attitude scores between the two groups at the post-test stage. This suggests that the intervention had a significant impact on the attitude scores of the Intervention Group.

Table 4: Life-Skills Scores.

Time Point	Intervention (Mean \pm SD)	Control (Mean \pm SD)	p-value
Pre-test	55.3 \pm 6.8	54.9 \pm 6.5	0.62
Post-test	72.1 \pm 5.9	55.2 \pm 6.7	<0.001

Interpretation

Peer-led sessions significantly enhanced overall life-skills in the intervention group. This table presents a comparison of life-skills scores between an Intervention Group and a Control Group at two time points: pre-test (before the intervention) and post-test (after the intervention).

Pre-test

The mean life-skills score of the Intervention Group is 55.3 (with a standard deviation of 6.8), while the Control Group has a mean score of 54.9 (with a standard deviation of 6.5). The p-value of 0.62 indicates that there is no statistically significant difference in life-skills scores between the two groups at the pre-test stage. This suggests that both groups had similar life-skills levels before the intervention.

Post-test

The mean life-skills score of the Intervention Group increased to 72.1 (with a standard deviation of 5.9), while the Control Group's mean score remained relatively stable at 55.2 (with a standard deviation of 6.7). The p-value of <0.001 indicates that there is a highly statistically significant difference in life-skills scores between the two groups at the post-test stage. This suggests that the intervention had a significant impact on the life-skills scores of the Intervention Group.

Table 5: Substance Use Initiation (Past 3 Months).

Out come	Intervention Group (n=200)	Control Group (n=200)	Chi-square	p-value
Initiated tobacco	3 (1.5%)	12 (6.0%)	6.52	0.011
Initiated alcohol	2 (1.0%)	10 (5.0%)	6.01	0.014
Any substance use	5 (2.5%)	18 (9.0%)	8.11	0.004

Interpretation

Initiation of tobacco or alcohol was significantly lower in the intervention group, demonstrating the preventive effect of peer-led life-skills education. This table presents a comparison of substance use initiation between an Intervention Group and a Control Group over the past 3 months.

Substance Use Initiation

Tobacco: 3 participants (1.5%) in the Intervention Group initiated tobacco use, compared to 12 participants (6.0%) in the Control Group. The chi-square value is 6.52, with a p-value of 0.011, indicating a statistically significant difference between the groups.

Alcohol: 2 participants (1.0%) in the Intervention Group initiated alcohol use, compared to 10 participants (5.0%) in the Control Group. The chi-square value is 6.01, with a p-value of 0.014, indicating a statistically significant difference between the groups.

Any Substance Use: 5 participants (2.5%) in the Intervention Group initiated any substance use, compared to 18 participants (9.0%) in the Control Group. The chi-square value is 8.11, with a p-value of 0.004, indicating a statistically significant difference between the groups.

4. Discussion

The present study assessed the effectiveness of peer-led life-skills education in preventing initiation of tobacco and alcohol use among adolescents in selected pre-university colleges of Belagavi District, Karnataka. Findings revealed a significant improvement in knowledge, attitude, and life-skills scores among students in the intervention group compared to the control group. Moreover, the proportion of

students initiating tobacco or alcohol use at follow-up was substantially lower in the intervention group, demonstrating the preventive potential of peer-led education. These results are consistent with earlier studies by Kumar et al. (2020) and Nair et al. (2018), which reported that peer-based interventions effectively enhanced adolescents' awareness and coping abilities against peer pressure. The improvement in life-skills—particularly decision-making, communication, and refusal skills—suggests that adolescents were better equipped to make informed choices and resist experimentation with substances.

The peer-led approach proved advantageous because adolescents are more receptive to learning from their peers than from teachers or adults. This finding aligns with Bandura's Social Learning Theory, emphasizing the role of modeling and social reinforcement in behaviour change. The program was feasible, interactive, and cost-effective, indicating potential for integration into school-based health promotion initiatives such as the Rashtriya Kishor Swasthya Karyakram (RKSK).

Although the study achieved its objectives, certain limitations exist, including reliance on self-reported data and a relatively short follow-up period. Long-term studies are recommended to evaluate sustained behavioural outcomes. Overall, the study demonstrates that peer-led life-skills education is an effective and practical strategy to improve psychosocial competence and prevent early initiation of tobacco and alcohol use among adolescents.

5. Conclusion

The study concluded that peer-led life-skills education is an effective approach to prevent the initiation of tobacco and alcohol use among adolescents. The intervention significantly improved students' knowledge, attitudes, and essential life-skills such as decision-making, communication, and refusal abilities. By empowering adolescents through peer support and interactive learning, the program fostered positive behavioral change and reduced the risk of substance use initiation. Peer-led interventions are feasible, cost-effective, and sustainable within the educational system, making them suitable for large-scale implementation. Integrating such programs into existing adolescent health and school health initiatives can play a crucial role in promoting healthy lifestyles and preventing substance use among young people.

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