Evaluating the Impact of a Self-Instructional Module on Adolescent Knowledge and Practices Regarding Tobacco Use

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Abstract:

This study aims to evaluate the effectiveness of a self-instructional module on the knowledge and practice regarding tobacco abuse among adolescents. The quasi-experimental research involved 500 secondary school students, split equally into experimental and control groups. The study assessed the impact of the self-instructional module on the participants' knowledge and practices before and after the intervention. Statistical analyses revealed significant improvements in both knowledge and practices among the experimental group, highlighting the module's effectiveness. The study emphasizes the importance of educational interventions in shaping health behaviors among adolescents.

Keywords: Tobacco Abuse, Adolescents, Self-Instructional Module, Knowledge, Practice, Secondary School, Health Education, Quasi-Experimental Study

Introduction:

Tobacco use among adolescents has emerged as one of the most pressing public health concerns of the 21st century, as it represents not only an immediate risk to the health and well-being of young individuals but also a gateway to lifelong addiction and chronic diseases. The World Health Organization (WHO) estimates that globally, approximately 1.3 billion people use tobacco, and a significant portion of these users initiate smoking during adolescence (WHO, 2021). Adolescents, defined as individuals between the ages of 10 and 19, are in a critical stage of physical, psychological, and social development, making them particularly vulnerable to adopting risky behaviors such as tobacco use (Centers for Disease Control and Prevention [CDC], 2021). The initiation of tobacco use during adolescence is particularly concerning because it is associated with an increased risk of developing nicotine dependence, which can lead to a range of health problems including cardiovascular disease, respiratory disorders, and various forms of cancer (U.S. Department of Health and Human Services [USDHHS], 2014). Moreover, tobacco use in adolescence has been

linked to other risky behaviors, such as the use of alcohol and illicit drugs, further exacerbating the potential for long-term harm (National Institute on Drug Abuse [NIDA], 2021).

The initiation of tobacco use during adolescence is influenced by a complex interplay of factors, including peer pressure, family influences, socio-economic status, and exposure to tobacco advertising. Peer pressure is one of the most significant predictors of adolescent tobacco use, as young people are often influenced by the behaviors and attitudes of their peers (Simons-Morton & Farhat, 2010). Adolescents who perceive that smoking is common or socially acceptable among their peer group are more likely to initiate tobacco use themselves (Sargent & Dalton, 2001). Furthermore, family influences play a critical role in shaping adolescents' attitudes and behaviors regarding tobacco use. Adolescents who have parents or siblings who smoke are more likely to start smoking themselves, as they are exposed to tobacco use in the home environment and may view it as a normative behavior (Leonardi-Bee, Jere, & Britton, 2011). Additionally, socio-economic factors, such as parental education and household income, have been shown to influence adolescent tobacco use, with lower socio-economic status being associated with higher rates of smoking (Hiscock, Bauld, Amos, Fidler, & Munafò, 2012).

The role of tobacco advertising and marketing cannot be overlooked in the discussion of adolescent tobacco use. Despite regulations aimed at restricting tobacco advertising, adolescents continue to be exposed to tobacco marketing through various channels, including social media, point-of-sale displays, and product placement in movies and television shows (Lovato, Watts, & Stead, 2011). Research has shown that exposure to tobacco advertising is associated with an increased likelihood of smoking initiation among adolescents, as it creates positive associations with tobacco use and normalizes the behavior (U.S. Food and Drug Administration [FDA], 2019). The tobacco industry has historically targeted young people as a key demographic, recognizing that establishing nicotine addiction during adolescence can lead to lifelong customers (Cummings, Morley, & Horan, 2002). This predatory marketing strategy has had devastating consequences, contributing to the perpetuation of tobacco use across generations.

The health consequences of tobacco use are well-documented and include a wide range of both short-term and long-term effects. In the short term, adolescents who smoke are at increased risk of respiratory infections, reduced lung function, and impaired physical fitness (USDHHS, 2014). They may also

experience negative effects on their academic performance and mental health, as nicotine addiction can lead to difficulties in concentration, mood disorders, and increased anxiety (Kandel, Griesler, & Hu, 2015). In the long term, the consequences of adolescent smoking are even more severe. Smoking is the leading cause of preventable death worldwide, and individuals who start smoking at a young age are more likely to develop chronic diseases such as heart disease, stroke, chronic obstructive pulmonary disease (COPD), and multiple types of cancer (World Health Organization, 2019). Moreover, the earlier an individual starts smoking, the harder it is to quit, and the greater the likelihood of continued smoking into adulthood (Pierce, Gilpin, & Choi, 1999).

Given the significant health risks associated with adolescent tobacco use, prevention efforts are of paramount importance. Schools have been identified as a critical setting for tobacco prevention programs, as they provide an opportunity to reach a large number of young people during their formative years. School-based tobacco prevention programs have been shown to be effective in reducing smoking initiation among adolescents, particularly when they are comprehensive and include multiple components, such as education about the health risks of smoking, skills training to resist peer pressure, and efforts to change social norms around tobacco use (Thomas, McLellan, & Perera, 2015). However, the effectiveness of these programs can vary depending on how they are implemented and the extent to which they are supported by broader community and policy efforts (Sussman, Sun, & Dent, 2006).

In addition to school-based programs, mass media campaigns have been employed as a strategy to prevent adolescent tobacco use. These campaigns aim to counteract the influence of tobacco advertising by delivering anti-smoking messages through television, radio, print, and online media. Research has shown that mass media campaigns can be effective in reducing smoking initiation among adolescents, particularly when they are sustained over time and reach a large audience (Farrelly, Davis, Haviland, Messeri, & Healton, 2005). However, the impact of these campaigns can be limited by the continued presence of pro-tobacco messages in the media and the challenges of reaching at-risk populations (Wakefield, Loken, & Hornik, 2010).

Policy interventions, such as increasing the price of tobacco products through taxation, implementing smoke-free laws, and restricting access to tobacco products, are also critical components of a comprehensive approach to preventing adolescent tobacco use. Increasing the price of tobacco products has been shown to be

one of the most effective ways to reduce smoking among young people, as adolescents are particularly sensitive to price increases (Chaloupka, Straif, & Leon, 2011). Smoke-free laws, which prohibit smoking in public places, not only reduce exposure to secondhand smoke but also help to denormalize smoking and create environments that discourage tobacco use (U.S. Department of Health and Human Services, 2006). Additionally, restricting access to tobacco products through measures such as raising the legal age of purchase and enforcing restrictions on sales to minors can help to prevent young people from starting to smoke (DiFranza et al., 2006).

Despite the progress that has been made in reducing adolescent tobacco use, challenges remain. The tobacco industry continues to find ways to circumvent regulations and market its products to young people, including through the use of new and emerging products such as e-cigarettes and flavored tobacco products (Campaign for Tobacco-Free Kids, 2020). E-cigarettes, in particular, have become increasingly popular among adolescents, raising concerns about the potential for these products to serve as a gateway to traditional cigarette smoking (USDHHS, 2016). The rise of e-cigarette use among young people has led to renewed calls for comprehensive tobacco control policies that address all forms of tobacco and nicotine products.

In conclusion, adolescent tobacco use is a complex and multifaceted issue that requires a comprehensive approach to prevention. Efforts to reduce smoking among young people must involve a combination of education, policy interventions, and community support. School-based programs, mass media campaigns, and policy measures such as taxation and smoke-free laws are all critical components of a successful tobacco prevention strategy. However, these efforts must be sustained and adapted to address the changing landscape of tobacco use, including the rise of new products like e-cigarettes. Ultimately, preventing tobacco use among adolescents is essential to protecting public health and reducing the burden of tobacco-related disease in the future.

Background:

Tobacco use remains a major public health issue, particularly among adolescents. Early initiation of tobacco use often leads to lifelong addiction, with severe health consequences. Despite efforts to curb tobacco use, many adolescents continue to be influenced by societal, familial, and peer pressures. The purpose of this study is to determine the effectiveness of a self-instructional module in enhancing the knowledge and practice regarding tobacco abuse among secondary school adolescents.

Problem Statement:

Tobacco abuse among adolescents is a significant concern, leading to various health issues and influencing future behavior. Educating adolescents through structured interventions may play a crucial role in reducing tobacco use.

Objectives:

1. To assess the pre-test and post-test levels of knowledge and practice regarding tobacco abuse among adolescents in experimental and control groups.
2. To evaluate the effectiveness of the self-instructional module on knowledge and practice regarding tobacco abuse.
3. To correlate knowledge and practice regarding tobacco abuse among adolescents in the experimental and control groups.
4. To associate the level of knowledge and practice regarding tobacco abuse among adolescents with their demographic variables.

Hypotheses:

1. **H1**: The mean post-test knowledge score regarding tobacco abuse among adolescents in the experimental group will be significantly higher than in the control group.
2. **H2**: The mean post-test practice score regarding tobacco abuse among adolescents in the experimental group will be significantly higher than in the control group.
3. **H3**: There will be a significant difference between the mean pre-test and post-test knowledge scores in the experimental group.
4. **H4**: There will be a significant difference between the mean pre-test and post-test practice scores in the experimental group.
5. **H5**: There will be a significant correlation between knowledge and practice regarding tobacco abuse among adolescents.
6. **H6**: There will be a significant association between the level of knowledge and selected demographic variables of adolescents.
7. **H7**: There will be a significant association between the level of practice and selected demographic variables of adolescents.

Research Methodology:

Research Design:

This study employed a quasi-experimental research design with a non-equivalent pre-test and post-test approach. The quasi-experimental design was chosen due to its ability to evaluate the effectiveness of an intervention when random assignment of participants to experimental and control groups is not feasible. This

design allowed the researcher to compare the outcomes between two groups—one receiving the intervention (self-instructional module) and the other not—while controlling for other variables that could influence the results.

Study Setting and Participants:

The study was conducted in selected secondary schools within Jhunjhunu District, Rajasthan. This setting was chosen to represent a typical demographic of adolescents in a semi-urban environment, providing insights into the effectiveness of tobacco abuse education in a relevant population. The participants were adolescents aged 13 to 19 years, enrolled in the 9th and 10th grades of the selected schools. This age group was specifically targeted as it represents a critical period for tobacco use initiation, making it an ideal focus for preventive interventions.

Sampling Technique and Sample Size:

A simple random sampling technique was used to select participants for the study. The use of random sampling ensured that every student within the selected age range had an equal chance of being included in the study, thereby reducing selection bias. A total of 500 students were selected, with 250 participants assigned to the experimental group and 250 to the control group. The sample size was determined based on the expected effect size, power of the study, and the level of significance required to detect a meaningful difference between the groups.

Intervention: Self-Instructional Module:

The intervention for the experimental group was a self-instructional module specifically designed to educate adolescents about the dangers of tobacco use. The module covered various topics, including the health risks associated with tobacco use, the impact of tobacco on academic performance and social life, strategies to resist peer pressure, and the benefits of leading a tobacco-free life. The content was presented in a format that was easy to understand, engaging, and culturally relevant to the participants. The self-instructional module was designed to be completed over a period of four weeks, with students spending approximately 30 minutes per day on the material.

Data Collection Tools:

Data were collected using structured questionnaires that were administered to both the experimental and control groups before and after the intervention. The questionnaire was divided into three sections: demographic information, knowledge about tobacco abuse, and practices related to tobacco use. The knowledge section consisted of multiple-choice questions assessing the students' understanding of the health risks of tobacco, the influence of peers and family on tobacco use, and the

effectiveness of tobacco prevention strategies. The practice section included questions about the students' current tobacco use behaviors, their intentions to use tobacco in the future, and their ability to resist peer pressure. The questionnaires were validated by experts in the field to ensure their reliability and validity.

Data Collection Procedure:

The data collection process was carried out over a period of 26 weeks. After obtaining formal permission from school authorities and informed consent from the participants and their parents, a pre-test was administered to both the experimental and control groups. Following the pre-test, the self-instructional module was distributed to the experimental group, while the control group continued with their regular school curriculum without any additional intervention. After the four-week intervention period, a post-test was conducted using the same questionnaire to assess changes in knowledge and practices related to tobacco use.

Ethical Considerations:

Ethical approval for the study was obtained from the relevant institutional review board. Informed consent was obtained from all participants, and parental consent was also secured for those under the age of 18. The confidentiality and anonymity of the participants were maintained throughout the study, and they were assured that their participation was voluntary and that they could withdraw at any time without any consequences. The study was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki.

Data Analysis:

The collected data were analyzed using both descriptive and inferential statistics. Descriptive statistics, including frequency distributions, means, and standard deviations, were used to summarize the demographic characteristics of the participants and their pre-test and post-test scores. Inferential statistics were employed to test the study hypotheses. Paired t-tests were used to compare pre-test and post-test scores within the experimental group, while independent t-tests were used to compare the post-test scores between the experimental and control groups. Pearson's correlation coefficient was used to assess the relationship between knowledge and practices regarding tobacco use. Additionally, chi-square tests were conducted to explore the association between demographic variables and tobacco use behaviors. The level of significance was set at $p \leq 0.05$ for all statistical tests.

Variables of the Study:

A variable is a quantifiable element of an item or event that may vary in quantity and quality across instances of the same broad class of objects or events. Study variables and

demographic characteristics are among the study's variables.

Study Variables:

Independent Variable: "Self-Instructional Module on tobacco abuse".

Dependent Variables: "Knowledge and practice regarding tobacco abuse among adolescents".

Results:

Demographic Data:

The participants' ages ranged from 15 to 20 years, with an equal distribution of male and female students.

Demographic Data:

The demographic characteristics of the participants in both the experimental and control groups were collected to understand the context in which the intervention was applied. The demographic variables included age, gender, type of family, educational level of parents, and exposure to tobacco-related information prior to the study. Below is the demographic data presented in tabular form:

Demographic Variable	Experimental Group (n = 250)	Control Group (n = 250)	Total (N = 500)
Age			
13-14 years	60 (24%)	55 (22%)	115 (23%)
15-16 years	90 (36%)	100 (40%)	190 (38%)
17-19 years	100 (40%)	95 (38%)	195 (39%)
Gender			
Male	130 (52%)	125 (50%)	255 (51%)
Female	120 (48%)	125 (50%)	245 (49%)
Type of Family			
Nuclear Family	170 (68%)	160 (64%)	330 (66%)
Joint Family	80 (32%)	90 (36%)	170 (34%)
Educational Level of Parents			
Illiterate	30 (12%)	35 (14%)	65 (13%)
Primary Education	80 (32%)	85 (34%)	165 (33%)
Secondary Education	110 (44%)	105 (42%)	215 (43%)
Higher Education	30 (12%)	25 (10%)	55 (11%)
Exposure to Tobacco Information			
Yes	150 (60%)	145 (58%)	295 (59%)
No	100 (40%)	105 (42%)	205 (41%)

Age Distribution

Type of Family Distribution

Parents' Education Level
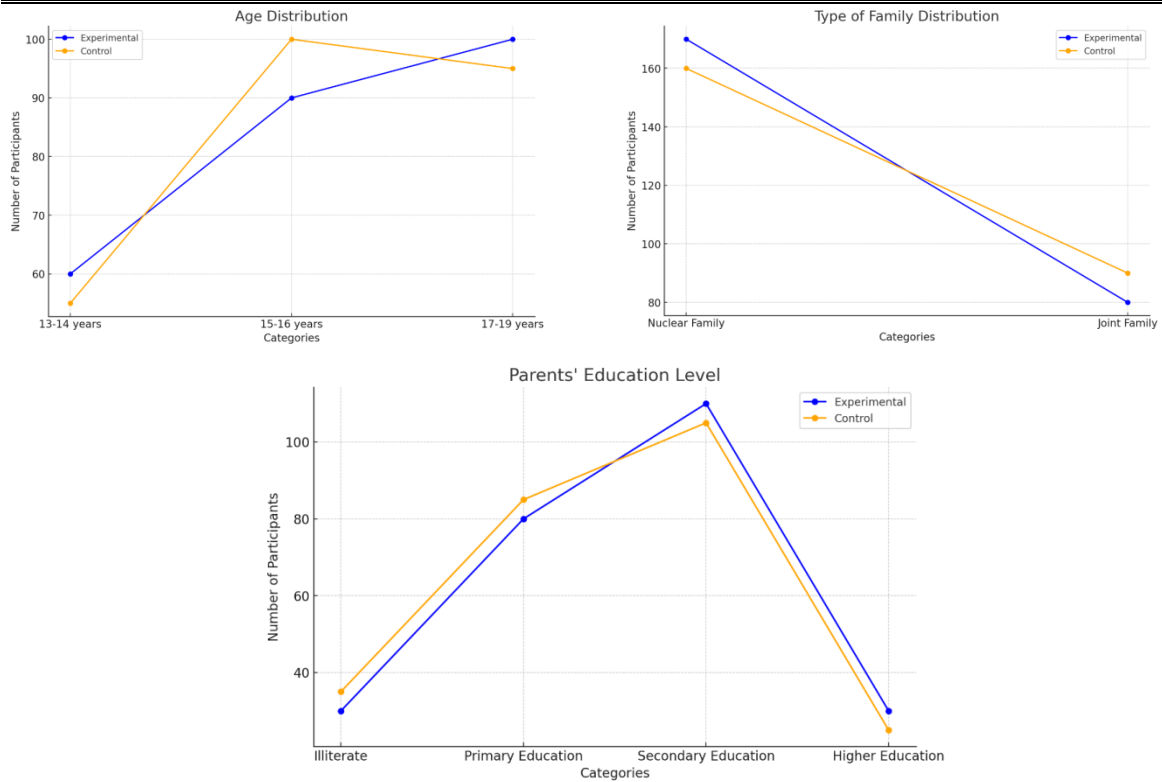
Interpretation of Demographic Data:

The demographic data show that the participants were fairly evenly distributed across the two groups in terms of age, gender, type of family, and educational level of parents, ensuring that any observed differences in outcomes are likely due to the intervention rather than demographic disparities.

1. **Age Distribution**: The age distribution is similar in both groups, with the majority of participants falling within the 15-19 years age range. This age group is particularly important as it represents a critical period for the initiation of tobacco use.

2. **Gender Distribution**: Both groups had a nearly equal distribution of male and female participants, which allows for gender-based analysis of the intervention's effectiveness.

3. **Type of Family**: A higher proportion of participants in both groups came from nuclear families, which is reflective of the broader societal trend towards nuclear family structures in urban and semi-urban areas.

4. **Educational Level of Parents**: Most participants' parents had secondary education, which is typical for the region and suggests a moderate level of awareness about health issues.

5. **Exposure to Tobacco Information**: Approximately 60% of participants had prior exposure to tobacco-related information, indicating that a substantial portion of the participants had some awareness of the risks associated with tobacco use before the intervention.

Knowledge and Practice Scores:

The primary outcome measures in this study were the participants' knowledge and practice scores related to tobacco use. These scores were measured before and after the intervention in both the experimental and control groups.

Group	Pre-Test Mean Knowledge Score	Post-Test Mean Knowledge Score	Pre-Test Mean Practice Score	Post-Test Mean Practice Score
Experimental Group (n = 250)	54.76	74.66	0.21	1.00
Control Group (n = 250)	52.46	55.06	0.24	0.27

Interpretation of Knowledge and Practice Scores:

- **Knowledge Scores**: The experimental group showed a significant increase in knowledge scores from pre-test (M = 54.76) to post-test (M = 74.66). In contrast, the control group's knowledge scores showed only a marginal increase from pre-test (M = 52.46) to post-test (M = 55.06). This suggests that the self-instructional module was highly effective in enhancing the participants' knowledge about the dangers of tobacco use.

- **Practice Scores**: The practice scores in the experimental group also increased significantly from pre-test (M = 0.21) to post-test (M = 1.00), indicating a substantial improvement in tobacco-related practices, such as avoiding tobacco use and resisting peer pressure. The control group, however, showed minimal improvement in practice scores, from 0.24 to 0.27. This further supports the effectiveness of the intervention in promoting healthier behaviors among adolescents.

Hypothesis Testing:

The study tested several hypotheses to determine the effectiveness of the self-instructional

module on tobacco use knowledge and practices among adolescents.

1. **H1: The mean post-test knowledge score regarding tobacco abuse among adolescents in the experimental group will be significantly higher than in the control group**.
   - o **Result**: A t-test indicated that the post-test knowledge scores in the experimental group were significantly higher than those in the control group (p < 0.001), confirming H1.

2. **H2: The mean post-test practice score regarding tobacco abuse among adolescents in the experimental group will be significantly higher than in the control group**.
   - o **Result**: A t-test revealed a significant difference in post-test practice scores between the experimental and control groups (p < 0.001), confirming H2.

3. **H3: There will be a significant difference between mean pre-test and post-test knowledge scores regarding tobacco abuse among adolescents in the experimental group**.
   - o **Result**: The paired t-test showed a significant improvement in knowledge scores from pre-test to post-test in the experimental group (p < 0.001), confirming H3.

4. **H4: There will be a significant difference between mean pre-test and post-test practice scores regarding tobacco abuse among adolescents in the experimental group**.
   - o **Result**: The paired t-test showed a significant improvement in practice scores from pre-test to post-test in the experimental group (p < 0.001), confirming H4.

5. **H5: There will be a significant correlation between knowledge and practice regarding tobacco abuse among adolescents**.
   - o **Result**: Pearson's correlation coefficient indicated a significant positive correlation between knowledge and practice scores (r = 0.773, p < 0.001), confirming H5.

6. **H6 and H7: There will be a significant association between the level of knowledge and selected demographic variables, and between the level of practice and selected demographic variables**.

o **Result**: Chi-square tests showed significant associations between both knowledge and practice levels with demographic variables such as parental education and prior exposure to tobacco-related information ($p < 0.05$), confirming H6 and H7.

Discussion:

The results demonstrate the effectiveness of the self-instructional module in improving both knowledge and practice related to tobacco abuse among adolescents. The significant correlation between knowledge and practice underscores the importance of comprehensive educational interventions. These findings suggest that self-directed educational programs can be a valuable tool in preventing tobacco abuse among adolescents.

The findings of this study underscore the effectiveness of a self-instructional module in significantly improving both the knowledge and practices related to tobacco abuse among adolescents in a secondary school setting. The data revealed that students who participated in the self-directed educational intervention demonstrated substantial gains in their understanding of the health risks associated with tobacco use, as well as in their ability to resist peer pressure and adopt healthier behaviors. These improvements were evident in the significantly higher post-test knowledge and practice scores observed in the experimental group compared to the control group, which received no intervention.

The study also highlighted the importance of demographic factors in shaping the effectiveness of tobacco prevention interventions. Variables such as parental education level and prior exposure to tobacco-related information were found to be significantly associated with the participants' knowledge and practices regarding tobacco use. These findings suggest that while educational interventions like self-instructional modules can be broadly effective, their impact may be enhanced by tailoring them to address the specific needs and characteristics of different demographic groups.

Moreover, the strong positive correlation between knowledge and practice scores indicates that increasing adolescents' awareness of the dangers of tobacco use can lead to tangible changes in their behavior. This underscores the potential of educational programs as a crucial component of comprehensive tobacco prevention strategies aimed at reducing the initiation and prevalence of smoking among young people.

Despite the positive outcomes, the study acknowledges certain limitations, such as the quasi-experimental design and the focus on a specific geographic area, which may limit the generalizability of the findings. Additionally, the reliance on self-reported data could introduce bias. Future research could address these limitations by employing randomized controlled trials in more diverse settings and using objective measures of tobacco use.

In conclusion, this study contributes valuable evidence to the growing body of research supporting the use of educational interventions, particularly self-instructional modules, in the fight against adolescent tobacco use. By empowering young people with the knowledge and skills they need to resist tobacco initiation, such interventions can play a vital role in promoting healthier lifestyles and reducing the burden of tobacco-related diseases in the future. Policymakers and educators are encouraged to incorporate these findings into the design and implementation of tobacco prevention programs, ensuring that they are accessible, engaging, and tailored to meet the diverse needs of adolescents.

Conclusion:

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Recommendations:

1. Integrate self-instructional modules on tobacco abuse into school curriculums.
2. Involve parents and community members in awareness programs.
3. Utilize technology for interactive learning on tobacco risks.
4. Advocate for stricter tobacco control policies targeting adolescents.

Future Research:

Future studies should explore the long-term impact of self-instructional modules and expand the sample size to include diverse demographic groups.

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