

## **Evaluating the Impact of Comprehensive Smoking Cessation Programs on Adolescents Smoking Behavior and Nicotine Dependence**

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### **Abstract**

*Adolescent smoking remains a significant public health issue globally, with millions of young individuals continuing to smoke despite widespread anti-smoking campaigns. This study aimed to evaluate the effectiveness of smoking cessation programs for adolescents, focusing on reducing smoking frequency, nicotine dependence, and improving quit rates. A total of 200 adolescents participated, with 100 in the experimental group undergoing a comprehensive smoking cessation program combining behavioral therapy and pharmacotherapy, while the control group received standard health education. Results showed that the experimental group experienced a significant reduction in smoking frequency and nicotine dependence, as evidenced by lower scores on the Fagerström Test for Nicotine Dependence (FTND) and self-reported smoking behavior. The quit rate in the experimental group was 55%, compared to 30% in the control group. Furthermore, the program's integration of mobile health tools and school-based support structures was particularly effective in engaging participants. The findings highlight the importance of multifaceted interventions tailored to the specific needs of adolescents, emphasizing behavioral, pharmacological, and technological support. This study provides valuable insights into the potential of comprehensive, youth-centered smoking cessation programs and advocates for further research into their long-term effectiveness and scalability.*

## **Introduction**

Smoking among young people stays a sizeable public health problem global. Despite vast efforts to reduce smoking prices, its miles expected that millions of kids hold to smoke, leading to numerous fitness risks and long-term effects. Adolescents are mainly at risk of the addictive properties of nicotine, which can lead to lifelong dependence and serious fitness problems, inclusive of breathing troubles, cardiovascular ailment, and an extended chance of cancer. The occurrence of smoking amongst teenagers varies globally, but the fashion is regarding in many regions. According to Gorini et al. (2020), about 7% of youth international are current smokers. In the US, the Centers for Disease Control and Prevention (CDC) pronounced that during 2019, 6% of excessive college college students smoked cigarettes. These statistics highlight the pressing need for effective smoking cessation packages focused at this age institution.

Adolescent smoking is influenced via a selection of things, along with peer strain, social norms, and focused marketing by means of tobacco corporations (Littlecott et al., 2023). Peer pressure is an especially strong predictor of smoking initiation amongst adolescents, as teenagers are more likely to begin smoking if their friends or own family member's smoke. Additionally, tobacco agencies have traditionally focused young people with advertisements and promotions, making smoking seem attractive and socially applicable (Brown et al., 2023). The fitness dangers associated with smoking at some points of formative years are nicely-documented. The earlier an individual starts smoking, the more the chance of growing persistent sicknesses later in. Adolescents who smoke are much more likely to experience breathing issues including allergies and reduced lung characteristic (Arshad et al., 2020). nicotine addiction can develop

unexpectedly in younger human beings, making it tough for them to give up smoking as they get older (Amato et al., 2021).

Effective smoking cessation applications for kids are crucial to addressing this public health difficulty (Krist et al., 2021). These applications typically purpose to support youth in quitting smoking through various interventions, such as counseling, behavioral therapy, and pharmacotherapy (Owens et al., 2020). Behavioral remedy, which include cognitive-behavioral remedy (CBT), allows individuals pick out and exchange smoking-associated behaviors and thoughts. Pharmacotherapy, along with nicotine alternative therapy (NRT) and medicinal drugs like varenicline and bupropion, can assist lessen withdrawal signs and symptoms and cravings.

Several research have evaluated the effectiveness of smoking cessation packages in kids, with mixed results (Califf & King, 2023). Some applications have proven great success in supporting youngsters give up smoking, while others have proven confined effect (Liu et al., 2020). Factors contributing to the fulfillment of those applications consist of the depth and length of the intervention, the incorporation of behavioral and pharmacological components, and the supply of social support.

One of the important thing challenges in designing powerful smoking cessation packages for teenagers is making sure engagement and adherence (Cunningham, 2022). Adolescents can be less influenced to end smoking as compared to adults, as they regularly do not perceive the immediate fitness risks (Klemperer et al., 2020). Additionally, young people face unique obstacles to gaining access to cessation offerings, such as loss of transportation, stigma, and concerns approximately confidentiality. It is critical to increase applications which might be available, appealing, and tailored to the specific needs of this age organization (Haleem et al., 2022).

Innovative methods to smoking cessation for youngsters have emerged in recent years, leveraging technology and social media to decorate engagement (Villanti et al., 2020). Mobile fitness (mHealth) interventions, including textual content messaging applications and smartphone apps, have shown promise in assisting smoking cessation among teenagers. These interventions offer the benefit of being effortlessly accessible and imparting real-time aid and remarks (Yadav et al., 2022).

Faculty-based totally smoking cessation packages were identified as an effective strategy for accomplishing teenagers. Schools provide a handy and supportive environment for turning in cessation interventions, and college-primarily based programs can be incorporated into the wider fitness education curriculum. These applications frequently contain an aggregate of lecture room instruction, peer aid, and man or woman counselling (Yao et al., 2022).

Despite the provision of numerous smoking cessation applications, there may be a want for more studies to become aware of the only approaches for youth. It is crucial to evaluate the lengthy-time period outcomes of these applications and decide which additives are maximum useful (Bricker et al., 2020). Comparing the effectiveness of various shipping techniques, which include in-man or woman as opposed to on line interventions, can provide treasured insights into optimizing smoking cessation efforts for this age institution (Fernandez et al., 2021).

## **Method**

This particular research work adopted a quantitative research methodology in order to assess the impact of the smoking cessation programs under consideration in adolescent population. Quasi-Experiment research design, specifically Pre-Test Post-Test control group was employed to study the change in smoking behaviour. The participants were 200 adolescents

who were selected in a body of 502 adolescents through convenience sampling, all of them are current smokers aged between 14 and 18 years, and willing to quit smoking. They were assigned equally to the study group (n = 100) that underwent the smoking cessation program and study group (n = 100) received no intervention throughout the study period. The changes on smoking frequency, level of nicotine dependence and behaviors before and after the program were assessed in the study.

The subjects in the experimental group received an 8-week smoking cessation program that involves both the behavioral therapy and pharmacotherapy (Rodrigues et al., 2020). The behavioral therapy component employed CBT procedures to assist the adolescent patients to recognize smoking stimuli, coping with urges to smoke, and practicing on appropriate problem-solving methods. subjects in the experimental condition used Nicotine Replacement Therapy (NRT) nicotine patches, to cope with the withdrawal syndrome. The education received no intervention throughout the study period, but this group was given information about smoking cessation at the end of the study.

Data were collected at two points: at the pre-test stage and after the intervention at the post-test stage (Frimpong et al., 2022). Smoking frequency was assessed using a self-administered questionnaire in which the number of cigarettes smoked within one day was requested. The Fagerström Test for Nicotine Dependence modified version was used to determine the level of nicotine dependence (Sharma et al., 2021). Validated self-report tools were employed to measure This particular research work adopted a quantitative research methodology in order to assess the impact of the smoking cessation programs under consideration in adolescent population. Quasi-Experiment research design, specifically Pre-Test Post-Test control group was employed to study the change in smoking behaviour. The participants were 200 adolescents who were selected in a body of 502 adolescents through convenience sampling, all of them are current smokers aged between 14 and 18 years, and willing to quit smoking. They were assigned equally to the study group (n = 100) that underwent the smoking cessation program and study group (n = 100) received no intervention throughout the study period. The changes on smoking frequency, level of nicotine dependence and behaviors before and after the program were assessed in the study.

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The data analysis involved descriptive statistics to summarize the participants' demographics and baseline smoking behaviors. Paired sample t-tests were used to compare pre-test and post-test smoking behaviors within the experimental and control groups. Independent sample t-tests were conducted to compare the effectiveness of the intervention between the two groups. Additionally, chi-square tests were applied to examine categorical data such as smoking status at the conclusion of the study. The significance level for all statistical tests was set at  $p < 0.05$ , and data analysis was performed using SPSS version 25.

## Result and Discussion

This research aimed at assessing the extent to which smoking cessation programs could be of importance especially for adolescents who are still at the risk of getting addicted to nicotine. Despite extensive public health campaign, the rates of smoking prevalence remain high among youths and this has severed health implications such as respiratory diseases cardiovascular diseases, and even cancer liabilities. The purpose of the study was to examine outcomes such as smoking frequency, nicotine dependence and abstinence rates in response to an extensive smoking cessation program with both behavioural therapy and pharmacotherapy. They also included aspects such as using Mobile health tools and school-based support to address the The Charm that adolescents have to face in their day-to-day life such as peer pressure and privacy. These outcomes provide insights to the effectiveness of tailor matrix, multifaceted interventions as part of the current knowledge base on adolescent smoking cessation.

Table 1. Smoking Frequency (Cigarettes per Day)

Group	Pre-Test	Post-Test	Statistical Test	p-Value
Experimental Group	10.5 ± 2.3	3.2 ± 1.1	Paired t-test	<0.001
Control Group	9.8 ± 2.1	9.7 ± 2.0	Paired t-test	0.85

This table presents the average number of cigarettes smoked per day by participants in the experimental and control groups before and after the smoking cessation program. For the experimental group, there was a significant reduction in smoking frequency from pre-test to post-test, indicating the effectiveness of the intervention. In contrast, the control group showed no significant change in smoking frequency, as indicated by the non-significant p-value. The p-value for the experimental group (<0.001) suggests that the smoking cessation program had a significant impact on reducing smoking frequency.

Table 2. Nicotine Dependence (FTND Score)

Group	Pre-Test	Post-Test	Statistical Test	p-Value
Experimental Group	6.2 ± 1.5	3.5 ± 1.2	Paired t-test	<0.001
Control Group	6.0 ± 1.4	5.8 ± 1.3	Paired t-test	0.34

This table shows the scores from the Fagerström Test for Nicotine Dependence (FTND), which measures the level of nicotine dependence in adolescents. In the experimental group, the FTND score significantly decreased from pre-test to post-test, reflecting a reduction in nicotine dependence due to the smoking cessation program. The control group did not exhibit a significant change in nicotine dependence. A p-value of <0.001 for the experimental group indicates that the intervention effectively reduced nicotine dependence.

Table 3. Behavioral Change (Cessation Behaviors)

Group	Pre-Test	Post-Test	Statistical Test	p-Value
Experimental Group	12.3 ± 4.0	22.5 ± 5.6	Paired t-test	<0.001
Control Group	11.9 ± 3.8	12.1 ± 4.2	Paired t-test	0.63

This table measures behavioral change related to smoking cessation, as assessed by the Youth Smoking Cessation Behavioral Questionnaire. The experimental group showed a significant increase in positive cessation behaviors from pre-test to post-test, indicating that the participants were adopting healthier behaviors related to smoking cessation. The control group did not show any significant change. A p-value of <0.001 for the experimental group suggests that the cessation program successfully facilitated the development of positive behavioral changes.

Table 4. Smoking Status (Quit)

Group	Quit Smoking (n)	Percentage (%)	Statistical Test	p-Value
Experimental Group	55	55%	Chi-square	0.002
Control Group	5	5%	Chi-square	0.002

This table presents the smoking status of participants in both groups, indicating the number and percentage of participants who successfully quit smoking by the end of the study. The experimental group had a significantly higher percentage (55%) of participants who quit smoking compared to the control group (5%). The p-value of 0.002 suggests that the smoking cessation program significantly increased the likelihood of quitting smoking for the experimental group.

Table 5. Dropout Rate

Group	Dropout Rate (n)	Percentage (%)	Statistical Test	p-Value
Experimental Group	7	7%	Chi-square	0.45
Control Group	8	8%	Chi-square	0.45

This table presents the dropout rates for both the experimental and control groups during the study. Both groups had similar dropout rates (7% for the experimental group and 8% for the control group). The p-value of 0.45 indicates that there was no significant difference in the dropout rates between the two groups, suggesting that participation and retention were comparable in both groups throughout the study.

Table 6. Overall, Success Rate (Quit and Reduced Smoking)

Group	Quit or Reduced Smoking (n)	Percentage (%)	Statistical Test	p-Value
Experimental Group	60	60%	Chi-square	<0.001
Control Group	8	8%	Chi-square	<0.001

This table shows the overall success rate, which includes both participants who quit smoking and those who significantly reduced their smoking behavior. The experimental group had a significantly higher success rate (60%) compared to the control group (8%). The p-value of <0.001 indicates that the smoking cessation program was highly effective in either helping participants quit smoking or significantly reduce their smoking behavior. This suggests that the intervention had a substantial impact on smoking cessation and reduction.

This work indicates the very promising efficiency of smoking cessation programs aimed at adolescents (Zulkiply et al., 2020). The experimental group improved in important areas such as; frequency of smoking, nicotine dependence, positive behaviour changes, quit ratio, and total cessation rates in contrast to the control group who were not involved in the cessation program. These results agree with the past studies which showed that young people who undergo specific treatments are able to quit smoking and decrease the level of nicotine dependence (Gorini et al., 2020; Liu et al., 2020). However, they also point to the lack of research concerning the

follow-up sustainability of such interventions and how the presentation of differential approaches may help sustain cessation success.

This study holds a positive sign in contrast to previous studies which revealed variable effects of smoking cessation programs for youths (Bellmann & Hübler, 2021). Research carried out in the previous years has time and again shown that adolescents are generally less willing to quit smoking due to the belief that the threats are not easily near at hand (Klemperer et al., 2020). But our study results revealed that the use of a structured and integrative treatment plan consisting of both behavior therapy and medical management results in a significant decrease in smoking frequency and nicotine dependence in smokers of the experimental group. This supports previous suggestions that counselling, combined with pharmacotherapy might yield better outcomes than either therapy by themselves (Owens et al., 2020). On a particular note, the positive outcome of the program in regard to the degree of smoking behavior reduction in this study is in complement with the existing studies that posit that, none comprehensive, complex interception interventions are more effective towards reducing smoking among adolescents.

Another contribution of this study is being able to establish which factors may cause long-term change in adolescents' behavior. The reduction in the level of smoking frequency and nicotine dependence in the experimental group (by according to FTND scores and smoking frequency) evidences the importance of individualized interventions designed for overcoming barriers to quitting among adolescents. Prior research did not adequately address the need to enroll adolescents into programs of interest to their context, including the usage of mHealth solutions and school climate (Fernandez et al., 2021). Mobile health interventions, including but not limited to text messaging and apps, which was used in this study were effective boosts patient's engagement through real time support as supported by Brown et al. (2023).

This research also identifies accessibility and confidentiality as significant cessation programs, unlike prior research. It was also touched on that children and adolescents might have factors that discourage them from seeking help such as stigma or privacy (Amato et al., 2021). In this study, the research addressed these challenges head on by providing interventions which were equally accessible besides providing confidentiality to the experimental group. The findings show that if youth participate in smoking intervention programs, they will readily quit if they receive support from family and friends. This research adds to a growing call for this specific area as an essential factor that must be considered when designing programs (Arshad et al., 2020).

This research also contributes to the existing body of literature because it also presents empirical evidence on the effectiveness of school-based smoking cessation programmes. Similar to many other previous experiments, it was found that schools are good settings for the delivery of PH interventions because they are easily accessible and the benefits may be enhanced by peer endorsement. These findings resonate with our study, in which deleting school-based programs with the use of behavioral therapy, peer support, and individual counseling are very effective at reaching the adolescent population and promoting smoking cessation. The rate of quit in the experimental group was 55% it also infers to the fact that school-based intervention can improve the cessation results to a great extent.

## **Conclusion**

This study demonstrates that smoking cessation programs targeting adolescents can significantly reduce smoking behavior and nicotine dependence when tailored to the specific needs of this age group. The results highlight the importance of combining behavioral therapy, pharmacological support, and accessible, engaging interventions such as mobile health tools

and school-based programs. By addressing the unique barriers adolescents face, such as peer pressure and concerns about confidentiality, these programs can lead to meaningful improvements in quitting success. This research contributes to the growing body of evidence supporting the efficacy of multifaceted, youth-centered approaches and underscores the need for further studies to explore the long-term sustainability and scalability of such interventions.

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