

Effectiveness of the Department of Health Brief Tobacco Intervention on Smoking Cessation Among Senior High School Students in Ipil, Zamboanga Sibugay, Philippines

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Abstract. Adolescent smoking remains a pressing public health concern, particularly in rural areas where access to cessation support is limited. The Department of Health's Brief Tobacco Intervention (BTI) program provides structured, low-resource counseling based on the 5 A's Framework and Prochaska's Readiness to Change Model. This study aimed to evaluate the effectiveness of the BTI program in reducing smoking behavior and nicotine dependence among Grade 12 students in Ipil, Zamboanga Sibugay. A mixed-methods design was employed, involving 25 identified smokers from a cohort of 233 senior high school students. Quantitative data were collected using pre- and post-intervention surveys, including the Fagerström Test for Nicotine Dependence (FTND), with follow-up assessments at 1 week, 1 month, and 3 months. Relapse rates were monitored with additional follow-up sessions. Qualitative data were obtained through two focus group discussions involving students, BTI providers, senior high school teachers, and Rural Health Unit staff, and were analyzed thematically. At one week, 8 participants (32%) reported abstinence; however, relapse rates increased to 52% at one and three months, with only 32% maintaining abstinence. FTND scores showed a consistent decline, indicating reduced nicotine dependence even among those who relapsed. Four participants (16%) were lost to follow-up. Qualitative findings identified peer pressure, academic stress, and family smoking behaviors as key contributing factors. The BTI program demonstrated effectiveness in initiating smoking cessation, although sustained abstinence was challenged by environmental and psychosocial influences. Continued counseling, school-based integration, and tailored interventions are recommended to enhance long-term cessation outcomes.

Keywords: Adolescents; Brief Tobacco Intervention; Nicotine Dependence; Smoking Cessation; Rural Youth

Introduction

Adolescent smoking remains a major public health concern globally and in the Philippines, contributing significantly to morbidity and mortality. Tobacco use is a leading preventable risk factor for cardiovascular diseases, cancers, and chronic respiratory conditions. Despite ongoing tobacco control policies such as taxation, smoking bans, and public health campaigns, smoking initiation continues to occur predominantly during adolescence, with most adult smokers beginning before the age of 18. In the Philippines, tobacco use remains highly prevalent, with millions of smokers and significant exposure to secondhand smoke, particularly among youth.

Nicotine dependence during adolescence is especially concerning due to its effects on brain development, behavior, and long-term addiction potential. Environmental factors such as peer pressure, family influence, and media exposure further contribute to early smoking initiation. These factors may also influence students' academic performance and overall development, as nicotine exposure has been associated with cognitive and behavioral impairments. Although national policies such as Republic Act 9211 and Executive Orders regulating tobacco use have been implemented, gaps remain in providing targeted cessation interventions for adolescents, particularly in school-based settings.

The Department of Health (DOH) introduced the Brief Tobacco Intervention (BTI), a structured, evidence-based strategy grounded in the 5 A's Framework (Ask, Advise, Assess, Assist, Arrange), designed to promote smoking cessation through brief counseling. While BTI has demonstrated effectiveness in clinical and community settings, its application among adolescent populations, particularly in school environments, remains underexplored. This study evaluates the effectiveness of the DOH Brief Tobacco Intervention program

in reducing smoking behavior and nicotine dependence among Grade 12 Senior High School students in Ipil, Zamboanga Sibugay, and explores the factors influencing cessation outcomes.

This study aims to evaluate the effects of the Department of Health's (DOH) Brief Tobacco Intervention (BTI) program on promoting smoking cessation among selected Grade 12 Senior High School students in Ipil, Zamboanga Sibugay, within five to six months of program implementation.

Research Questions

This study aims to evaluate the effects of the Department of Health's (DOH) Brief Tobacco Intervention (BTI) program on promoting smoking cessation among selected Grade 12 Senior High School students in Ipil, Zamboanga Sibugay, within five to six months of program implementation.

1. To describe the baseline smoking behaviors and smoking-related knowledge of selected Grade 12 Senior High School students in terms of:
 - 1.1 age of smoking initiation,
 - 1.2 duration of smoking, and
 - 1.3 smoking-related knowledge.
2. To evaluate the short-term effects of the Brief Tobacco Intervention program on:
 - 2.1 smoking attitudes,
 - 2.2 cigarette consumption per day,
 - 2.3 quit attempts, and
 - 2.4 nicotine dependence scores.
3. To determine the smoking cessation outcomes of participants at 1 week, 1 month, and 3 months post-intervention in terms of:
 - 3.1 smoking status,
 - 3.2 relapse occurrence, and
 - 3.3 intention to quit smoking.
4. To explore the perceived facilitating factors and barriers influencing smoking cessation among participants who underwent the Brief Tobacco Intervention program.

Scope and Delimitation of the Study

This study assessed the effectiveness of the Department of Health's (DOH) Brief Tobacco Intervention (BTI) program by evaluating smoking behaviors, smoking cessation outcomes, and students' perceptions before and after participation in the intervention. It focused on the implementation of the brief intervention and examined changes in smoking frequency, quit attempts, nicotine dependence, and factors influencing these outcomes, including student engagement and perceived barriers to quitting. The study also explored participants' experiences and perceptions regarding the implementation of the program. The study was limited to Grade 12 Senior High School students in Ipil, Zamboanga Sibugay, who were selected based on specific inclusion criteria. It focused solely on the Department of Health's Brief Tobacco Intervention program and did not include other tobacco cessation initiatives or broader tobacco control policies. Due to these limitations, the findings may not be generalizable to other populations or settings.

Literature Review

Smoking remains one of the leading preventable causes of morbidity and mortality worldwide and continues to pose a major public health challenge among adolescents. According to the World Health Organization, tobacco use contributes to more than eight million deaths annually, including deaths associated with secondhand smoke exposure. Adolescence is recognized as a critical period for smoking initiation, with most adult smokers beginning tobacco use before the age of 18. Early exposure to nicotine is associated with long-term dependence, impaired neurocognitive development, behavioral problems, and increased risk of chronic diseases later in life.

Several studies have identified multiple determinants influencing adolescent smoking behavior. Peer pressure, parental smoking, media exposure, stress, socioeconomic factors, and accessibility of tobacco products have consistently been associated with smoking initiation and continued tobacco use among adolescents. Studies further suggest that smoking among adolescents is not only a behavioral issue but is also influenced by environmental and psychosocial factors that contribute to relapse and difficulty in maintaining smoking abstinence. School-based smoking cessation interventions have been increasingly recognized as effective strategies for reducing smoking behavior among adolescents. Recent evidence from school-based and community-based interventions demonstrated that structured counseling, peer support, and health education improve smoking-related knowledge, increase quit attempts, and reduce cigarette consumption among young

smokers. Jakobsen et al. (2021) reported that smoke-free school interventions significantly reduced smoking prevalence among adolescents by improving awareness and promoting supportive school environments. Similarly, Mpousiou et al. (2021) found that school-based smoking prevention programs positively influenced smoking attitudes and smoking-related behaviors among students. Despite the effectiveness of school-based interventions in initiating smoking cessation, sustaining long-term abstinence remains a challenge. Previous studies showed that relapse commonly occurs due to persistent environmental triggers such as peer influence, stress, exposure to smokers within the household, and inadequate follow-up support. Hughes et al. (2004) emphasized that relapse rates remain highest during the early months following cessation attempts, highlighting the importance of continuous counseling and reinforcement strategies.

The Department of Health's Brief Tobacco Intervention (BTI), grounded on the 5 A's Framework (Ask, Advise, Assess, Assist, Arrange), is an evidence-based and low-cost smoking cessation strategy designed to provide structured counseling and behavioral support. Studies have demonstrated that even brief counseling sessions lasting only a few minutes can significantly increase quit attempts and smoking abstinence rates compared with no intervention. Aveyard et al. (2012) reported that brief opportunistic smoking cessation counseling increased the likelihood of quitting smoking among participants. Similarly, Kassim et al. (2019) demonstrated that brief interventions combined with self-help materials improved smoking cessation outcomes and enhanced participants' motivation to quit. Assessment of nicotine dependence is also essential in evaluating smoking cessation outcomes. The Fagerström Test for Nicotine Dependence (FTND), developed by Heatherton et al. (1991), remains one of the most widely used and validated tools for measuring nicotine addiction severity. The FTND has been extensively used in smoking cessation studies to assess dependence levels and monitor behavioral changes following intervention programs.

In the Philippine setting, smoking among adolescents remains a significant public health concern despite the implementation of tobacco control policies such as Republic Act No. 9211 and various Department of Health tobacco cessation initiatives. Although the Brief Tobacco Intervention has been integrated into the National Tobacco Control Program and has shown effectiveness in clinical and community settings, there remains limited evidence regarding its effectiveness among adolescents in school-based environments. Existing local studies have primarily focused on adult smokers or community-based populations, leaving a gap in evidence involving adolescent-focused smoking cessation interventions. Furthermore, few studies have explored both the quantitative outcomes and qualitative experiences of adolescents participating in Brief Tobacco Intervention programs. Understanding not only the measurable effects of smoking cessation interventions but also the psychosocial barriers, facilitating factors, and participant experiences is important in strengthening future implementation strategies.

Methodology

Research Design

This study utilized a sequential explanatory mixed-methods design integrating quantitative and qualitative approaches to evaluate the effectiveness of the Department of Health's Brief Tobacco Intervention program on smoking cessation among Grade 12 senior high school students. The quantitative component employed a pre- and post-intervention design, allowing measurement of changes in smoking behaviors, nicotine dependence levels, and smoking-related knowledge, attitudes, and practices before and after exposure to the intervention. This design enabled objective comparison of behavioral changes across different time points. The qualitative component complemented the quantitative findings by exploring participants' experiences, perceptions, and challenges related to smoking cessation through focus group discussions and semi-structured interviews. This approach provided deeper insights into psychosocial and environmental factors influencing the effectiveness of the intervention. Quantitative data were encoded, cleaned, and analyzed using descriptive statistics. Frequencies, percentages, means, and standard deviations were used to summarize participants' demographic characteristics, smoking history, smoking-related knowledge, attitudes, practices, and nicotine dependence levels. Pre- and post-intervention outcomes were compared to evaluate changes following the implementation of the Department of Health Brief Tobacco Intervention (BTI) program. For the qualitative component, focus group discussions and semi-structured interviews were transcribed verbatim and analyzed using thematic analysis to identify recurring themes and patterns related to smoking cessation experiences and intervention outcomes.

Sampling Design

The study population consisted of Grade 12 students enrolled at Ipil National High School during the school year 2024–2025. A purposive sampling technique was employed to identify participants who met the inclusion criteria, particularly students identified as current smokers. Among the total population of 233 Grade

12 students, 25 were identified as eligible smokers and consented to participate in the study. Purposive sampling was deemed appropriate to ensure that the intervention was directed toward individuals most relevant to the objectives of the study, specifically adolescents with active smoking behavior. This approach allowed the researchers to comprehensively evaluate the effectiveness of the Department of Health's Brief Tobacco Intervention program among the target population.

Research Locale

The study was conducted at Ipil National High School, a public secondary educational institution located in Ipil, Zamboanga Sibugay, Philippines, which serves both junior and senior high school students and provides an appropriate setting for adolescent health-related research and interventions due to its accessibility, large student population, and supportive academic environment. The participants consisted of Grade 12 senior high school students enrolled during the school year 2024–2025, typically aged 16 to 18 years, representing both male and female adolescents from various academic strands. The study specifically focused on students identified as current smokers, with baseline data collected on demographic characteristics such as age and sex, as well as smoking-related variables including age of smoking initiation, duration of smoking, and number of cigarettes consumed per day to characterize smoking behavior patterns. Inclusion criteria comprised Grade 12 students who were current smokers (defined as smoking at least one cigarette per day) and who voluntarily agreed to participate in the Brief Tobacco Intervention program and associated research procedures, while exclusion criteria included non-smokers, students previously enrolled in smoking cessation programs, those who declined consent, and those unavailable during intervention or follow-up periods. For the qualitative component, participants were purposively selected from students who completed or engaged in the intervention, alongside Brief Tobacco Intervention providers such as medical students, senior high school teachers, and Rural Health Unit staff, in order to capture diverse and in-depth perspectives on the implementation process, experiences, and perceived effectiveness of the intervention.

Research Instrument

The study utilized validated research instruments to assess participants' demographic characteristics, smoking history, knowledge, attitudes, practices, and level of nicotine dependence. The primary tool used to measure nicotine dependence was the Fagerström Test for Nicotine Dependence, which consists of six items assessing smoking behavior and addiction severity. The questionnaire was adapted, pilot-tested, and revised to ensure clarity, cultural appropriateness, and reliability. Reliability testing using Cronbach's alpha demonstrated acceptable to excellent internal consistency among the study instruments, with alpha coefficients of 0.97 for Smoker's Knowledge, 0.75 for Smoker's Attitude, 0.72 for Smoker's Practices, and 0.80 for Nicotine Dependence. These validated instruments were utilized during the pre- and post-intervention phases to assess changes in smoking-related knowledge, attitudes, practices, and nicotine dependence among participants.

Data Gathering Procedure

Data gathering began after the researchers secured the necessary institutional approvals and permissions to conduct the study at Ipil National High School. Coordination was made with the school administration, teachers, Rural Health Unit staff, and trained Brief Tobacco Intervention providers to finalize the schedule, venue, participant flow, and follow-up activities. Before data collection, the researchers and intervention providers underwent training on the Department of Health's Brief Tobacco Intervention program to ensure uniform delivery of counseling using the 5 A's Framework, which includes Ask, Advise, Assess, Assist, and Arrange. After coordination and training, the researchers conducted an orientation among eligible Grade 12 students. The purpose of the study, procedures, expected participation, benefits, possible risks, confidentiality measures, and right to withdraw were explained. Informed consent was obtained from participants, and parental or guardian consent was secured when required. Only students who met the inclusion criteria and agreed to participate were included in the study. A baseline survey was then administered before the intervention. This pre-intervention questionnaire gathered demographic data, smoking history, smoking behavior, knowledge and attitudes toward smoking, number of cigarettes consumed per day, previous quit attempts, readiness to quit, and baseline nicotine dependence using the Fagerström Test for Nicotine Dependence. The baseline survey also served to identify students who were current smokers and eligible for the Brief Tobacco Intervention. Following the baseline assessment, the Brief Tobacco Intervention was implemented individually or in small counseling sessions using the 5 A's Framework. First, participants were asked about their tobacco use. Second, they were advised in a clear and personalized manner to stop smoking. Third, their readiness to quit was assessed. Fourth, those willing to quit were assisted in preparing a quit plan, including setting a preferred QuitDate (defined as the target date set by the participant to stop smoking),

identifying triggers, strengthening social support, and developing coping strategies. Participants who were not yet ready to quit were still provided with health education, motivational counseling, and self-help guidance. Lastly, follow-up sessions were arranged to monitor their progress. Follow-up assessments were conducted at one week, one month, and three months after the intervention or quit date. During each follow-up, the researchers assessed smoking status, number of cigarettes consumed per day, relapse episodes, reasons for relapse, quit attempts, intention to continue quitting, and changes in nicotine dependence. Participants who remained abstinent were reinforced and encouraged to continue staying quit, while those who relapsed received additional counseling and support. Participants who could not be contacted despite repeated follow-up attempts were classified as lost to follow-up based on the study's operational definition. After the follow-up period, a post-intervention survey was administered to evaluate changes in smoking behavior, smoking status, cigarette consumption, quit attempts, and nicotine dependence compared with baseline findings. The post-intervention data were used to determine the measurable effects of the Brief Tobacco Intervention program. For the qualitative component, focus group discussions and semi-structured interviews were conducted after the intervention period. Participants included selected students and Brief Tobacco Intervention providers, such as ADZU-SOM medical students, senior high school teachers, and Rural Health Unit staff. The discussions explored experiences with the intervention, perceived facilitators and barriers to quitting, reasons for relapse, acceptability of the program, and recommendations for improving school-based smoking cessation services. These sessions were conducted in a private and comfortable setting, audio-recorded with consent, and transcribed verbatim. All completed questionnaires, follow-up forms, and interview transcripts were checked for completeness and accuracy. Quantitative data were encoded for statistical analysis, while qualitative data were reviewed and analyzed thematically. The results from both components were then integrated to provide a comprehensive evaluation of the effectiveness, challenges, and feasibility of the Department of Health's Brief Tobacco Intervention program among Grade 12 students.

Results and Discussions

Research Question 1: To describe the baseline smoking behaviors and smoking-related knowledge of selected Grade 12 Senior High School students in terms of age of smoking initiation and duration of smoking?

Table 1. Baseline Demographic Characteristics and Smoking History of Identified Smoker Participants

Demographic Data			
Smokers			
	Variable	Respondents	Rate (%)
Age	17 – 18 years old	8	32%
	19 – 20 years old	2	8%
	21 – 22 years old	1	4%
	23 – 24 years old	7	28%
	25 – 26 years old	4	16%
	27 – 28 years old	2	8%
	29 – 30 years old	1	4%
	>31 years old	0	0
Sex	Male	25	100%
	Female	0	0
Age Started Smoking	13-14 years old	2	8%
	15 – 16 years old	11	44%
	17 – 18 years old	8	32%
	19 – 20 years old	2	8%
	21 – 22 years old	2	8%
Number of Years Smoking	< 1 year	3	12%
	1 - 2 year	9	36%
	3 – 4 years	4	16%
	5 – 6 years	2	8%
	7 – 8 years	2	8%
	9-10 years	2	8%
	>10 years	3	12%

As shown in Table 1, the baseline characteristics indicate that most participants-initiated smoking during mid-adolescence, particularly between 15–16 years old and had been smoking for one to two years prior to participation in the intervention. Initially, 233 Grade 12 students were interviewed, of whom 208 were identified as non-smokers, while 25 were identified as current smokers and included in the intervention phase

of the study. Although most participants reported shorter smoking durations, several respondents disclosed smoking histories extending beyond 10 years, indicating early initiation and prolonged tobacco exposure among some adolescents. These findings highlight early exposure to tobacco use among adolescents and support previous studies showing that most smokers begin smoking before the age of 18, emphasizing adolescence as a critical period for smoking prevention and cessation interventions. The presence of older students in the study population reflects the inclusion of learners enrolled through the Alternative Learning System (ALS) within the senior high school program.

Table 2. Changes in Attitude Responses on Smoking-Related Issues Pre- and Post-Intervention

Questions	Pre-Intervention		Post-Intervention (1 Week Post Quit Date)	
	Mean Score	Interpretation	Mean Score	Interpretation
Q1: Cigarette does not make young people feel fit in, cool, etc.	1.76	Agree	1.68	Agree
Q2: Cigarette should be banned at work, school or public places	2.28	Strongly Agree	2.24	Strongly Agree
Q3: Young people should stay away from smoking	1.8	Agree	2.28	Strongly Agree
Q4: Secondhand smoking (SHS) is harmful for children and other people	2.08	Agree	2.24	Strongly Agree
Overall Mean	1.98	Agree	2.11	Agree

As shown in Table 2, participants demonstrate an improvement in their attitudes toward smoking following implementation of the Brief Tobacco Intervention program. The overall mean score increased from 1.98 (Agree) during the pre-intervention assessment to 2.11 (Agree) one week post-intervention, indicating a positive shift in smoking-related attitudes and perceptions among participants. Increased agreement was observed in statements emphasizing smoking prevention, avoidance of smoking among youth, and recognition of the harmful effects of secondhand smoke. These descriptive findings suggest that the intervention may have contributed to enhanced awareness and more favorable attitudes toward smoking cessation and tobacco control among participants. The results are consistent with previous school-based smoking intervention studies reporting that structured counseling and health education programs improve smoking-related knowledge, attitudes, and preventive behaviors among adolescents. The observed improvement in smoking-related attitudes may be explained by the 5 A's Framework, particularly the "Advise" and "Assist" components, which emphasize personalized counseling and health education to encourage behavioral change. The findings also support Prochaska's Readiness to Change Model, suggesting that participants may have progressed from precontemplation or contemplation toward preparation and action stages following the intervention. Adolescents are particularly responsive to repeated counseling and awareness-building strategies, which may contribute to improved smoking-related perceptions during the early phases of smoking cessation.

Research Question 2: To evaluate the short-term effects of the Brief Tobacco Intervention program on cigarette consumption per day?

Table 3. Pre- and Post-Intervention Cigarette Consumption Among Participants

Number of cigarettes consumed by the smoker in a day	Pre-Intervention		Post-Intervention (1 Week Post Quit Date)	
	n	(%)	n	(%)
Not smoking currently	0	0	8	32%
1 to 5	13	52%	9	36%
6 to 10	6	24%	2	8%
11 to 15	2	8%	1	4%
16 to 20	2	8%	0	0
More than 20 cigarettes per day (>1 pack)	2	8%	1	4%
Lost to follow-up	0	0	4	16%

As shown in Table 3, the findings suggest that the Brief Tobacco Intervention (BTI) program contributed to short-term reductions in cigarette consumption among participants. One-week post-intervention, 32% of participants reported abstinence from smoking, while the proportion consuming 6–10 cigarettes per day decreased from 24% to 8%. Participants smoking more than one pack per day also decreased from 8% to 4% following the intervention. These descriptive outcomes suggest improved awareness, increased motivation to quit, and observable positive behavioral changes following participation in the BTI program. The

reduction in smoking frequency is clinically important because decreased tobacco exposure during adolescence may reduce the risk of long-term nicotine dependence and smoking-related diseases. However, continued smoking among some participants and the 16% loss to follow-up suggest that brief counseling alone may be insufficient to sustain long-term smoking cessation. Strengthening follow-up counseling, peer-support systems, and school-based reinforcement programs may improve the sustainability of smoking reduction outcomes among adolescents. The qualitative findings further supported these quantitative outcomes, as student participants reported increased awareness regarding the harmful effects of smoking and improved motivation to quit following counseling sessions. Counselors also emphasized that supportive and non-judgmental communication encouraged participant openness and engagement during the intervention. These findings suggest that the observed reduction in cigarette consumption may have been influenced not only by increased health awareness but also by the supportive counseling environment established during the BTI sessions. These findings may also be interpreted within the context of adolescent behavioral change theory, which emphasizes the importance of social support, reinforcement, and self-awareness in modifying health behaviors. The reduction in cigarette consumption observed shortly after counseling suggests that individualized and supportive interventions may strengthen adolescents' motivation and self-efficacy to reduce smoking behaviors. However, sustained behavioral change among adolescents remains vulnerable to peer influence and environmental exposure, particularly in the absence of long-term reinforcement strategies.

Table 4. Pre- and Post-Intervention Quit Attempts Among Participants.

Attempts to quit smoking	Pre-Intervention		Post-Intervention (1 Week Post Quit Date)	
	n	(%)	n	(%)
Once	13	52%	12	48%
Twice	6	24%	6	24%
Thrice	2	8%	2	8%
More than thrice	4	16%	5	20%

As shown in Table 4, the findings demonstrate a slight increase in repeated quit attempts following implementation of the Brief Tobacco Intervention program. Participants reporting more than three quit attempts increased from 16% pre-intervention to 20% post-intervention, while participants reporting only one quit attempt decreased from 52% to 48%. These findings suggest improved motivation and greater willingness to engage in smoking cessation efforts after exposure to the intervention. Repeated quit attempts are common during the smoking cessation process and may reflect progression toward behavioral change rather than failure to quit smoking. These findings emphasize the importance of continuous counseling, motivational reinforcement, and relapse-prevention strategies in supporting sustained smoking cessation among adolescents. Future interventions should incorporate structured follow-up activities and peer-support mechanisms to strengthen long-term cessation outcomes. Qualitative findings complemented these results by identifying increased motivation to change, supportive counseling approaches, and individualized guidance as important facilitators influencing repeated quit attempts among participants. However, focus group discussions also revealed that peer pressure, stress, and environmental exposure to smokers continued to challenge sustained smoking cessation efforts despite repeated attempts to quit. The increase in repeated quit attempts may reflect progression through the stages of behavioral change described in Prochaska's Readiness to Change Model. Multiple quit attempts are recognized as part of the smoking cessation process, particularly among adolescents who may transition gradually between preparation, action, relapse, and maintenance stages. These findings suggest that repeated attempts to quit smoking should be interpreted as indicators of continued motivation toward behavioral change rather than treatment failure alone.

Table 5. Perceived Barriers to Smoking Cessation Before and After the Intervention

Primary barriers to quitting if you have not attempted to quit	Pre-Intervention		Post-Intervention (1 Week Post Quit Date)	
	n	(%)	n	(%)
Nicotine Dependence	5	20%	5	20%
Withdrawal symptoms	2	8%	2	8%
Living or working with smokers	3	12%	5	20%
Stress, depression, anxiety etc.	11	44%	6	24%
Peer pressure	3	12%	5	20%
Others:	1	4%	2	8%

As shown in Table 5, the findings indicate that psychosocial and environmental factors remained significant barriers to smoking cessation among participants despite the intervention. Stress-, depression- and

anxiety-related barriers decreased from 44% pre-intervention to 24% post-intervention, suggesting improved coping awareness after counseling. However, peer pressure increased from 12% to 20%, while living or working with smokers also increased from 12% to 20% following the intervention period. Nicotine dependence remained unchanged at 20%, and withdrawal symptoms remained at 8%. These findings suggest that smoking cessation among adolescents is influenced not only by individual motivation but also by persistent social and environmental conditions. The persistence of these barriers highlights the need for comprehensive smoking cessation programs that incorporate peer-support systems, stress-management interventions, family involvement, and school-based tobacco prevention strategies. Strengthening smoke-free environments and community-based tobacco control efforts may further improve long-term smoking cessation outcomes. These qualitative findings corresponded with the quantitative increase in peer pressure and exposure-related barriers observed during follow-up assessments, reinforcing the influence of psychosocial and environmental factors on adolescent smoking behaviors. These findings support psychosocial and environmental theories of adolescent smoking behavior, which emphasize the influence of peer relationships, family exposure, stress, and social environments on smoking initiation and relapse. Adolescents are particularly susceptible to social acceptance and environmental reinforcement, which may explain the persistence of peer pressure and smoking exposure as barriers despite counseling interventions. The findings highlight that smoking cessation among adolescents requires not only individual behavioral counseling but also broader environmental and community-based support systems.

Table 6. Nicotine Dependence Interpretation

NICOTINE DEPENDENCE			
Modified Fagerström Score	Pre- Intervention	Intervention (BTI Counseling)	Post-Intervention (1 Week Post QuitDate)
Very Low Dependence	14	14	19
Low Dependence	7	8	5
Medium Dependence	2	1	0
High Dependence	2	2	1
Very High Dependence	0	0	0

As shown in Table 6, the findings demonstrate a reduction in nicotine dependence levels following implementation of the Brief Tobacco Intervention program. Participants categorized under very low nicotine dependence increased from 14 pre-intervention to 19 post-intervention, while those under low dependence decreased from 7 to 5. Participants classified under medium dependence decreased from 2 to 0, whereas high dependence decreased from 2 to 1 following the intervention. These descriptive findings suggest that brief counseling interventions may contribute to smoking reduction and lower nicotine dependence levels among adolescents. However, the persistence of participants within higher nicotine dependence categories indicates that brief interventions alone may not be sufficient to achieve sustained smoking cessation. Continuous counseling, relapse-prevention strategies, and long-term behavioral support may therefore be necessary to maintain smoking reduction and prevent recurrence of nicotine dependence. The reduction in nicotine dependence levels following the intervention may be partially explained by the supportive counseling strategies incorporated within the 5 A's Framework, particularly the "Assist" and "Arrange" components, which encourage coping strategies, relapse prevention, and follow-up support. However, relapse theory suggests that nicotine dependence remains a chronic relapsing condition influenced by physiologic addiction, environmental triggers, and psychosocial stressors. This may explain why some participants continued to demonstrate persistent nicotine dependence despite short-term reductions following counseling. Qualitative findings further supported the observed reduction in nicotine dependence, as participants described increased awareness of smoking-related health consequences and improved willingness to reduce smoking behaviors following counseling. Counselors likewise reported that individualized and supportive communication approaches contributed to participant engagement and behavioral reflection during intervention sessions.

Research Question 3: To determine the smoking cessation outcomes of participants at 1 week, 1 month, and 3 months post-intervention in terms of smoking status, relapse occurrence, and intention to quit smoking?

Table 7. Smoking Status and Participation Outcomes of Students at Baseline, 1 Week, 1 Month, and 3 Months Post-Intervention

Participation and Engagement of Students	Intervention (Counseling)	1 week after QuitDate	1 month after QuitDate	3 months after Quit Date
Staying Quit	25	11	8	8
Relapse	0	14	13	13
Lost to follow-up	0	0	4	4

As shown in Table 7, the findings demonstrate that the Brief Tobacco Intervention program produced favorable short-term smoking cessation outcomes, as reflected by the 11 participants who remained abstinent one week after the intervention. However, abstinence declined to eight participants at both the one-month and three-month follow-up assessments, indicating that relapse remained common among participants over time. These findings suggest that while the intervention appeared to contribute to initial quit attempts and short-term behavioral change among participants, its long-term effectiveness may be limited without sustained support mechanisms. The persistence of relapses may be influenced by peer pressure, environmental exposure to smokers, emotional stress, adolescent vulnerability to social influences, and ongoing nicotine dependence. Qualitative findings further supported these results, identifying psychosocial and environmental barriers that challenged sustained abstinence among participants. Student participants specifically identified peer influence, stress, and exposure to smokers within their environment as major barriers to maintaining abstinence, while counselors and RHU staff highlighted logistical limitations and inconsistent follow-up as factors affecting continuity of cessation support. These findings emphasize that smoking cessation among adolescents requires not only brief counseling interventions but also continuous follow-up, relapse-prevention strategies, family and peer support, and stronger school- and community-based reinforcement systems to improve long-term cessation outcomes. The high relapse rates observed during follow-up assessments are consistent with relapse theory, which recognizes smoking cessation as a cyclical process characterized by repeated attempts, relapse episodes, and behavioral recovery. Adolescents may be particularly vulnerable to relapses because of developmental susceptibility to peer influence, emotional stress, and social pressures. These findings suggest that brief interventions alone may be insufficient to sustain long-term abstinence without continued reinforcement, family support, peer-based interventions, and community-level smoking prevention strategies. Despite the favorable short-term outcomes observed during the early follow-up period, the consistently high relapse rates observed at one month and three months suggest that the effectiveness of the Brief Tobacco Intervention program may have been primarily limited to short-term behavioral change. Although initial abstinence was achieved among several participants, relapse substantially reduced the number of students who maintained smoking cessation over time. These findings indicate that brief counseling interventions alone may not adequately address the chronic, relapsing nature of nicotine dependence among adolescents, particularly in the presence of persistent psychosocial and environmental smoking influences. Therefore, conclusions regarding long-term effectiveness should be interpreted cautiously, and sustained cessation may require more intensive, continuous, and multi-level support interventions. The quantitative findings demonstrated that although the Brief Tobacco Intervention program contributed to short-term reductions in smoking behavior and improved quit attempts, relapse remained common during follow-up assessments. To further explain these outcomes, the qualitative component explored participants' experiences, perceived facilitators, and barriers influencing smoking cessation. The integration of qualitative findings provided deeper insights into how psychosocial, environmental, and operational factors influenced both the initial behavioral improvements and the challenges in sustaining long-term abstinence among adolescents.

Research Question 4: To explore the perceived facilitating factors and barriers influencing smoking cessation among participants who underwent the Brief Tobacco Intervention program?

Table 8. Demographic Profile of Focus Group Discussion (FGD) Participants

	BTI Participants n (%)	BTI Providers n (%)
Sex		
Male	4 (100%)	2 (20%)
Female	0 (0%)	8 (80%)
Age		
20-25 years old	4 (100%)	0 (0%)
26-30 years old	0 (0%)	4 (40%)
31-35 years old	0 (0%)	5 (50%)
36-40 years old	0 (0%)	0 (0%)
41-45 years old	0 (0%)	1 (10%)
Stakeholders		
Students		
Medical Personnel (RHU Staff, Medical Students)	4 (100%) 0 (0%)	0 (0%) 7 (70%)
Senior High School Advisers	0 (0%)	3 (30%)

Note. BTI = Brief Tobacco Intervention; RHU = Rural Health Unit.

As shown in Table 8, it summarizes the demographic characteristics of participants involved in the focus group discussions, including students and BTI providers. This diverse representation provided

comprehensive insights into both the experiences of adolescent smokers and the perspectives of intervention facilitators. Such multi-perspective approaches have been shown to enhance the understanding of factors influencing smoking behavior and intervention effectiveness in community-based studies.

Table 9. Facilitating Factors and Barriers Identified by Student Participants During Focus Group Discussion

Major Theme	Key Finding	Representative Quote*
Increased Awareness and Motivation	Participants reported improved understanding of the harmful effects of smoking and increased motivation to quit.	<i>"The program helped us understand the effects of smoking and encouraged us to stop."</i> – Student Participant
Supportive Counseling Environment	Students felt comfortable and supported during counseling sessions.	<i>"Yes, it was comfortable sharing during the sessions."</i> – Student Participant
Need for Improved Program Delivery	Participants recommended wider dissemination and simpler presentation of BTI materials.	<i>"The BTI should be easier to understand and reach more students."</i> – Student Participant

*Quotes were edited for brevity, clarity, and correctness.

As shown in Table 9, qualitative findings from the focus group discussions identified several facilitating factors and barriers influencing the effectiveness of the Brief Tobacco Intervention program among student participants. Increased awareness regarding the harmful effects of smoking, improved motivation to quit, and supportive counseling environments were commonly identified as positive aspects of the intervention. Participants appreciated the non-judgmental and comfortable atmosphere during counseling sessions, which encouraged openness and participation. However, students also suggested improving the delivery and accessibility of the program through simpler and more engaging educational materials and wider dissemination within the school community. These findings complemented the quantitative results demonstrating improved smoking-related attitudes, increased quit attempts, and reduced cigarette consumption following the intervention. Increased awareness and supportive counseling environments identified during focus group discussions may help explain the short-term behavioral improvements observed among participants.

Table 10. Facilitating Factors and Barriers Identified by Counselors During Focus Group Discussion

Major Theme	Key Finding	Representative Quote*
Supportive Counseling Approach	Non-judgmental counseling and individualized communication encouraged student participation.	<i>"Students were comfortable with their providers during counseling."</i> – Counselor
Institutional and Community Support	Collaboration among schools, RHUs, LGUs, and medical students facilitated program implementation.	<i>"The LGU, RHU, and school helped deliver the BTI smoothly."</i> – Counselor
Logistical and Participation Challenges	Connectivity issues, scheduling conflicts, and inconsistent participation affected follow-up activities.	<i>"It was difficult to contact students after graduation due to communication problems."</i> – Counselor

*Quotes were edited for brevity, clarity, and correctness.

As shown in Table 10, focus group discussions with counselors identified several facilitating factors contributing to the successful implementation of the Brief Tobacco Intervention program. Counselors emphasized that non-judgmental communication, individualized counseling approaches, and establishment of supportive environments improved participant engagement and openness during sessions. Strong institutional collaboration among the school, Rural Health Unit, Local Government Unit, and medical student volunteers also facilitated implementation. However, logistical barriers such as poor internet connectivity, communication difficulties, scheduling conflicts, and inconsistent participation among providers and students negatively affected follow-up activities and continuity of intervention delivery. These findings help explain the relapse and lost-to-follow-up outcomes observed during quantitative follow-up assessments. These qualitative findings may further explain the relapse and lost-to-follow-up outcomes observed quantitatively, particularly among participants who experienced communication difficulties, inconsistent follow-up, and limited social support after graduation.

Table 11. Facilitating Factors and Barriers Identified by Rural Health Unit Staff During Focus Group Discussion

Major Theme	Key Finding	Representative Quote*
Health Promotion and Policy Support	Anti-smoking ordinances and health education activities supported tobacco control efforts.	"Policies and health education helped strengthen smoking prevention efforts." – RHU Staff
Community Collaboration	Barangay officials and local government support facilitated program implementation.	"Barangay officials helped promote and support BTI activities." – RHU Staff
Operational and Engagement Challenges	Limited manpower, low student engagement, and external influences affected implementation.	"Lack of staff and low student participation affected the program." – RHU Staff

*Quotes were edited for brevity, clarity, and correctness.

As shown in Table 11, focus group discussions with Rural Health Unit staff highlighted the importance of strengthened anti-smoking policies, health education initiatives, and community-based collaboration in supporting implementation of the Brief Tobacco Intervention program. Barangay officials, Local Government Units, and community stakeholders were recognized as important facilitators in improving program delivery and sustainability. Nevertheless, operational limitations such as insufficient manpower, limited financial support, low student participation, and external social influences continued to affect implementation effectiveness. These findings reinforced the quantitative outcomes demonstrating that although the intervention promoted short-term smoking reduction and initial abstinence, sustained cessation remained challenged by psychosocial, environmental, and operational barriers requiring long-term community-based support strategies.

Ethical Considerations

Ethical principles were strictly observed throughout the conduct of the study to ensure the protection of participants' rights, safety, and well-being. Ethical approval was obtained from the Ateneo de Zamboanga University Research Ethics Committee (ADZU-REC) with REC Code: 2025-0001, approved on February 4, 2025, before the commencement of data collection. Permission to conduct the study was also secured from the administration of Ipil National High School and the relevant local health authorities. Informed consent was obtained from all participants before their inclusion in the study. For participants below 18 years of age, written parental or guardian consent was secured alongside participant assent. Participants were fully informed of the study's purpose, procedures, duration, potential risks, and benefits, and were assured of their right to withdraw at any time without penalty or impact on their academic standing. Confidentiality and anonymity were strictly maintained throughout the study. Participants were assigned unique identification codes, and no personally identifiable information was included in any reports or publications. All data were reported in aggregate form to prevent identification of individual participants. Electronic data were stored in password-protected cloud-based storage and encrypted external drives, accessible only to the research team. Data will be retained for three (3) years and permanently deleted thereafter using secure data destruction methods. Participation in the study was entirely voluntary, and no monetary compensation was provided. However, small non-coercive tokens of appreciation, such as snacks and certificates, were given to acknowledge participants' time and contribution. These were not intended to influence participation. Potential risks to participants were minimal. Some participants may have experienced minor emotional discomfort when discussing their smoking behavior; however, this was mitigated by providing a safe, non-judgmental environment during counseling sessions. Participants were informed that they may decline to answer any question or withdraw from the study at any time. Counseling support and appropriate referrals were made available when necessary. Special consideration was given to the involvement of minors and the sensitive nature of smoking behavior. The study ensured strict confidentiality to prevent unintended disclosure to parents or peers. The research adhered to the principles of voluntary participation, beneficence, non-maleficence, and respect for autonomy, consistent with national and international ethical guidelines for research involving human participants. The researchers declared no conflicts of interest in the conduct of this study. No financial, professional, or personal relationships influenced the research process, ensuring objectivity and integrity in data collection, analysis, and reporting.

Conclusion

The findings of this study demonstrate that the Department of Health's (DOH) Brief Tobacco Intervention (BTI) program had a positive short-term impact on the smoking cessation behaviors of selected Grade 12 Senior High School students in Ipil, Zamboanga Sibugay. The intervention resulted in measurable improvements, including a reduction in cigarette consumption, decreased nicotine dependence, and increased

motivation to initiate quit attempts. Participants showed behavioral changes such as reduced smoking frequency and improved awareness of the harmful effects of tobacco use. The school-based implementation of the BTI program, supported by collaboration among Rural Health Unit staff, teachers, and medical students, provided a conducive environment that facilitated engagement and behavioral change. However, the study also identified significant challenges, particularly the high rate of relapse and difficulties in maintaining follow-up due to logistical and communication barriers. These findings highlight that while BTI is effective in initiating smoking cessation, sustained behavioral change requires continuous support, structured follow-up systems, and stronger institutional integration. Despite the positive findings, the study had several limitations. The relatively small number of identified smokers and the conduct of the study within a single public secondary school may limit the generalizability of the findings to broader adolescent populations. Smoking behaviors and cigarette consumption were also primarily based on self-reported responses, which may be subject to recall bias or social desirability bias. Nevertheless, the study provides valuable preliminary evidence on the feasibility and effectiveness of the Department of Health's Brief Tobacco Intervention program in a school-based adolescent population and may serve as a basis for future large-scale and longitudinal studies. Overall, the BTI program demonstrated strong potential as a scalable and low-cost intervention for adolescent smoking cessation. Despite its limitations, the program contributed to increased awareness, motivation, and initial cessation efforts among participants, emphasizing the need for long-term reinforcement strategies to improve sustained outcomes.

Reccomendations

Based on the findings of the study, it is recommended that the Brief Tobacco Intervention (BTI) program be institutionalized within school-based health programs through collaboration among the Department of Education, Local Government Units, and health authorities to ensure sustainability and wider reach. Strengthening follow-up systems is essential to reduce relapse rates; this may include the use of peer support groups, community-based monitoring, and multiple communication channels to maintain participant engagement. Future implementations should integrate relapse prevention strategies, including continuous counseling, booster sessions, and coping mechanisms to address triggers and withdrawal symptoms. Enhancing student engagement through the use of age-appropriate, culturally relevant, and interactive educational materials is also recommended to improve program effectiveness. Support for BTI providers should be strengthened through continuous training, adequate manpower, and logistical support to ensure efficient program delivery. Establishing safe and supportive environments for students attempting to quit smoking is likewise essential to promote openness and reduce stigma. Further research is recommended using larger sample sizes and longitudinal designs to assess long-term outcomes and improve generalizability. Additionally, adapting interventions to real-world challenges such as limited access to communication and geographic barriers, as well as incorporating more objective and multi-source data collection methods, will enhance the accuracy and effectiveness of future BTI implementations.

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