Model of No-Tobacco-Use-in School (NTUIS) on tobacco use knowledge, attitude and
behaviour among adolescents in Bhutan: A quasi-experimental study

Mr. Sonam Rinchen

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รูปแบบของการใช้บุหรี่ที่ไม่มีการใช้ในโรงเรียน (NTUIS) เกี่ยวกับความรู้ทัศนคติและพฤติกรรมการสูบ
บุหรี่ของวัยรุ่นในภูฏาน: การศึกษากึ่งทดลอง

นายโซนัม รินเชน

Thesis Title	Model of No-Tobacco-Use-in School (NTUIS) on tobacco use knowledge, attitude and behaviour among adolescents in Bhutan: A quasi-experimental study
By	Mr. Sonam Rinchen
Field of Study	Public Health
Thesis Advisor	Professor Surasak Taneepanichskul, M.D.

Accepted by the College of Public Health Sciences, Chulalongkorn University in Partial Fulfillment of the Requirements for the Doctoral Degree

Dean of the College of Public Health Sciences

(Professor Sathirakorn Pongpanich, Ph.D.)

THESIS COMMITTEE

Chairman

(Associate Professor Ratana Somrongthong, Ph.D.)

Thesis Advisor

(Professor Surasak Taneepanichskul, M.D.)

Examiner

(Alessio Panza, M.D.)

Examiner

(Samlee Plianbangchang, M.D.)

External Examiner

(Nanta Auamkul, M.D.)

โซนัม รินเชน : รูปแบบของการใช้บุหรี่ที่ไม่มีการใช้ในโรงเรียน (NTUIS) เกี่ยวกับความรู้ ทัศนคติและพฤติกรรมการสูบบุหรี่ของวัยรุ่นในภูฏาน: การศึกษากึ่งทดลอง (Model of No-Tobacco-Use-in School (NTUIS) on tobacco use knowledge, attitude and behaviour among adolescents in Bhutan: A quasi-experimental study) อ .ที่ ปรึกษาวิทยานิพนธ์หลัก: สุรศักดิ์ ฐานีพานิชสกุล, 173 หน้า.

บทนำ: การบริโภคยาสูบในวัยรุ่นอายุ 13-15 ปี เป็นปัญหาที่สำคัญของประเทศภูฏาน จาก รายงานพบว่าร้อยละ 28.6 ในวัยรุ่นชายและ ร้อยละ 11.1 ในวัยรุ่นหญิงที่บริโภคยาสูบ ยังไม่มี การศึกษาถึงรูปแบบการป้องกันบริโภคยาสูบในโรงเรียน ในประเทศภูฏาน การศึกษาครั้งนี้มี วัตถุประสงค์ เพื่อที่จะหารูปแบบการป้องกันบริโภคยาสูบ และความตั้งใจในการงดบริโภคยาสูบ

วิธีการศึกษา: นักเรียนมัธยม 4 โรงเรียนในประเทศภูฏาน จำนวน 378 คน ได้เข้าร่วม การศึกษาในโปรแกรมป้องกันการบริโภคยาสูบในโรงเรียน การศึกษานี้มีรูปแบบเป็นการวิจัยกึ่ง ทดลอง ทำการศึกษาในปี คศ. 2016 มีนักเรียนในโรงเรียนที่เป็นกลุ่มทดลองที่เข้าร่วมโปรแกรมนี้ จำนวน 186 คน และนักเรียนในโรงเรียนนี้ที่เป็นกลุ่มควบคุม จำนวน 192 คน ได้ติดตามนักเรียนทั้ง สองกลุ่ม ที่ 3 เดือน และ 6 เดือน

ผลการศึกษา: อายุเฉลี่ยของนักเรียน 14.9 ปี ค่าเฉลี่ยของความรู้ในกลุ่มทดลอง แตกต่าง กับกลุ่มควบคุมอย่างมีนัยสำคัญ (P< 0.001) ค่าเฉลี่ยของทัศนคติในกลุ่มทดลองและกลุ่มควบคุม แตกต่างกันอย่างมีนัยสำคัญเช่นกัน(P< 0.009) ความตั้งใจที่จะงดบริโภคยาสูบในกลุ่มทดลองแตกต่าง กับกลุ่มควบคุมอย่างมีนัยสำคัญ(P< 0.001) อย่างไรก็ตามโปรแกรมนี้ไม่มีผลอย่างนัยสำคัญในการลด การสูบบุหรี่ในนักเรียน (P=0.361)

บทสรุป: โปรแกรมการป้องกันการบริโภคยาสูบในโรงเรียนมีผลดีในด้านความรู้ ทัศนคติ และความตั้งใจที่จะงดบริโภคยาสูบ อย่างไรก็ตาม โปรแกรมนี้ไม่มีมีผลต่อการลดการสูบบุหรี่ใน นักเรียน

สาขาวิชา สาธารณสุขศาสตร์	ลายมือชื่อนิสิต ....
ปีการศึกษา 2560	ลายมือชื่อ อ.ที่ปรึกษาหลัก ....

SONAM RINCHEN: Model of No-Tobacco-Use-in School (NTUIS) on tobacco use knowledge, attitude and behaviour among adolescents in Bhutan: A quasi-experimental study. ADVISOR: PROF. SURASAK TANEEPANICHSKUL, M.D., 173 pp.

Introduction: Tobacco use among the 13–15 year olds is a major concern in Bhutan. The prevalence of tobacco use is higher in adolescents than in adults. It had been reported that 28.6% of boys and 11.1% of girls are current smokers. There has not been a single study conducted to this point on the tobacco use prevention in schools. This study attempted to explore a school-based peer-led health education model called 'No-Tobacco-Use in Schools' (NTUIS) to evaluate changes in the student's tobacco use knowledge, attitudes towards tobacco use, intentions to use tobacco in the future and maintenance of non-user status.

Method: A total of 378 eighth grade-students from four secondary schools in Wangdue Phodrang district, Bhutan took part in a quasi-experimental study in 2016. The schools and study subjects were selected using a multi-stage sampling. The intervention schools had 186 participants and the control had 192. The model was implemented in three phases by the peer educators in the intervention schools for five weeks. The data on the study variables were collected at the baseline, posttest, 3-month follow-up and 6-month follow assessments using a self-administered questionnaire. The overall effect of the model was evaluated using a repeated-measures analysis of variance.

Results: Of the 378 students enrolled, 363 completed the study. Their mean age was 14.9 years. Implementation of the NTUIS model had improved the knowledge scores of students, and there was a significant difference between the intervention and control groups (F=645.64, p<0.001, d=0.64). Although the attitudes of the participants were significantly different between the groups (χ^2 =6.890, p=0.009), their attitudes turned negative. The intention of participants in the intervention group to remain tobacco free was significant both for five years (F=284.603, p <0.001, d=0.446) and for lifetime (F=331.590, p <0.001, d= 0.484). However, the model had no significant effect either on the student's use of cigarettes/*bidi* (χ^2 =0.771, p = 0.380) nor on the use of smokeless tobacco products (χ^2 =0.834, p=0.361).

Conclusion: The NTUIS model had a positive effect on the student's knowledge and their intentions to remain tobacco free in the future. But the model did not determine the student's use of tobacco products. Nevertheless, the study findings will provide basis for strengthening the existing tobacco education programs for youth in schools.

Field of Study: Public Health

Academic Year: 2017

Student's Signature ---

Advisor's Signature ---

ACKNOWLEDGEMENTS

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จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

CHAPTER I
INTRODUCTION

1.1 Background and rationale

Tobacco use is one of the major public health problems in the world. Globally, tobacco use kills more than seven million tobacco users each year, and out of which

about 890 000 nonusers die due to their exposure to second-hand tobacco smoke (WHO, 2018). It is estimated that around 28 percent of those deaths due to second-hand smoke were children (Öberg, Jaakkola, Woodward, Peruga, & Prüss-Ustün, 2011). Exposure to second-hand smoke is high among adolescents aged 12–15 years in low-income and middle-income countries (Xi et al., 2016). The tobacco use among adolescents is comparatively lower than that of adults. However, implications of tobacco use in adolescence go far beyond the apparent numbers and its short-term effects. Tobacco use starts in young age, most often as an experimentation or under peer pressure, and when that becomes regular, it usually turns into a strong addiction. The majority of adult smokers started using tobacco in their adolescence (CTFK, 2018b). The earlier an adolescent first tries using tobacco products, the higher his or her chances of eventually becoming a regular tobacco user. Adolescent tobacco users face a higher risk of getting a host of health problems in their adulthood when compared with those who initiate later or do not start at all (Arrazola et al., 2015; CTFK, 2018a).

Between 80 000 to 100 000 young people worldwide become addicted to tobacco every day (Bank, 1999). The younger a person is when he or she starts using tobacco, the more difficult it is for that person to quit later in life. If the present global pattern of tobacco use continues, a lifetime of tobacco use will result in the deaths of 250

million children and young people alive today, most of them taking place in developing countries (WHO-SEARO, 2006).

The South-East Asia Region has a high prevalence of tobacco use among youth, including cigarettes and other forms of indigenous tobacco and smokeless tobacco products. It is due to an easy accessible of tobacco products to youth regardless of regulations prohibiting their sale to minors. Youths are also widely exposed to tobacco industry marketing tactics through tobacco product advertising, promotion and sponsorship. The exposure to second-hand smoke is high both at home and in public places (WHO-SEARO, 2015a).

Tobacco use among the 13–15 year olds is a major concern in several countries of WHO South-East Asia Region. According to the Global Youth Tobacco Survey (GYTS), the prevalence of tobacco use in this age group was highest in Timor-Leste (42%), followed by Bhutan (30%), Nepal (20%) and Indonesia (20%). The use of tobacco among boys was higher than that for girls in all countries of the region. The GYTS reports also revealed that Bhutan, Myanmar and Nepal have the highest rates of smokeless tobacco (SLT) use among adolescents. In all these countries, SLT use among boys was higher than among girls (WHO-SEARO, 2014). Therefore, tobacco use,

particularly smokeless tobacco use among adolescents in the region needs serious attention and to put in place stringent control measures.
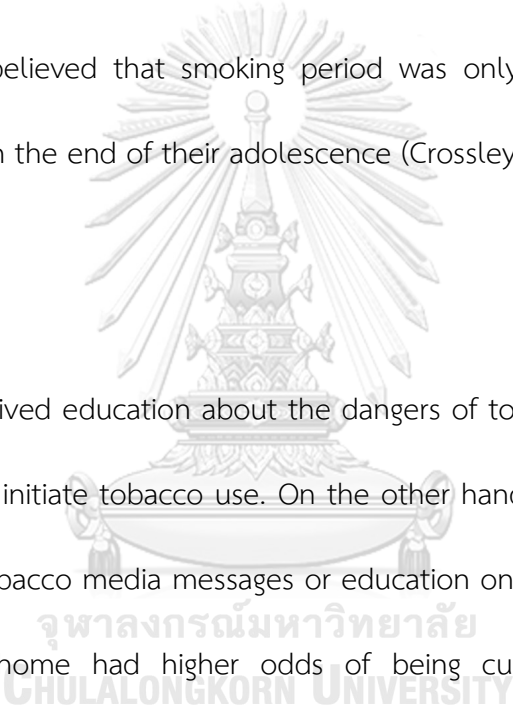
The death rate due to tobacco for men over 30 years was 219 per 100 000 in the region. The proportion of deaths attributable to tobacco use was 13 percent in men and 1 percent in women. Three fourth of cancers of the trachea, bronchus and lungs, and one fourth of all other malignancies in males of the same age group occurred due to tobacco use. Over half of those who were dying of respiratory diseases of the same age group died from causes attributable to tobacco. It is one of the major contributors of deaths due to noncommunicable diseases (WHO, 2012).

The Global School-based Student Health Survey reported that 29.4 percent of students aged 13-17 years old were current users of tobacco products and about 25 percent were current cigarette smokers in Bhutan (MOH, 2017). The same report showed that about a half of the students had described of having exposed to second-hand tobacco smoke. Similarly, the Global Youth Tobacco Survey of Bhutan stated that 28.6 percent of boys and 11.1 percent of girls currently smoked tobacco. In addition, 27.2 percent of boys and 19.8 percent of girls were the current users of smokeless tobacco (WHO-SEARO, 2015b). The tobacco use prevalence among adolescents is one of the highest in WHO region of South-East Asia. Cigarette smoking

among boys has substantially increased from 18.3 percent in 2009 to 23.1 percent in

2013. The prevalence of tobacco use is higher in adolescents than in adults (WHO-

SEARO, 2015b). Despite the stringent tobacco control acts and regulations in place, it

is a worrisome situation to see the prevalence of tobacco use rising among

adolescents in Bhutan.

Studies from other countries have established that the most adult users of tobacco

had started using tobacco in their youth, and some of them started even before the

age of ten (CTFK, 2018a). The younger they are when they first try tobacco, the more

likely they are to become regular users, and the less likely to quit (Breslau &

Peterson, 1996; D'Avanzo, La Vecchia, & Negri, 1994; Everett et al., 1999). It has been

found that earlier initiation of smoking is linked to making adolescents regular

smokers (Reidpath, Davey, Kadirvelu, Soyiri, & Allotey, 2014). However, the initiation

of tobacco use can be delayed or stopped. Efforts must be directed towards

reducing experimentation and regular tobacco use among adolescents. Delaying the

age when adolescents first begin using tobacco can reduce the risk that they become

regular tobacco users and increase their chances of successfully quitting, even if they

do become regular users (Azagba, Baskerville, & Minaker, 2015; CDC, 1994, 2004).

Besides demographic characteristics, adolescents' cigarette smoking is affected by

the behaviour of others. Tobacco use is a result of influences emerging from the

adolescent's environment such as parents, siblings, peers, or media. Peer influences are found to be the most significant risk factors for cigarette smoking (CDC, 2012). Conversely, even though most young people seemed to be aware of the addiction and health consequences of smoking, they deliberately chose to offer alternative reasoning to legitimize smoking and maintain their smoking practices. They did not take smoking to be as harmful as other risky behaviours that adolescents often indulge in. They believed that smoking period was only a temporary phase that would be over with the end of their adolescence (Crossley, 2000; Gough, Fry, Grogan, & Conner, 2009).

Students who received education about the dangers of tobacco use in their schools were less likely to initiate tobacco use. On the other hand, adolescent who did not receive any anti-tobacco media messages or education on the harmful effects either in school or at home had higher odds of being current smokers than their counterparts (Rao, Aslam, Zaheer, & Shafique, 2014). Lower scores on knowledge and perceived vulnerability reported greater intentions to use tobacco in the future. Public education campaigns reduce the number of youth who start smoking, increase the number of smokers who quit, and make tobacco industry marketing less effective, saving lives and health care cost. Schools serve as ideal settings for preventing tobacco use among adolescents. Schools provide an efficient means of reaching

large numbers of adolescents, facilitating participation and maximizing the potential cost-effectiveness of preventive measures (CTFK, 2017). School-based prevention programs have been shown to moderately improve adolescents' tobacco harm knowledge, attitude and reduce smoking intention and behaviors (E., Julie, & Rafael, 2013). A peer education intervention in schools is another popular strategy used for smoking prevention. However, the effect of peer education in schools has been somewhat mixed (Rooney & Murray, 1996). The major reasons for it being not significantly effective are - inability of studies to separate out peer education effect from other factors (Milburn, 1995), a lack of clear purpose of peer education program, conflict between the project design and the environment, inadequate training of peer educators (Walker & Avis, 1999), and selecting unsuitable peer educators (Starkey, Audrey, Holliday, Moore, & Campbell, 2009). But, one study using ASSIST model in the United Kingdom showed an encouraging result. It found that the likelihood of students becoming smokers was significantly lower in the intervention schools at two-year follow-up (Campbell et al., 2008).

The recent survey in Bhutan showed that the trend of tobacco use among Bhutanese youth has not decreased between 2007-2013 (WHO-SEARO, 2015b). Instead, the use of smokeless tobacco among youth has increased substantially. Even though Bhutan banned the sale of tobacco products since 2004, the ban did not seem to have

deterred the access of adolescents to tobacco products and their using them. It also hints at the lack of or limited health education programs on harms of tobacco use for the adolescents. As a result, students may not have sufficient information and skills with them to keep themselves away from tobacco products.

Reviews of studies in some countries on the school-based peer education programs showed success in increasing knowledge about tobacco and improving attitudes of students. However, studies on reducing the prevalence of smoking behaviour among adolescents produced mixed results. This could be partly due to inconsistency in methods used (E. et al., 2013) or a poorly designed program for peer-led education (Starkey et al., 2009; Walker & Avis, 1999).

In the case of Bhutan, the tobacco studies carried out so far were cross-sectional in nature, mainly assessing the prevalence of tobacco use and exposure to tobacco smoke. Tobacco use questions are also integrated in other surveys such as National Health Survey (NHS), Non-communicable Disease Risk Factor (STEPS) Survey and Global School-based Student Health Survey (GSHS). A catalogue of publications maintained by the Ministry of Health, Royal Government of Bhutan does not feature a single study that is related to tobacco use prevention in schools. Moreover, any strategy of peer-led education on tobacco use in schools is virtually non-existent

other than sporadic awareness programs being organized on substance abuse in schools. Schools also currently do not have tobacco use-related issues featuring in their curricula. Hence, the proposed intervention package can be a model, if proven successful, to guide a future course of prevention program on tobacco use in schools. Furthermore, this study intent to overcome the study flaws as much as possible in the design and development of the model so that it is able to generate reliable and useful information.

As per the news in different print media, illegal sales of tobacco products were reported to be rampant in Bhutan (Cheki, 2018; Lhamo, 2017; Pokhrel, 2018; Tshomo, 2016a, 2016b). This could be apparently true since the amount of the contraband products being seized by the customs office every year is on the upward trend. Such a situation gives adolescents an easy access to tobacco products, especially the cheaper ones that come across the border illegally from India. The surge in tobacco use prevalence among adolescents in recent years may roughly be attributed to the widespread illegal trade in tobacco. Despite the ban on sales of tobacco products in the country since 2004, this illegal trade has made tobacco products easily accessible to adolescents. In view of such a situation, the concerned authorities may look at the measures to reduce the demand for tobacco by young adolescents. One of the strategies may be to improve the health literacy among students on the

negative consequences of tobacco use. Based on the reviews of experiences in other countries, the school-based and peer-led health education could be explored in Bhutan.

1.2 Research question

- Will a school-based NTUIS model enable adolescents to acquire knowledge about tobacco use and its harmful consequences?

- Can the NTUIS model bring changes in attitudes towards tobacco use, intention to use tobacco in the future and in tobacco use behaviour among adolescents?

1.3 Purpose of the study

- To evaluate the school-based NTUIS model on student's tobacco use knowledge, attitudes, intentions and behaviour.

1.3.1 Specific objectives

- To assess the student's knowledge on and attitude towards tobacco use, and intention to use tobacco before and after implementation of the school-based NTUIS model.

- To compare the effects of NTUIS model on the tobacco use knowledge, attitude, intention and behaviour between the groups before and after implementation of the model.

1.4 Research hypothesis

Null hypothesis (H_o):

✓ There is no difference in knowledge on tobacco use between NTUIS group and control group.

✓ There is no difference in attitude towards tobacco use between NTUIS group and control group.

✓ There is no difference in intention to use tobacco between NTUIS group and control group.

✓ There is no difference in change of tobacco use between NTUIS group and control group.

Alternative hypothesis (H_1):

✓ There is difference in knowledge on tobacco use between NTUIS group and control group.

✓ There is difference in attitude towards tobacco use between NTUIS group and control group.

✓ There is difference in intention to use tobacco between NTUIS group and control group.

✓ There is difference in change of tobacco use between NTUIS group and control group.

1.5 Operational definitions

- *No-Tobacco-Use-In-School Model:* It is a peer-led education program that is being carried out by peer educators in schools to improve the knowledge about and attitude towards the tobacco use among their friends, and help them in maintaining tobacco free behaviour.

- *Peer educators*: The students who were selected based on the set criteria to receive a training on peer education in order to implement the NTUIS model in their schools and disseminate the anti-tobacco messages among their peers.

- *Peer-led education:* It refers to a method that facilitates in transferring the knowledge and skills from one peer to another in the context of tobacco use prevention.

- *Adolescents:* Students, belonging to the age range of 10-19 years, currently studying in the eighth grade in secondary schools in the district of Wangdue Phodrang, Bhutan. In the current study, the terms 'adolescents' and 'students' are used interchangeably.

- *Knowledge*: It is the amount of information on health hazards of tobacco use, effects of second-hand smoke, nicotine addiction, religious perspectives on tobacco use and tobacco control regulations acquired by a student through a peer education program in schools.

- *Attitude*: It refers to the extent to which an adolescent is holding a positive or negative observation (feeling or thinking) towards the use of tobacco and its health effects.

- *Intentions*: Serious thoughts or commitments expressed by adolescents about their likelihood of abstaining from tobacco use in the next five years and for lifetime.

- *Behaviour*: It is the maintenance of the nonuser status of tobacco among students during the study period. If students do not uptake either smoking cigarettes or smokeless tobacco before and after the intervention, they are considered to maintain a nonuser status.

- *Tobacco*: It is any form of product made from the tobacco plant. Tobacco products are produced in a smoking form like cigarettes, cigars or *bidis*, and a smokeless form such as *baba, surti* and *khaini*.

- *Tobacco use*: It is an act of consuming any product made from tobacco leaves, generally called tobacco products. Tobacco products can be smoked, chewed, gurgled or sniffed. In this study, the context is in reference to the use of common tobacco products in Bhutan like cigarettes, *bidi, baba* and *khaini*

- *Age*: A self-reported age of an adolescent.

- *Sex*: Adolescents self-identifying themselves either as male or female.

- *School hostel/home*: A dwelling place where the adolescents/students live.

- *Parent's occupation*: A work that the mother and father of adolescents do for living.

- *Personality type*: Adolescents identifying themselves either as extroverts or introverts.

- *Self-esteem*: Adolescents stating their levels of self-worthiness or confidence ranging from a 'very low' to a 'very high' self-esteem.

- *Alcohol use*: It is an act of drinking any alcoholic beverages by adolescents in the past 30 days.

- *Tobacco use by parents*: It is the observation made by adolescents regarding the consumption of tobacco products by their parents in the past or in the past 30 days.

- *Tobacco use by siblings*: It is the observation made by adolescents regarding the consumption of tobacco products by their siblings in the past or in the past 30 days.

- *Tobacco use by peers*: It is the observation made by adolescents regarding the consumption of tobacco products by their friends in the past or in the past 30

days.
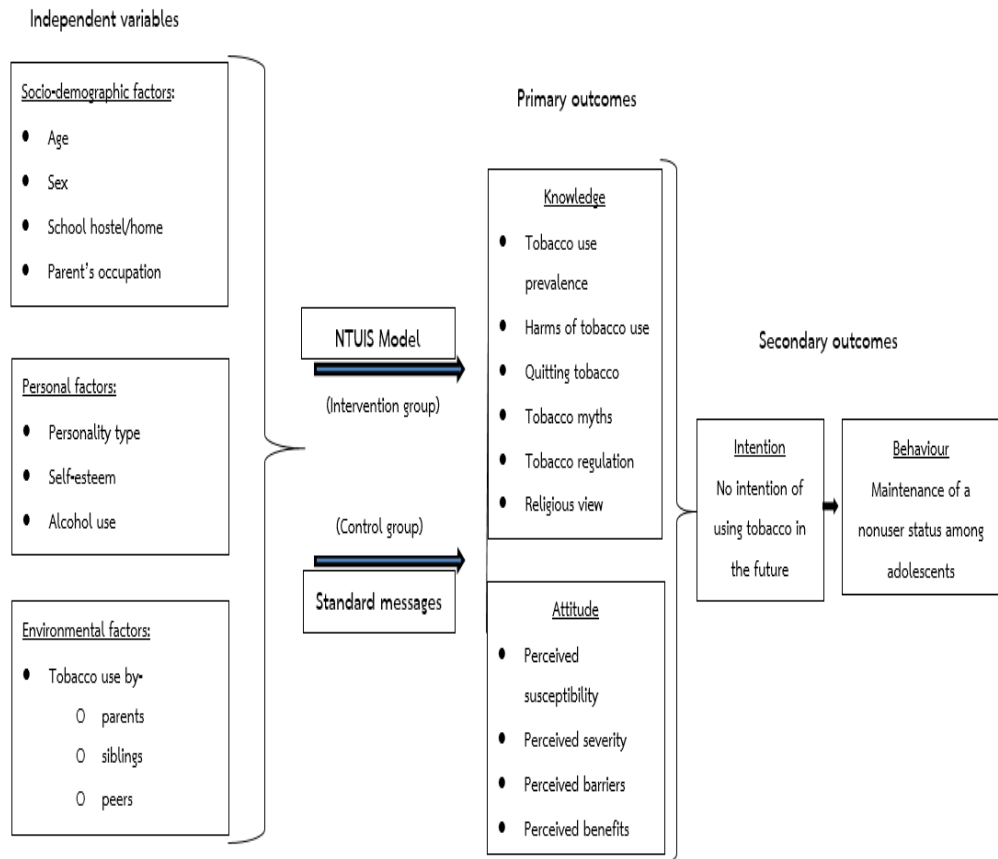
Figure 1- 1. Conceptual Framework

CHAPTER II
LITERATURE REVIEW

The following topics are covered in the literature review:

2.1 Global prevalence of tobacco use among adolescents

2.2 Regional prevalence of tobacco among adolescents

2.3 Tobacco use situation in Bhutan

2.4 Tobacco control strategy for Bhutan

2.5 Tobacco control act of Bhutan

2.6 Global and Regional tobacco control strategy

2.7 WHO FCTC and Article on tobacco education

2.8 Health Education

2.9 Health Belief Model

2.10 Theory of Planned Behaviour

2.11 Diffusion of Innovation Theory

2.12 Knowledge, Attitude, Intention and Behaviour

2.13 School-based health education

2.14 Peer education and tobacco use prevention

2.15 Smoking and adolescents
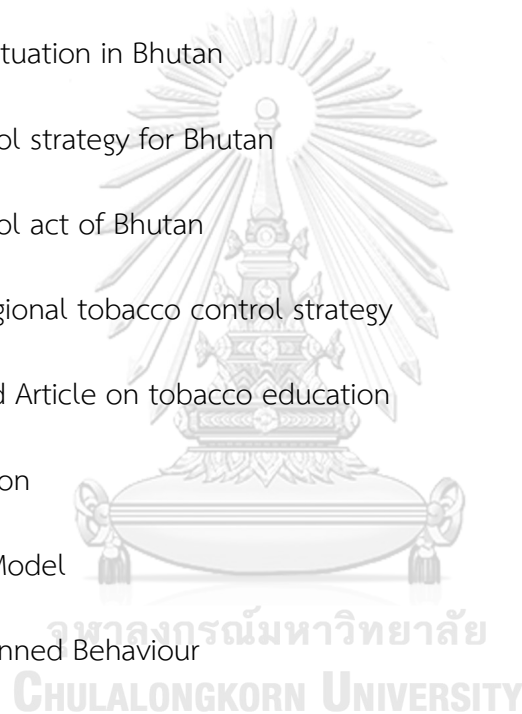
2.1 Global prevalence of tobacco use among adolescents

Even though there had been large reductions in the estimated prevalence of daily smoking among general population in the last three decades at the global level, there had been a significant increase in the number of smokers in general (Ng, Freeman, Fleming, & et al., 2014). The data from the WHO Global Health Observatory data showed that the use of tobacco products among adolescents aged 13-15 years old is prevalent throughout the world (WHO, 2015b). On an average, one in every twenty adolescents uses some types of tobacco products. The global tobacco use prevalence stands at 18%, with highest prevalence in Eastern Mediterranean (21%) and South-East Asia (21%). Cigarette smoking, in particular, is common among adolescents. However, a rising concern is shown by various reports on how other tobacco products, such as smokeless tobacco, *bidis*, pipes, hookahs, etc., are also being commonly used by youth worldwide (Eriksen, Mackay, Schluger, Gomeshtopeh, & Drope, 2015). Indeed, prevalence of the use of these products is higher than that of cigarettes in the regions of Southeast Asia, the Eastern Mediterranean, and sub-Saharan Africa. Most regular smokers initiate smoking before 20 years of age. Adolescent's attitudes towards tobacco use have been found to be associated with initiation of use tobacco. Vulnerability of adolescents to use tobacco increases when their family members and friends are tobacco users.

Table 2- 1. Prevalence of current tobacco use among adolescents aged 13-15 years (2007-2014)

WHO Regions	Tobacco use prevalence	
	Female	Male
Africa*	11.0	12.0
Americas	13.8	17.0
South-East Asia	7.4	21.0
Europe*	8.0	12.0
Eastern Mediterranean	9.7	21.3
Western Pacific	3.5	12.4
Global	8.3	18.2

*Tobacco use other than cigarettes

Source: WHO Global Health Observatory Data Repository (2015) & GYTS, CDC

Globally, 12 percent of boys and 7 percent of girls currently smoke cigarettes. The rates for boys are highest in the regions of Europe and Western Pacific, while girls have highest in the regions of Europe and the Americas. Boys are more likely than girls to smoke cigarettes in the regions of Africa, Eastern Mediterranean, South-East Asia, and Western Pacific. However, girls are more likely than boys to smoke cigarettes in the Americas. Review of the global data from the youth tobacco surveys found that the majority of sites from where the data were collected showed no change over time in prevalence of cigarette smoking among 13-15 year olds between 1999 and 2008 (Warren et al., 2009).
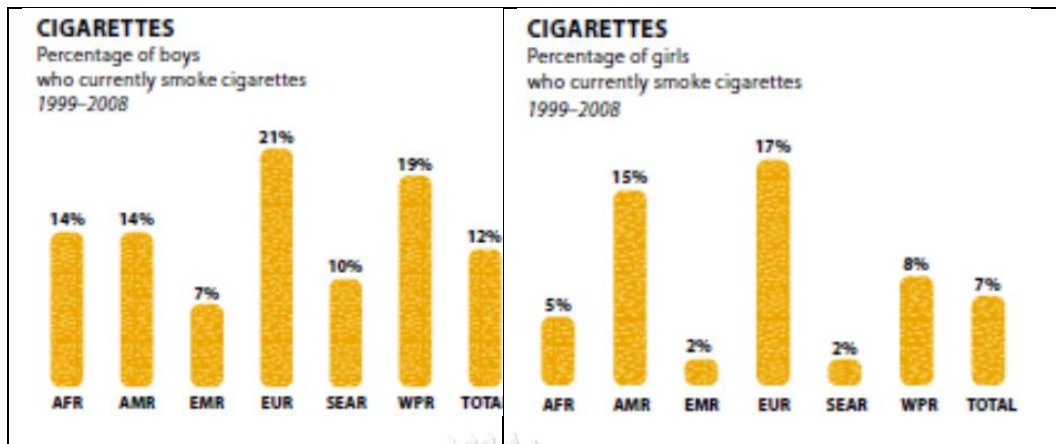
Source: Report of Global Youth Tobacco Survey (GYTS), Centre for Disease Control and Prevention (CDC)

Figure 2- 1. Prevalence of current cigarette smoking among adolescents aged 13-15 years (1999-2008)

The susceptibility to initiate cigarette smoking is high among adolescents who had never smoked in all regions. About 19 percent of both boys and girls said that they were susceptible to starting to smoke within the next year. There was no overall difference between boys and girls in wanting to initiate cigarette smoking.
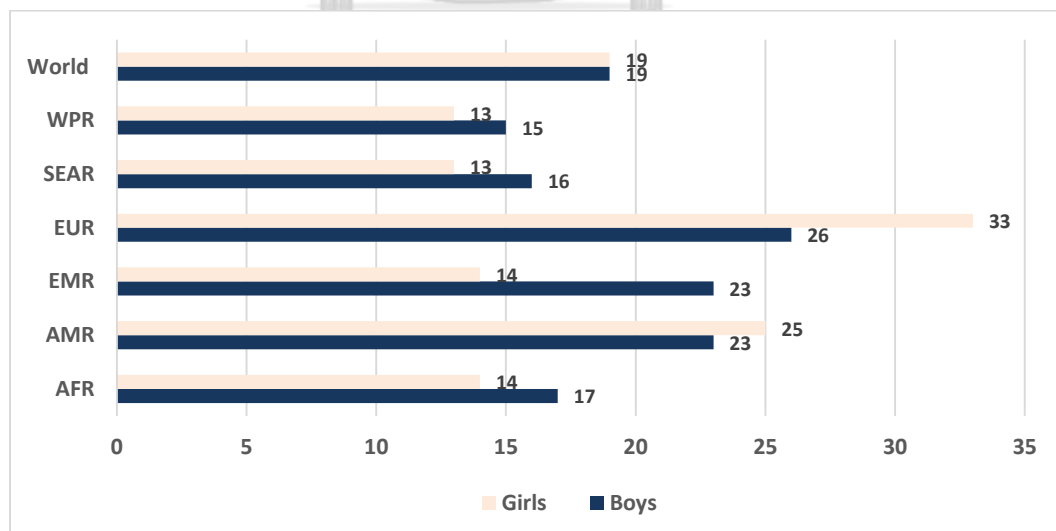
Source: Report of GYTS & Centre for Disease Control and Prevention (CDC)

Figure 2- 2. Percentage of adolescents aged 13-15 years who never smoked but consider themselves susceptible to initiate cigarette smoking (1999-2008)

The exposure of adolescents to second-hand smoke is disturbingly high. About 50 percent of adolescents in the world are exposed to exposed to second-hand smoke in public places, while 45 percent at their homes. The second-hand exposure is highest in European region both at homes (78%) and in the public places (86%). According to the Surgeon General's Report, there is no safe level of second-hand smoke exposure, and it is known to cause severe health conditions, including middle-ear disease, impaired lung function, sudden infant death syndrome, and lower respiratory illness (CDC, 2006).
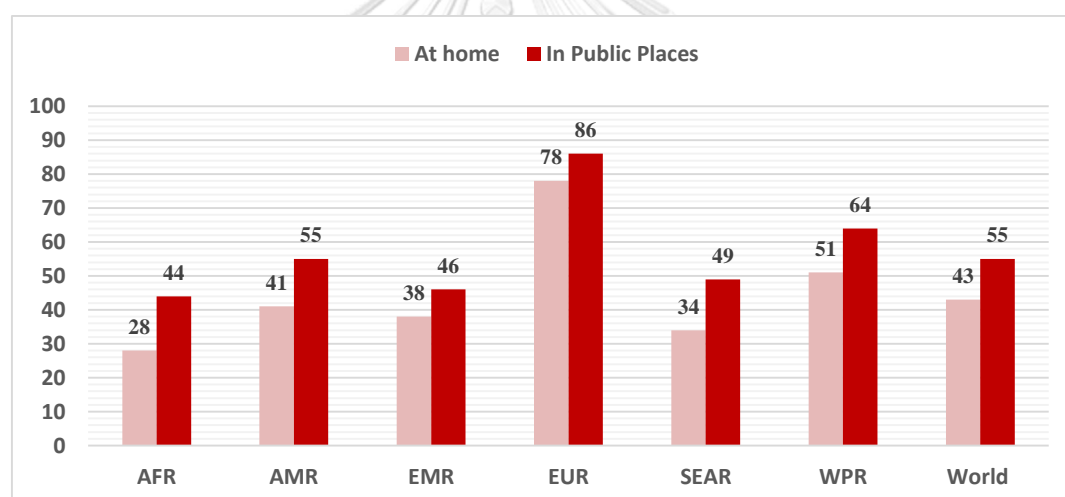
Source: Report of Global Youth Tobacco Survey (GYTS), Centre for Disease Control and Prevention (CDC)

Figure 2- 3. Percentages of adolescents aged 13-15 years who were exposed to secondhand smoke at homes and in public places (1999-2008).

Tobacco use is one of the major preventable causes of death in the world. It is considered as one of the highest risk factors for deaths from non-communicable diseases. Tobacco kills up to half of its users. Currently, tobacco kills about seven million people every year, including 890 000 of non-smokers who are exposed to

second-hand smoke. The children account for 28 percent of all deaths attributable to second-hand smoke. There are more than 4000 chemicals in tobacco smoke, of which at least 250 are known to be harmful and more than 50 are known to cause cancer. Tobacco users who die prematurely deprive their families of income, raise the cost of health care and hinder economic development (WHO, 2018).
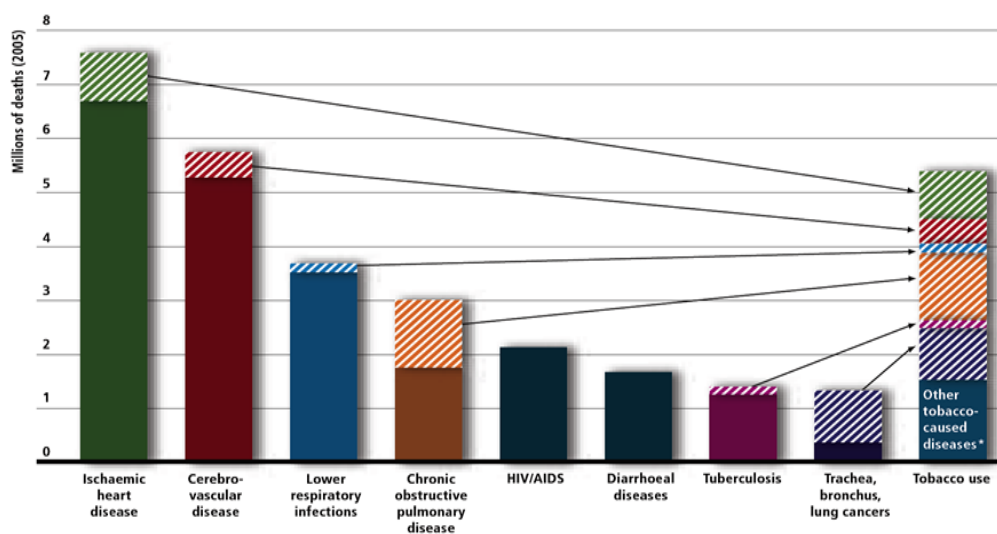
Source: WHO Global Report: Mortality attributable to tobacco, 2012.

Figure 2- 4. Numbers of attributable deaths due to tobacco use-related causes in the world

The deaths attributable to tobacco use are mostly from chronic obstructive pulmonary disease, cancers, ischaemic heart disease and different types of cancers. Amongst them, lung cancer is the leading cause of cancer death worldwide, killing approximately 1.4 million people globally in 2008. At least 80 percent of lung cancer deaths are attributable to smoking.

2.2 Regional prevalence of tobacco use among adolescents

Tobacco use among adolescents is increasingly becoming a major concern in the countries of WHO South-East Asia.

The pattern of tobacco use both among adolescents and adults in South East Asia is complex due to the availability and affordability of all sorts of tobacco products in the region, subsequently leading to the rise in their use (D. Sinha, Palipudi, Rolle, Asma, & Rinchen, 2011). The prevalence of tobacco use among adolescents in the Region is diverse and ranges from Bangladesh (7%) to Timor-Leste (42%) as per the recent GYTS report. Countries like Bhutan (30%), Nepal (20%) and Indonesia (20%) have high prevalence of tobacco use. Prevalence rates for boys are consistently higher than for girls across the countries.
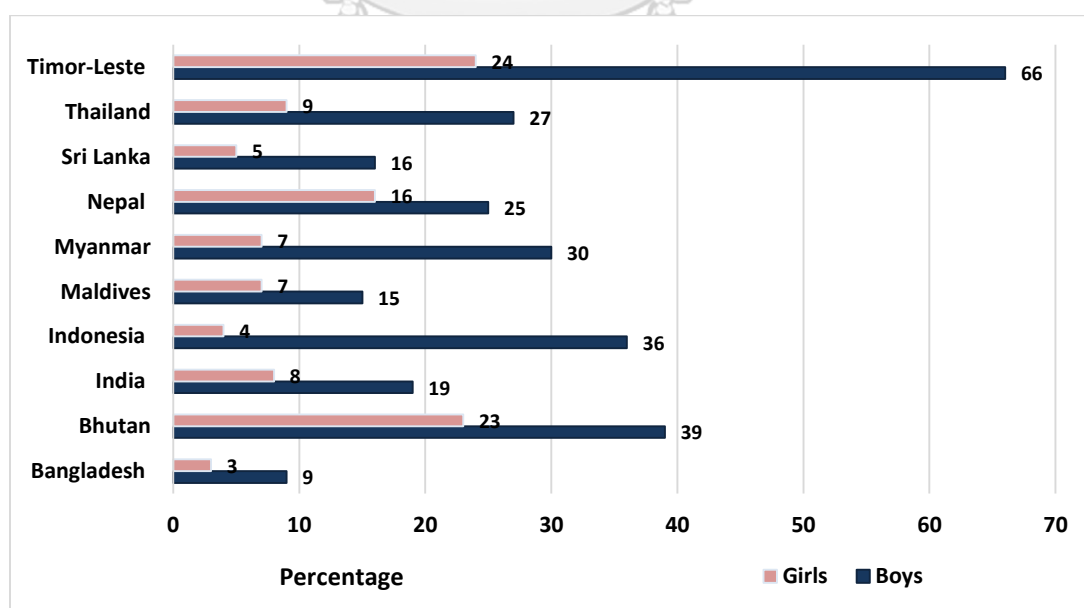
Source: WHO SEAR, Monitoring tobacco control among youth in countries of the South-East Asia Region, 2014: Findings from the Global Youth Tobacco Survey, 2003–2014.

Figure 2- 5. Prevalence of tobacco use among 13–15 year olds by sex in Member States of WHO SEAR

The smokeless tobacco use is high among adolescents aged 13–15 years in Bhutan, Myanmar and Nepal. More boys are using smokeless tobacco than girls in the region.

In Bangladesh, Bhutan, Nepal and Sri Lanka, the overall prevalence of SLT use in this age group of 13–15 years is higher than for smoking. The Region has also a huge prevalence of non-cigarette indigenous products like *bidi*, *kreteks*, *cheroots* and a variety of smokeless products, which the industry advertises, promotes and sponsors in a variety of ways to entice youth into tobacco use.
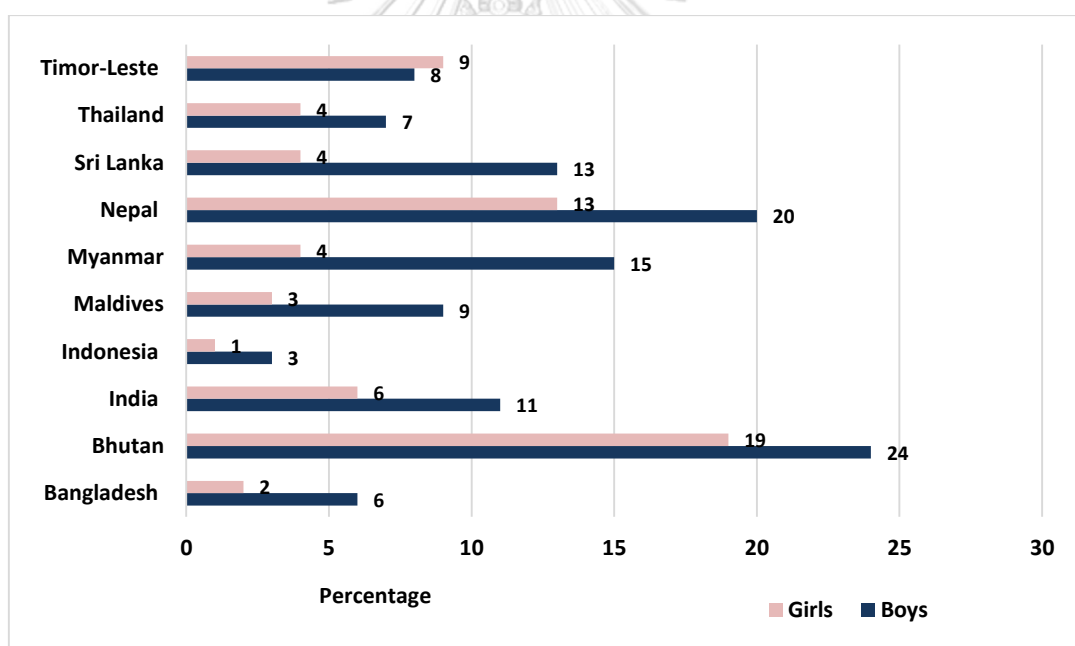
Source: WHO SEAR, Monitoring tobacco control among youth in countries of the South-East Asia Region, 2014: Findings from the Global Youth Tobacco Survey, 2003–2014.

Figure 2- 6. Prevalence of smokeless tobacco use among 13–15 year olds by sex in Member States of WHO SEAR

The Global Youth Tobacco Survey (GYTS) data indicated that more than one third of 13–15 year olds are exposed to tobacco smoke either at home or in enclosed public places in the region. Such exposure is high in Timor-Leste (70%), Thailand (68%), Indonesia (60%) and Bangladesh (59%) (WHO-SEARO, 2014).
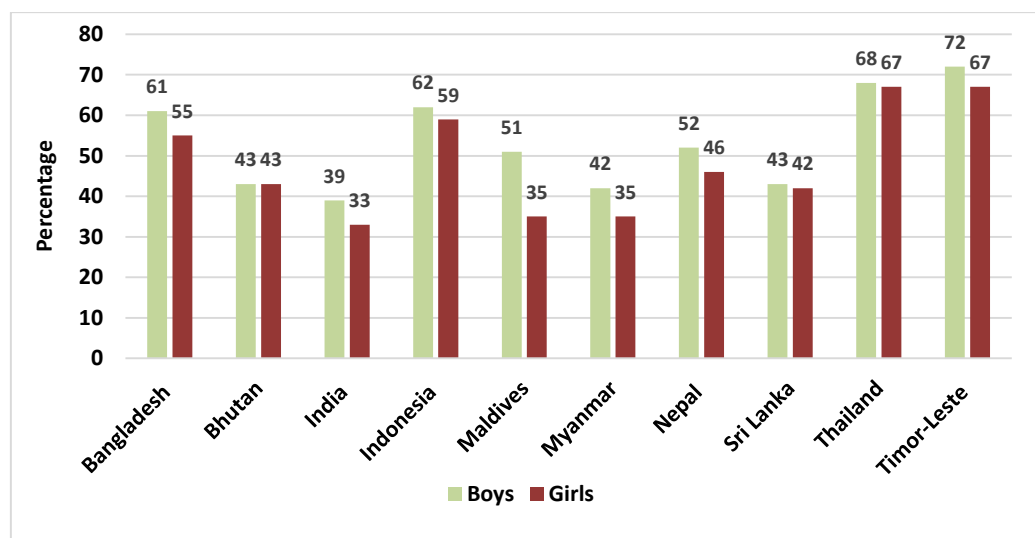
Source: WHO SEAR, Monitoring tobacco control among youth in countries of the South-East Asia Region, 2014: Findings from the Global Youth Tobacco Survey, 2003–2014.

Figure 2- 7. Percentage of adolescents aged 13–15 years by sex exposed to smoking in enclosed public places in Member States of WHO SEAR

The long-term use of smokeless tobacco is reported to cause a variety of health problems. More than one million die every year due to tobacco use in the South-East Asia. There is not much difference between the deaths among men (856,802) and women (851,102). The major causes of mortality among tobacco users in the region are diseases that include cancer, cardiovascular disease, chronic obstructive

pulmonary disease, and other respiratory and vascular diseases. In South-East Asia,

deaths due to smokeless tobacco are estimated to be 426,000. This is the 38% of

deaths due to all forms of tobacco (WHO, 2012).

Table 2- 2. Tobacco-attributable deaths in WHO South-East Asia (2004)

Age	Male	Female	Total
0-29	517,963	482,312	1,000,275
30-44	172,808	163,720	336,527
45-59	106,101	102,496	208,597
60-69	37,148	39,844	76,992
70-79	17,800	20,628	38,428
80+	4,983	6,101	11,084
Total	856,802	851,102	1,671,904

Source: WHO Global Report, Mortality attributable to tobacco (2012)

Deaths attributable to tobacco include chronic illnesses such as heart disease, lung

disorders and cancers. In fact, the morbidity or impairment of health caused by

tobacco is more widespread. Loss of income and the psychological effects due to

chronic illness are other factors that affect families of tobacco users. It is therefore

one of the major causes of loss of quality of life, or healthy years of life lost in the

world (WHO, 2009).

One major challenge of the governments in the Region is how to tack tobacco

advertising. In South-East Asia, exposure of adolescents to tobacco pro-

advertisements is very high. Young boys and girls face increasing exposure to tobacco

advertising and promotion campaigns. The tobacco industry uses tactical and innovative ways to reach its tobacco products to youth. Exposure to pro-tobacco ads is mainly through newspapers, television, video or movies. The GYTS data showed that over 60 percent of adolescents in most of the countries of the region saw pro-tobacco ads. Thailand and Maldives had the lowest exposure.
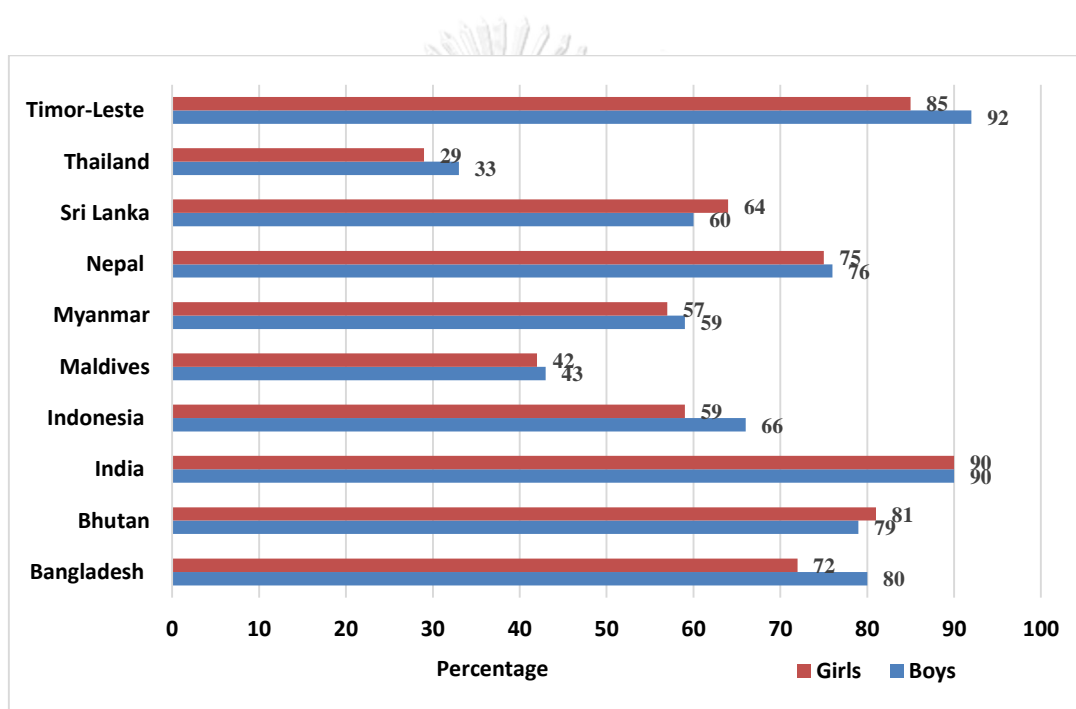
Source: WHO SEAR, Monitoring tobacco control among youth in countries of the South-East Asia Region, 2014: Findings from the Global Youth Tobacco Survey, 2003–2014.

Figure 2- 8. Percentage of adolescents aged 13–15 years who are exposed to pro-tobacco advertisement by sex in Member States of WHO SEAR

2.3 Tobacco use situation in Bhutan

The adolescents in Bhutan seem to use equally both the smoked and smokeless forms of tobacco. The Global Youth Tobacco Survey report showed that 39% of boys

and 23.2% of girls were the current users of tobacco. The current prevalence of smoking was 26.3% among boys and 8.6% among girls, while for the smokeless tobacco, it was 25% for boys and 18.9% for girls. The smokeless tobacco use prevalence is the highest in the region while the overall tobacco use among boys remains the second highest (WHO-SEARO, 2015b).
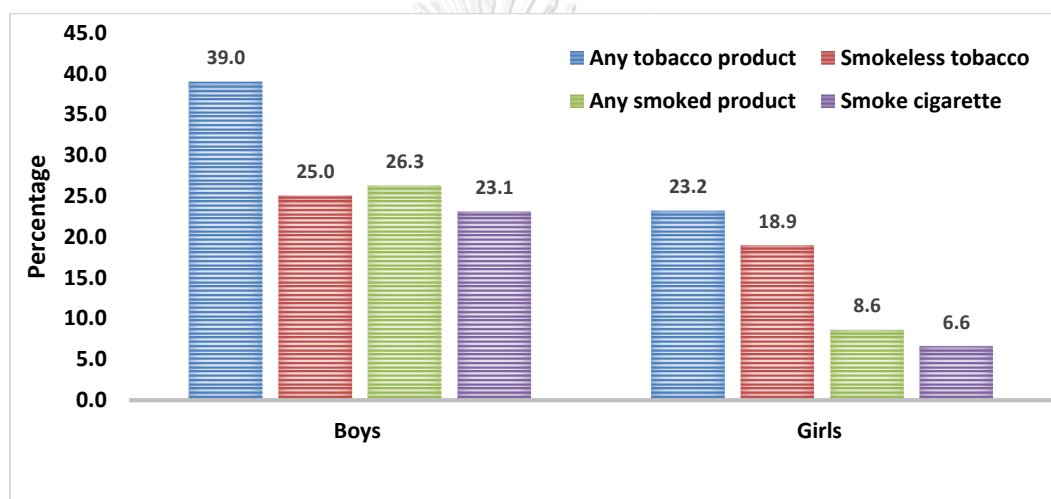
Source: GYTS Report, 2013

Figure 2- 9. Prevalence of tobacco use among adolescents aged 13-15 years by sex in Bhutan

As far as the trends of tobacco use among adolescents go, according to the GYTS Bhutan report, there has been an overall increase in all forms of tobacco use from 2004 to 2013 (21.7% to 39% for boys and 14.6% to 23.2% for girls). Mostly Indian brands of smoking (cigarettes and *bidis*) as well as smokeless products (*Baba* and *Khaini*) are popular among adolescents. But in general, chewing of betel quid with areca nut called "*Doma*" with or without tobacco is a very common practice.

| Cigarettes | Chewing tobacco | Dried tobacco leaf | Baba |

Photo courtesy: Sonam Rinchen, 2012

Figure 2- 10. Popular brands of tobacco products on display in an Indian town across the Bhutan-India border.

There is no information on deaths of adolescents due to tobacco use. However, as per the WHO mortality report of 2012, the overall proportion of deaths attributable to tobacco among adults aged 30 years and over was 8 percent in 2004, accounting for 10 percent of all NCDs and 3 percent of all communicable disease related deaths in Bhutan. The tobacco-related diseases killed more men (13%) than women (1%). The majority of the tobacco-related diseases that people died from were respiratory disease (51%), malignant lesions (24%) and cardiovascular disease (10%).
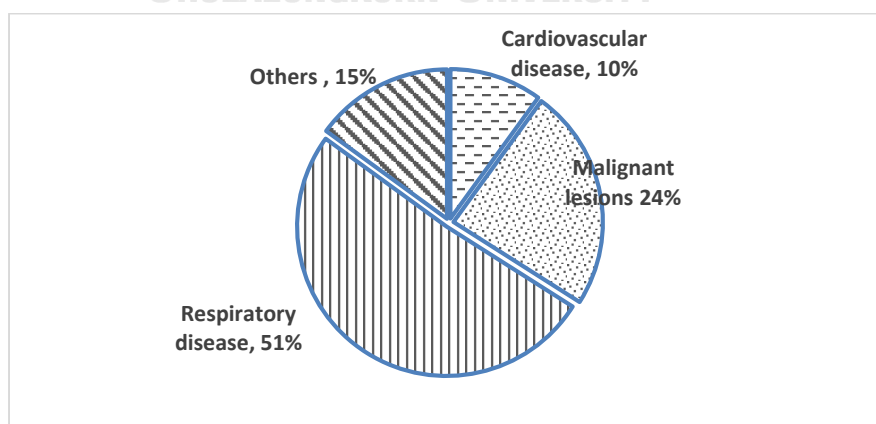
Source: WHO Global report on mortality attributable to tobacco, 2012

Figure 2- 11. Percentage of major tobacco attributable deaths in Bhutan

Exposure to second-hand tobacco smoke among adolescents in enclosed public places (42.8%) is higher than it is at home (15.3%) as per the Global Youth Tobacco Survey report (2013). However, on the whole, its trend has been gradually decreasing over the years (2004-2013) even though the exposure in enclosed public places still remains high.
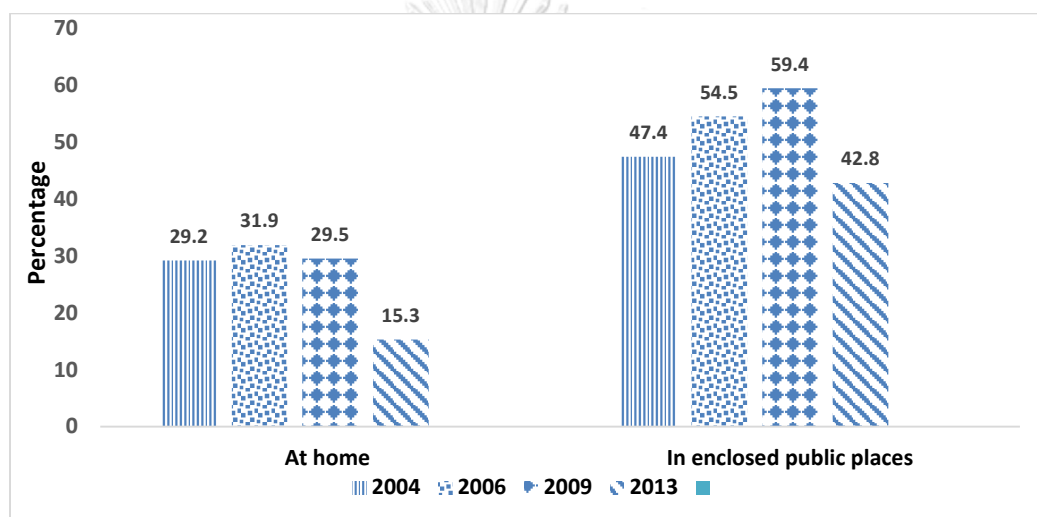
Source: GYTS Bhutan Report, 2013

Figure 2- 12. Percentage of adolescents aged 13-15 years exposed to secondhand smoke by years at homes and in enclosed public places (2004-2013)

2.4 Tobacco control strategy for Bhutan

Bhutan signed the WHO Framework Convention on Tobacco Control (WHO FCTC) in 2003 and ratified it in 2004 (NAB, 2004). Having ratified the Convention, the government issued a ban on the sale of tobacco products in the whole country with effective from 17 December 2004 (RGOB, 2004). Following which a series of activities that took place ultimately culminated in the development of the first Tobacco

Control Act of Bhutan in 2010 (NAB, 2010). The strategic plans for tobacco control were drawn up and policy measures put in place for their effective implementation and better outcomes. Generally, the program is designed to cover all people residing in Bhutan. However, the program intents to give more focus to the vulnerable groups such as poor community, un-reach population, urban youth and out-of-school children. The government's objectives for tobacco control are as follows (BNCA, 2010; RGOB, 2009, 2010):

- Reduce the prevalence of tobacco use.

- Protect the health of non-users from tobacco smoke.

- Implement the Tobacco Control Act effectively.

- Implement the WHO FCTC Articles through the national legislations.

- Reduce prevalence of tobacco use among adolescents/youth (10-24 years) by 20%.

- Scale up research for prevention and control of NCDs and their risk factors.

2.5 Tobacco Control Act of Bhutan

The First Parliament of Bhutan enacted the Tobacco Control Act of Bhutan (TCAB) in June 2010. One of the major provisions of this Act was to impose a complete ban on the cultivation, harvest, manufacture, supply, distribution and sale of tobacco and

tobacco products. However, a person can import for personal consumption tobacco, but should be within the permissible quantity. Individuals can purchase from outside the country up to 800 sticks of cigarettes, 1200 sticks of *bidis*, 150 cigars and 750 grams chewing tobacco per month (NAB, 2014). The Act provides a comprehensive ban on the advertisement, promotion and sponsorship of tobacco and tobacco products, including restricting the appearance of tobacco in domestic videos and movies to educational clips produced for the purpose of health promotion. This Act mandates the state to carry out comprehensive advocacy and educational programs, and put in place tobacco control strategies, including the research and surveillance of tobacco use in the country (NAB, 2010).

2.6 Global and Regional Tobacco Control Strategies

The WHO Global Action Plan 2013-2020 for the prevention of control of noncommunicable diseases (NCDs), gives high priority to reduce modifiable risk factors for noncommunicable diseases, including tobacco use by addressing the underlying determinants and promoting research and development (WHO, 2013). Within the timeframe of this Action Plan, a global target is set to reduce tobacco use by 30 percent. Similarly, for the WHO South-East Asia, the regional NCD strategy aims at improving health and social outcomes and well-being of people of the region by reducing morbidity, mortality and harmful economic and social consequences of all

forms of tobacco use (WHO-SEARO, 2012). In order to achieve this target, the WHO

recommends the countries to intensely implement the WHO FCTC and MPOWER

strategies. The MPOWER strategy in brief is as below:

- M – **Monitoring** tobacco use and prevention policies diseases.

- P - **Protecting** people from tobacco smoke

- O - **Offering** help to quit tobacco use

- W - **Warning** about the dangers of tobacco

- E - **Enforcing** bans on tobacco advertising, promotion and sponsorship

- R - **Raising** tobacco taxes

2.7 WHO Framework Convention on Tobacco Control and tobacco education

The WHO FCTC was adopted unanimously by the World Health Assembly on 23 May

2003. It is the first international treaty negotiated under the auspices of WHO, and

entered into force in 2005. The WHO FCTC was developed in response to the

globalization of the tobacco epidemic and is an evidence-based treaty that reaffirms

the right of all people to the highest standard of health (FCTC-Secretariat, 2015). The

FCTC is divided into many sections and some of the pertinent sections are as follows

(WHO, 2005):

- Articles 6 to 14: demand-side reduction measures;

- Articles 15-17: supply-side reduction measures;

- Article 18: protection of the environment;

- Articles 20-22: cooperation and communication;

Article 4 (*Guiding Principles*) of FCTC stated that every person should be informed of the health consequences, addictive nature, and mortal threat posed by tobacco consumption and exposure to tobacco smoke. And, the Article 12 which is on "Education, communication, training and public awareness" emphasizes the importance of raising public awareness of tobacco control issues through all available communication tools, such as media campaigns, educational program and training.

2.8 Heath education

Health education is one strategy of health promote and is focused on helping individuals learn and use health-enhancing skills. Health education is often very visible and tangible, and it may often include educational programs, activities and skill-building group or individual group or individual sessions. Health education is part of health promotion, but health promotion is more than health education. Health education is indispensable in achieving individual and community health (Hou, 2014; WHO, 1998). Health education is defined in 1976 by Simonds as aimed at bringing about behavioural changes in individuals, groups and larger populations from behaviours that are presumed to be detrimental to health, behaviours that are conducive to recent and future health (Glanz, Riner, & Viswanath, 1997). In 1980,

Green defined health education as any combination of learning experiences designed to facilitate voluntary adaptations of behaviour conducive to health (Glanz et al., 1997). Generally, health education is defined as "any combination of planned learning experiences based on sound theories that provide individuals, groups and communities the opportunity to acquire information health education is defined as "any combination of planned learning experiences based on sound theories that provide individuals, groups, and communities the opportunity to acquire information and the skills needed to make quality health decisions." It comprises of consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge, and developing life skills which are conducive to individual and community health. It is designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes (Gold & Miner, 2001; Griffiths, 1972; WHO, n.d). Health education is any planned activity designed to produce health-related or illness-related learning aiming the occurrence of a relatively permanent change in capability or disposition - that is the change produced is not transitory and after the health educational intervention, people are capable of achieving what they were not capable of achieving before the intervention, people and feel differently about ideas, people and events (Tones & Green, 2004). Health education is concerned with individuals and families but also with the institutions and social conditions that

impede or facilitate individuals toward achieving optimum health. From declaration of Alma-Ata by emphasizing the need for individual and community participation, health education is defined as the process aimed at encouraging people to want to be healthy, how to maintain health and to seek help when needed. Health education as a tool for health promotion is critical for improving the health of populations and promotes health capital. It is consciously constructed opportunities for learning involving some form of communication designed to improve health literacy, including improving knowledge, and developing life skills, which are conducive to individual and community health (EMRO, 2012). Health education is the profession of educating people about health. Areas within this profession encompass environmental health, physical health, social health, emotional health, intellectual health, and spiritual health. It can be defined as the principle by which individuals and groups of people learn to behave in a manner conducive to the promotion, maintenance, or restoration of health.

On the other hand, health promotion is the process of enabling people to increase control over and improve their health. It is concerned with improving health by seeking to influence lifestyles, health services and environments (WHO, 2015a). Health promotion has its roots in many different disciplines. Over time it incorporated several previously separate components, one of which was health

education. Some authorities hold the view that health promotion comprises three overlapping components: health education, health protection and prevention (Kirsten, 1990; R.S.Downie, Fyfe, & Tannahil, 1990). These overlapping areas are potentially substantial: health education, for example, includes educational efforts to influence lifestyles that guard against ill-health as well as efforts to encourage participation in prevention services. Health education aimed at health protection champion positive health protection measures among the public and policy-makers. The combined efforts of all three components stimulate a social environment that is conducive to the success of preventive health protection measures (EMRO, 2012). The health promotion model was created consisting of three overlapping spheres of activity: health education, health protection and health protection. The focus from health education and prevention shifted to health protection and promotion. Health education is designed to change beliefs, attitudes, knowledge and behaviour in a way that facilitates health. Disease prevention aims to decrease risk factors and minimize the consequences of disease. However, health protection focuses on legal controls and policies aimed at ill-heath and enhancing wellbeing (Tannahill, 2009).

2.9 Health Belief Model

The Health Belief Model (HBM) was developed to help understand why people did or did not use preventive services offered by public health departments in the

1950's, and has evolved over the years to address newer concerns in prevention and detection as well as lifestyle behaviors such as sexual risk behaviors and injury prevention. The HBM theorizes that people's beliefs about whether or not they are at risk of a disease or health problem, and their perceptions of the benefits of taking action to avoid it, influence their readiness to take action. The HBM has been most-often applied to health concerns that are prevention-related and asymptomatic. The HBM is also clearly relevant to interventions to reduce health risk factors due to tobacco use.

Perceived Susceptibility - Belief about getting a disease or condition.

Perceived Severity - Belief about the seriousness of the condition, or leaving it untreated and its consequences.

Perceived Benefits - Belief about the potential positive aspects of a health action.

Perceived Barriers -Belief about the potential negative aspects of a particular health action.

Cues to Action - Factors which trigger action.
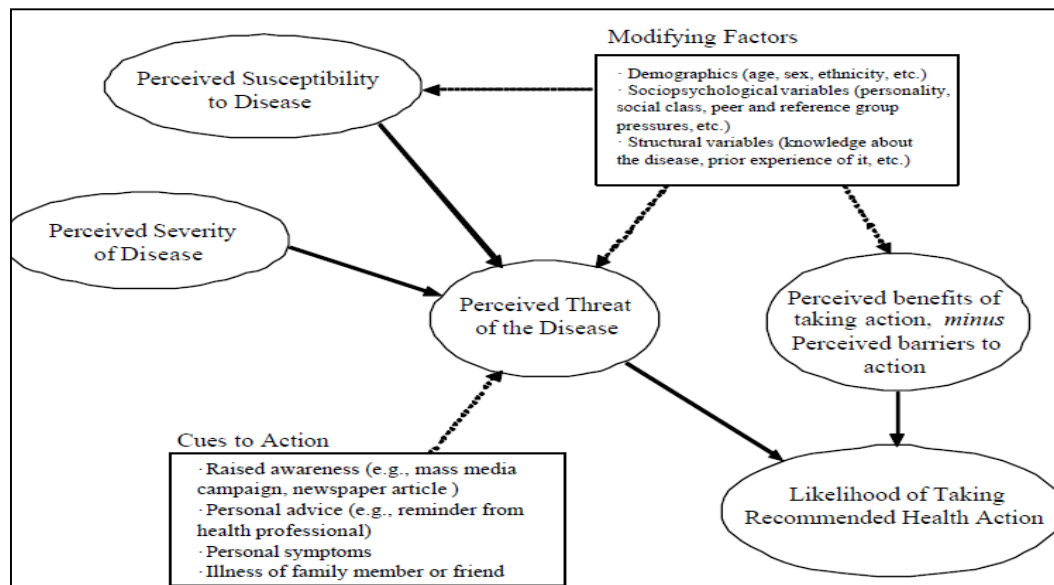
Figure 2- 13. Health Belief Model and its modifying factors

HBM was originally concerned with the uptake of tuberculosis screening opportunities provided via mobile X-ray units. In that context (in the early 1950s, when new medicines for tuberculosis were becoming available) it was found that beliefs about susceptibility to the infection and the benefits of screening were strongly correlated with chest X-ray acceptance. Subsequent extensions of the model were associated with efforts to apply it to other contexts, including not only other forms of screening but also immunization and compliance with medical treatment for conditions such as diabetes, renal failure and hypertension (Harrison, Mullen, & Green, 1992; Janz & Becker, 1984; Rosenstock, Strecher, & Becker, 1988). It has more recently been used in areas ranging from HIV prevention to weight control. But various studies have questioned the extent to which cognitions such as

perceived threats are effective behavioural motivators (Paschal & Sheina, 1998; Sheeran & Abraham, 2003).

2.10 Theory of Reasoned/Planned Behaviour

The Theory of Reasoned Behavior was formulated by Ajzen and Fishbein (1980) to predict deliberate behavior since behavior can be intentional and planned. This theory suggests that a person's intention is the predictor of his/her behavior. However, this intention is dependent on his/her attitude toward the behavior and his/her subjective norm. Intention represents a person's willingness to perform a particular behavior. Intention always precedes behavior. This intention is influenced by three other factors: a person's attitude toward a specific behavior, the subjective norms and the perceived behavioral control. The theory of planned behavior holds that only specific attitudes toward the behavior in question can be expected to predict that behavior. In addition to measuring attitudes toward the behavior, we also need to measure people's subjective norms – their beliefs about how people they care about will view the behavior in question. To predict someone's intentions, knowing these beliefs can be as important as knowing the person's attitudes. Finally, perceived behavioral control influences intentions. Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior. These predictors lead to forming intentions to take action. As a general rule, the more

favorable the attitude and the subjective norms and the greater the perceived control, the stronger should the person's intention to perform the behavior in question (Ajzen, 1991).
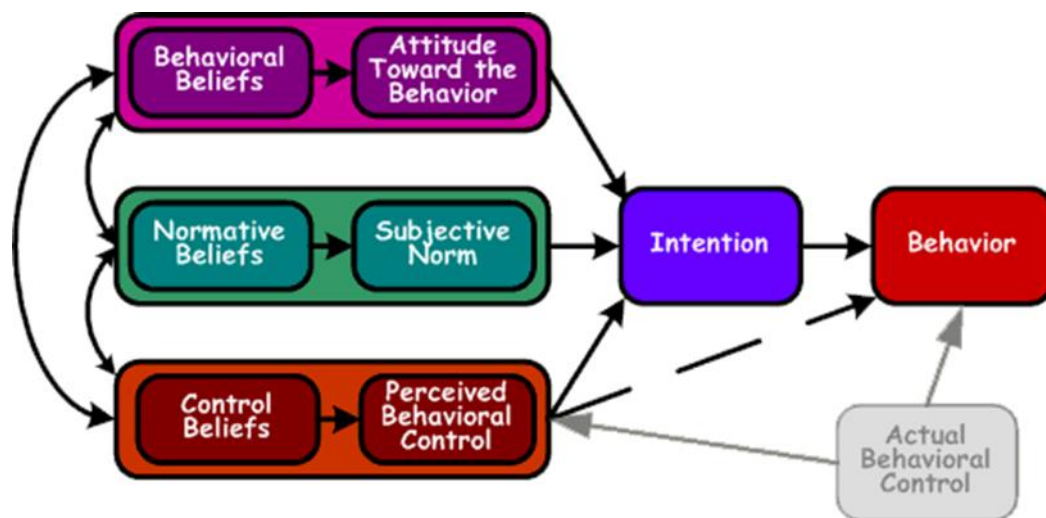
Figure 2- 14. Theory of Reasoned / Planned Behaviour

2.11 Diffusion of Innovation Theory

Diffusion of Innovation (DIT) Theory, developed by E.M. Rogers in 1962, explains how, over time, an idea or product gains momentum and diffuses or spreads through a specific population or social system (Rogers, 1983). People adopt a new idea, behavior, or product gradually in a social system. By adopting a new idea, a person behaves in a different way as compared to that of the past. However, diffusion is only possible only if people think the idea or behaviour as new or innovative. Adoption takes place at different times, some adopt early while others later. So, there are categories of adopters:

1.   Innovators – they are the first ones to try new idea or behaviour. They are adventurous, enthusiastic and risk-taking when it comes to adopting new ideas. They don't need to be pushed hard to take new ideas.

2.   Early Adopters – they represent opinion leaders and enjoy leadership roles, and embrace change opportunities. They are already aware of the need to change and so are very comfortable adopting new ideas.

3.   Early Majority – They adopt new ideas earlier than many others. They seek evidence of innovation working before they adopt new ideas completely.

4.   Late Majority – They are sceptics who will resist change, and will only adopt an innovation after it has been tried by the majority.

5.   Laggards – they are conservative people and very unwilling to change. However, whether people adopt innovations or not will depend on the following factors:

•   Relative advantage - an innovation is perceived as better than the existing ones.

•   Compatibility – reliability of innovation is imperative.

•   Complexity – simple to understand or use the innovation.

•   Triability – an innovation can be experimented before the full adoption.

•   Observability – an innovation produces tangible results.

2.12 Knowledge, Attitude, Intention and Behaviour

The term 'attitude' refers to a person's general feeling of favourableness (positivity) or unfavourableness (negativity) toward some stimulus object. The moment a person begins to form beliefs about an object, he/she inevitably and instantaneously acquire an attitude towards that object. Beliefs about an object provide the basis for the formation of attitudes. So, attitudes are normally measured by assessing a person's

belief. However, a person's attitude towards an object can be measured by a large set of his/her intentions with respect to that object. Intentions comprise of four parts: the behaviour, the target object at which that behaviour is directed, the situation in which the behaviour is to be performed, and the time at which the behaviour is to be performed. A change in behaviour is brought about by a chain of linkages among beliefs, attitudes and intentions (Fishbein & Ajzen, 2010).

Knowledge is the collection of expertise and skills by a person through experience or education while perception is the manner by which humans interpret and organize sensation to produce a meaningful experience of the world (Rosenstock et al., 1988). A person's inclination to change his or her behaviour is highly influenced by the way he/she perceives the world around him/her based on how common and acceptable any particular behaviour is. It has been found that the tendency of young people to take up smoking is invariably linked to their perception of how common and acceptable such a habit is there among their family members and friends (Ukwayi, Eja, & Unwanede, 2012). The factors that can affect the behaviour of a person are attitude, subjective norm, perceived personal control, and intention. Theoretically, a person is most likely to adopt a behavior if he or she has a positive attitude toward the behavior, views the behavior as normal, has control over whether or not he or she participates in the behavior, and if it is his or her intention to adopt this behavior

in the future. In the case of smoking, ease of access is a factor related to control (Montano & Kaspryzk, 2008).

In Vietnam, knowledge on specific diseases related to tobacco smoking among adults was low. Having higher education and access to information had been found to be associated with higher levels of knowledge about effects of smoking (Minh An et al., 2013). One study said that there was no correlation between knowledge and future tobacco use behaviour even though almost all the children in the study had knowledge about the hazards of smoking (Rosendahl, Galanti, Gilljam, & Ahlbom, 2005). Similarly, the Chinese KAP study found that young adult males with higher education who had a better knowledge of smoking hazards and a more positive attitude toward smoking did not show non-smoking behaviour (Xu, Liu, Sharma, & Zhao, 2015). One study in California found that only having the knowledge about the hazards of tobacco smoking was not enough to change their behaviours because they were directly influenced by overall attitude towards their peer and family smoking behaviors (Ganley & Rosario, 2013). Studies among adolescents and college students have found a strong correlation between tobacco use and attitudes (Ma, Shive, Legos, & Tan, 2003); positive attitude towards smoking revealing more smoking behaviour among them in the past (Larsen & Cohen, 2009). Students in Indonesia who were aware of the health risks associated with smoking underestimated how

addictive cigarettes were, and those who thought it was not easy to obtain cigarettes smoked less (Martini & Sulistyowati, 2005). A quasi-experimental study in Taiwan showed that the tobacco prevention education program improved significantly the adolescents' knowledge about and attitudes toward the hazards of cigarette smoking (Tsai et al., 2005).

Adolescents smoking initiation and sustenance has been found to be associated with individual's personality and peer influence. The more extrovert personality adolescents exhibited, the more probability of initiating smoking (Antonio & T., 2004; Rondina, Gorayeb, & Botelho, 2007). Similarly, peer influence, smoking status of friends, proved to be one of the most significant predictors of adolescent smoking (M., R., & DAVID, 1992; Wang, Fitzhugh, Westerfield, & Eddy, 1995). .

It has been shown that young people and adults who attend religious activities have lower rate of current cigarette smoking or lower odds of being a persistent smoker (Bailey, Slopen, Albert, & Williams, 2015; J. W. Sinha, Cnaan, & Gelles, 2007; Whooley, Boyd, Gardin, & Williams, 2002). Religion plays an important role in educating young people in tobacco use in many countries (Sharma, Suman, Manjula, Marimuthu, & Ahmad, 2011) as well as in changing adolescent's health attitudes and behaviour, including tobacco smoking (Rew & Wong, 2006).

2.13 School-based tobacco use prevention program

The meta-analysis of school-based prevention programs showed their strong effects on substance abuse behaviors among students (Onrust, Otten, Lammers, & Smit, 2016). Schools are the places where students spend most of their waking time and provide a unique platform to share and learn things from their peers. However, schools are also a major source of peer pressure for adolescents particularly in the uptake of peer-influenced behaviours, including tobacco use (Wang et al., 1995). Studies reveal that most of all smokers started smoking during their time in high school. And, about a half of youth would continue to smoke into adulthood, and a half of the adult smokers are expected to die prematurely due to smoking related diseases (CDC, 2004, 2012). Thus, schools serve as ideal settings for preventing tobacco use among adolescents. A large numbers of adolescents can be reached without much difficulty and their participation in tobacco prevention program facilitated (CTFK, 2017). School-based programs are taken as one of important strategies to reduce tobacco use among adolescents (Gingiss, Roberts-Gray, & Boerm, 2006). Integrating life skills in the prevention program for students to resist social and peer influence is considered important because such skills empower adolescents in challenging situations (WHO, 1997). However, for schools to be effective in preventing and reducing youth tobacco use, creation of enabling environment that discourages

students to have positive tobacco beliefs and behaviors is imperative (CTFK, 2018a). The school-based programs should target adolescents before they initiate tobacco use. Therefore, such programs provide an opportunity to prevent the initiation of tobacco use among adolescents, and help them to stay away before they get hooked to nicotine (CDC, 1994).

Prevention programs based in schools have been shown to improve adolescents' smoking knowledge and attitude (Ghrayeb, Rusli, Rifai, & Isma, 2013; Isensee, Hansen, Maruska, & Hanewinkel, 2014; Lee, Wu, Lai, & Chu, 2007; E. Park, 2006; Tsai et al., 2005), and reduce smoking intention (Ariza et al., 2008; Johnson et al., 2005; Lee et al., 2007) and behaviors (Chen, Fang, Li, Stanton, & Lin, 2006; H.-Y. Park, Dent, Abramsohn, Dietsch, & McCarthy, 2010; Sun, Miyano, Rohrbach, Dent, & Sussman, 2007). The Cochrane review of 134 studies found that there was an average 12% reduction in starting smoking among students in the school-based program groups compared to the control groups. The effect on the change in smoking behaviour was only significant when an intervention deployed a social influences program (E. et al., 2013). One study in elementary school presented a success story of preventing smoking among its 5th and 6th grade students through a prevention program (Crone, Spruijt, Dijkstra, Willemsen, & Paulussen, 2011). However, many studies had the non- to mixed results when it comes to changing smoking behaviour (Ariza et al., 2008;

Ganley & Rosario, 2013; Isensee et al., 2014; Tahlil, Woodman, Coveney, & Ward, 2013; Xu et al., 2015).

2.14 Peer-led tobacco use prevention program

A certain level of understanding exists between groups who share a similar economic, social, linguistic, and cultural background. People belonging to the same peer group, which may be defined by age, gender, grade, social status, etc., communicate with one another much better than with others who have come from different background characteristics (UNDOC, 2003). The concept of peer education derives from this knowledge. Peer education is the process whereby well-trained and motivated young people undertake informal or organized educational activities with peers who are close to them in age, background or interests over a period of time. It is aimed at increasing young people's knowledge, improving their attitudes, and stimulating behavior change among them. Ultimately, it will enable youth to be responsible for their own health and know how to protect it (IFRC, 2010). Peer relationships are important for adolescents and often they develop strong bonds (Maggs, Almeida, & Galambos, 1995).

Several studies have indicated that the peer influence as an important factor determining the uptake of smoking among youth (D., Fátima, A., & Hein, 2011; M. et al., 1992; Simons-Morton & Farhat, 2010; Tyas & Pederson, 1998; Wang et al., 1995). Due to which many researchers started studying correlation between the tobacco

smoking in adolescence and peer pressure. However, the peer education model on tobacco smoking prevention for youth is a recent tendency. The peer education programs carried out in the western countries in the 1950s and 60s were designed predominantly for the deprived youth population where they were provided with information on social and health related issues. A handful of peer education projects focusing on smoking prevention among young people came out only sometime in the 1990s (Morgan & Eiser, 1990; Wiist & Snider, 1991). The idea of peer education was largely applied to prevention of sexually transmissible infections (Tolli, 2012), sex education and prevention of bullying within schools (Borgia, Marinacci, Schifano, & Perucci, 2005; Mellanby, Newcombe, Rees, & Tripp, 2001; Naylor & Cowie, 1999; Ward, Hunter, & Power, 1997). Currently, peer education is experiencing substantial popularity in both developed and developing countries. It has been found to be a useful means of reaching certain 'hidden populations' (J. McDonald, Roche, Durbridge, & Skinner, 2003).

It has also been found to be more cost effective than other programs that are applied to various target groups, including youth, commercial sex workers, and injection drug abusers in developing countries (Harden, Oakley, & Oliver, 2001; R. & Caroline, 2008)

The effect of peer education in schools remain somewhat mixed. It is difficult to separate the effects of various factors present in complex environment in which

adolescent health behaviours occur. Measuring change in behaviour that is attributable to peer education alone is difficult (Milburn, 1995). One meta-analysis found that the overall evidence of the smoking prevention programs using peers being effective was quite limited (Rooney & Murray, 1996). Some of reasons why peer education intervention was not producing expected results included a lack of clear purpose, conflict between the project design and the environment, inadequate training of peer educators (Walker & Avis, 1999), and selecting uninfluential peer educators (Starkey et al., 2009). However, the peer-led ASSIST model intervention in United Kingdom involving 10 730 students aged 12–13 years across 59 schools had a promising study outcome. It was found that the likelihood of students becoming smokers was significantly lower in the intervention schools at two-year follow-up (Campbell et al., 2008). David McDonald in his review report on alcohol and other drug peer education in schools recommended the following points in order to optimize the effectiveness and appropriateness of peer-led intervention (McDonald, 2004):

- The students who are the target groups should be fully involved in the development and organization of the intervention.

- Competence of the peer educators is essential.

- Peer education program with female students is more effective than with males.

- It may work better with those who are at low levels of risk than those at higher risk.

- Doing simply didactic teaching is unlikely to work.

- Engaging a sufficient number of peer educators.

- Recruit peer educators on the basis of their capacity to do the job well.

- Plan for dealing with relationship problems between peer educators, teachers and peers.

- Design a systematic approach to develop, implement, monitor and evaluate before the program begins.

2.15 Smoking and adolescents

Adolescents picking up tobacco smoking is increasing and becoming popular. For instance, in the USA, over 3000 adolescents become regular smokers every day (Gilpin, Choi, Berry, & Pierce, 1999). The global figure for adolescents becoming established smokers daily is even more startling, between 80 000 and 100 000 (Bank, 1999). But, why do adolescents start smoking in the first place?

Reviews of studies found that the likelihood of adolescents trying to smoke and becoming regular smokers was pegged to their compromised socioeconomic status, poor bonding with family, lacking self-efficacy, low self-esteem, poor knowledge,

poor grades, experimentation with smoking, use of alcohol, negative attitudes and intentions towards smoking, living with parents and siblings who smoke, thoughts of becoming a smoker in the future, etc. Further, the risk of smoking was particularly high for those who were exposed to abuse, domestic violence and traumatic life events (Eileen, 1992; Griffin, Botvin, Doyle, Diaz, & Epstein, 1999; Komro, McCarty, Forster, Blaine, & Chen, 2003; M. et al., 1992; Simantov, Schoen, & Klein, 2000). However, analysis of survey reports in the U.K. in the late 1980s revealed that the onset of smoking among young adolescents (12-14 years old) was much more unpredictable than adult smoking. Because it was likely that attitudes of adolescents towards smoking were less rationale and less stable as compared to those of grown-ups. It was more likely than not that their attitudes were related to smoking behaviour (Eileen, 1992). Interestingly, from one qualitative study of a group of young smokers spoke much more than merely the assemblage of predictors of adolescent smoking from other quantitative studies. This study in the U.K revealed that young smokers, despite being aware of physical health consequences of smoking, downplayed the health risks that smoking posed, and tried instead justifying their smoking habit by comparing it with other risky activities that bear even bigger health consequences. They even cited the health benefits of smoking that included smoking as a means to relieve stress and enhance enjoyment. For them, smoking

was thought of as a transitory and youthful activity that would face ultimately away with time once they enter adulthood (Gough et al., 2009).

Therefore, it is difficult to draw tangible conclusions from any one or two predictors as the cause for adolescent smoking. It is apparent that the query on why adolescents start smoking may beget more questions than any clear answers for now. Some recent tobacco epidemic reports of reputed organizations consistently stated that the rising use of tobacco among youth may be attributed to the aggressive tactics of tobacco industry in luring youth into using tobacco through its attractive tobacco advertisements, product promotions and sponsorships. This situation is further aggravated by the poor enforcement of tobacco control measures (policies, rules and regulations) by government and other law enforcement agencies, resulting in youth having an easy access to tobacco products, which are affordable and widely available (CDC, 2012; Eriksen et al., 2015; WHO, 2008, 2017).

CHAPTER III

METHODOLOGY

The NTUIS model was implemented in schools to achieve the purpose of this study. The quasi-experimental design was used with the intervention and control groups.

3.1 Study site

The study was carried out in the district of Wangdue Phodrang which is located in the western region of Bhutan. It has population of about 35,000 spread across 15 sub-districts. Agriculture is the main source of livelihood for the people. In 2015, it had 33 public schools, out of which 20 were primary schools and 8 extended classrooms. The total number of students in the district was 8150 in 2015 (NSB, 2015). In accordance to the purpose and design of the study, the public schools were identified as the study sites. Most of the schools were not able to participate in the study because the primary schools and extended classes have grades 6 and below. Therefore, only four secondary public schools (Gaselo, Samtengang, Nobding and Phubjikha) that fulfilled the criteria participated in the study. These schools are about 40 to 80 kilometers apart. Due the mountainous terrains, travel by a car would take around 2 to 3 hours between the schools. This geographical distance would have prevented any communication or exchange of information among the students in the intervention and control schools. In addition, more than 90 percent of students

stayed in the school hostels, thereby restricting their movements and reducing the possibility of their coming in contact with one another. And, as a general rule, use of mobile phones is not allowed in the schools.

3.2 Study subjects

The subjects were the current students of those four schools which were selected as the study sites. The Global Youth Tobacco Survey of Bhutan (GYTS, 2013) recruited adolescents aged 13-15 years from grades 7 to 9. This study selected students who were in the age range similar to that of GYTS. The following inclusion and exclusion criteria were set to select the study subjects:

Inclusion criteria

- Students of 8th grades in rural schools

- Regular students

Exclusion criteria

- Students who have serious medical conditions (as detected by a health coordinator), which may, inadvertently, interfere with the conduct of the study.

- Showing signs of substance abuse or dependency (as detected by a health coordinator or a class teacher).

- Unable to give informed consent (by students or their guardians).

- Unwilling to participate in the study.

3.3 Study design

The quasi-experimental design was used to evaluate the peer-led NTUIS model on the tobacco use-related knowledge, attitude, intention and behaviour among students. The study design was appropriate for this type of study where random assignment of subjects was not feasible because the intervention was implemented at the group level. The study had the intervention and control groups, both of which were subjected to a pre-test at baseline and a posttest immediately after the intervention, and then a follow-up each at the third and sixth months to compare the differences in outcome variables before and after the intervention. Since the intervention was applied to the groups, blinding of subjects was not applicable.
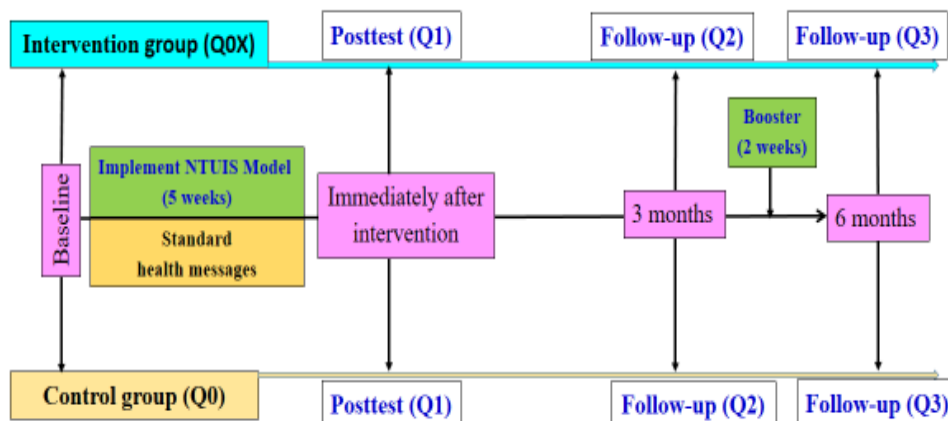
Figure 3- 1. Study flow chart

X   = Application of the NTUIS model

Q0 = Assessment of tobacco use knowledge, attitude, intention and behaviour (KAIB)

in the intervention and control groups before the implementation of the model.

Q1 = Assessment of tobacco use KAIB in both the intervention and control groups

immediately after implementation of the intervention in both the groups.

Q2 = Follow-up at three months after the intervention in both the groups.

Q3 = Follow-up at six months after the intervention in both the groups.

3.4 Sample size calculation

A sample size was estimated for the study to have 80% power to show an absolute between-group difference in the primary outcome measure at a 2-sided alpha level of 0.05, assuming a higher effect size of 0.8, and a standard deviation for the health knowledge score of 2.4 using this formula;

$$n_i = \frac{2\sigma^2 (Z_{\alpha/2} + Z_\beta)^2}{d^2}$$ (Hemming, Girling, Sitch, Marsh, & Lilford, 2011)

n_i = sample size per group

$Z_{\alpha/2}$ = standard value for type I error (α = 0.05) = 1.960

Z_β = standard value for type II error (β = 0.20) = 0.842

σ = standard deviation for the outcome variable (Tahlil et al.,2013) = 2.4

d = expected effect size = 0.8

$$n_i = \frac{2*(2.4)^2(1.960+0.842)^2}{0.8^2} = 141 \text{ (for each group)}$$

Accounting for the 10% drop out, sample for each arm of the study group was 155.

Therefore, the total sample size was 310. However, all the eighth grade students in

each school had to be considered for the study because the school administration wanted all eighth graders to participate in it. As a result, a total of 378 students (instead of 310 as was estimated) from four schools got enrolled as participants.

3.5 Sampling technique

In general, education in Bhutan is provided through a three-tiered system, namely primary, secondary and tertiary levels of education. The primary education starts from grades pre-primary to sixth. The extended classrooms, created to improve access to education for children living in the remote and rural communities, deliver primary level education in community learning centers or any public spaces. The secondary level of education constitutes grades from seventh till twelfth. The undergraduate studies take place in different tertiary educational and vocational institutes. Recently, the government introduced the concept of central schools, which have grades from pre-primary to twelfth. These schools provide free meals, uniforms, stationery and better boarding facilities. The Ministry of Education along with other government bodies manage the education system at the central level while the district administration and municipalities govern the educational institutions at the district and sub-district levels (MOE, 2015).

The district of Wangdue Phodrang was selected based on the administrative and logistic advantages it offered to the researcher (convenience sampling). As for the

selection of schools and subjects, a multi-stage sampling was used. Out of the 33 public schools in the district, only four were found eligible for recruitment as they fulfilled the study inclusion criteria. A total of 29 schools were excluded, including one large urban school. Four secondary schools were categorized into two school types: central schools and non-central schools. Two schools belonged to central group while the other two to non-central group, thereby forming two pairs of matched schools. The stratification of schools by their types was expected to prevent the risk of selection bias by reducing differences in group characteristics between the schools.

From each matched group, one school was randomly selected for the intervention group while the other went to the control group with a 50% chance of being allocated to either group by using a coin toss method. Finally, the students of the eighth grade were purposively selected to be the study subjects. The eight graders roughly represented the sample, in terms of the age range, used in the Global Youth Tobacco Survey (GYTS) or Global School-based Student Health Survey (GSHS) in Bhutan.
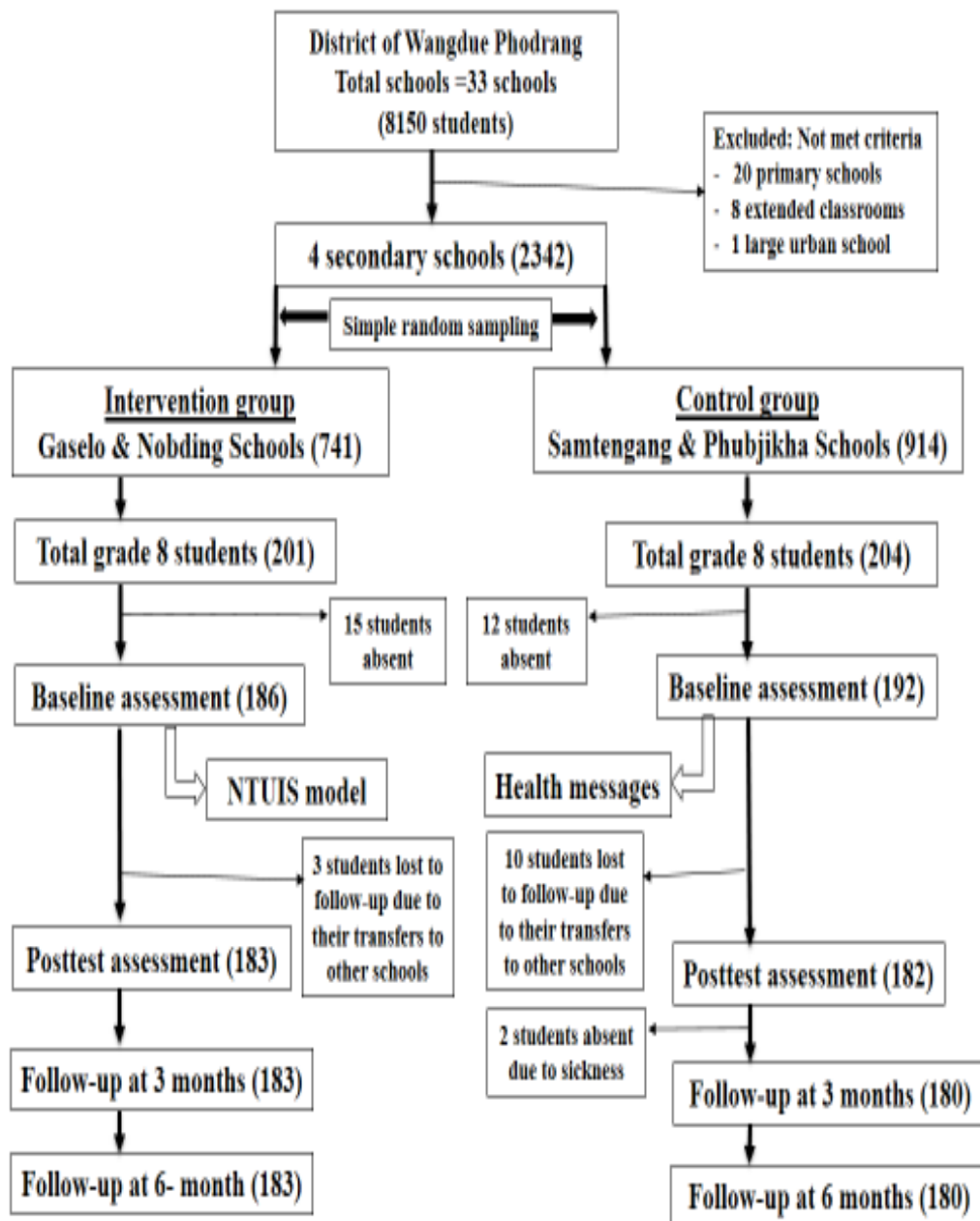
Figure 3- 2. The study design and participation flow chart

There were 405 eighth grade students in four schools, out of which Gaselo and

Nobding schools (intervention group) had 201 students while Samtengang and

Phubjikha schools (control group) had 204. However, on the day of the recruitment,

15 students from the intervention and 12 students from the control group were

absent, and thereby excluded from the study. Further, at the posttest, 3 students from the intervention group and 10 students from the control group were lost to follow due to their transfers to other schools. The control group lost another two students at the 3-month follow-up as they could not participate due to their health conditions. Therefore, 183 students in the intervention group and 180 students in the control group completed the study. Since the drop-out rate was low from the baseline till the last follow-up, this study did not examine the characteristics of those who did not turn up in the subsequent follow-up assessments. It was assumed that the characteristics of the drop-outs did not differ from those in the sample.

3.6 Intervention

3.6.1 No-Tobacco-Use-in-School (NTUIS) Model

The model was implemented for a period of five weeks after the baseline and a two-week booster session before the final assessment. It was implemented in May-June 2016 in two intervention schools. The purpose of this peer education-based program was to impart the knowledge to the students about the important aspects of tobacco and the health consequences of its use. As a result of the knowledge gained by the students, certain changes were expected to take place in the ways they viewed the issues on tobacco use and in their tobacco use behaviour. The development of the components of the model was based on some constructs of the Health Belief Model (HBM) and the Diffusion of Innovation Theory (DIT). The

primary focus of the model was to prevent tobacco use among adolescents in schools and maintenance of non-user status through a peer education program. This peer education-based model was essentially to engage students in a range of extra-curricular activities through which the sharing of information amongst themselves was facilitated. The information-sharing actions were, in turn, anticipated to bring about positive changes in their attitudes, intentions and behaviour related to tobacco use.

3.6.2 Educational materials used for the training of peer educators

The content of the model mainly dwelt on two parts: (i) Delivery of knowledge, and (ii) Skill building for peer educators. The training on knowledge and skill building were adapted from the following documents:

- Youth Education Tool kit, Training of trainers manual (UNFPA)

- Peer to Peer: Using peer to peer in drug abuse prevention (UNODC)

- Manual on Tobacco Control in Schools, World Health Organization

- Booklet on Health Hazards of tobacco use (compiled by the researcher)

- Pictorial health warnings (compiled by the researcher)

3.6.3 Three phases of implementing the model

During the preparatory stage of the intervention package, trainings were conducted at two levels. The health workers were trained first, and they in turn trained the peer educators. The third phase involved the peer educators rolling out of the model in their schools.

Phase I: Training of health workers

The health workers at the community health centers possess both clinical and health education skills. They were in fact trained-health educators. However, for this training, the emphasis was given to building those knowledge and skills required for being a trainer to the peer educators. They were comprehensively familiarized with the educational materials on tobacco. The researcher, after receiving an approval from the district health authority, selected two health workers based on their prior experiences in health education activities in schools. They received the training on the relevant parts of peer education modules extracted from the training manual of UNFPA called 'Youth Peer Education toolkit: Training of Trainers Manual.' The steps contained in this manual on how to conduct activities and transfer knowledge and skills to peer educators were meticulously followed through with integration of the theme on tobacco use prevention. Furthermore, health workers were made aware of the research objectives and instruments for data collection. The training was for two days and took take place in the district training center. The teaching methods included lectures, poster exhibitions, audio-visuals and role plays. There were discussion and 'Question & Answer' sessions to clarify their doubts and widen their understanding on the subject matter. At the end of the training, the health workers helped to assess the quality and adequateness of the content as well as the process of the training. The following was the training plan and its contents:

Table 3- 1. Training plan and sessions for health workers

Duration	Sessions	Contents
Day One	1st Session: Introduction	1. Objectives and outcomes of the study 2. Study designs and tools 3. Brief note on the study intervention 4. Objectives of the training 5. Expected outcomes
	2nd Session: Peer education	1. What is peer education? 2. Why peer education? 3. Theoretical basis for peer education 4. Translating theory into practise 5. Recruitment and retention of peer educators 6. Roles of health educators
	3rd Session: Communication skills	1. Team building and trust building 2. Techniques for sharing information 3. Techniques for building skills 4. Motivational tools and techniques
	4th Session: Skills for peer educators	1. Communication skills 2. Decision making skills 3. Refusal skills
Day Two	5th Session: Introduction-Tobacco use	1. Tobacco products 2. Facts and figures about tobacco 3. Why young people use tobacco?
	6th Session: Harms of tobacco use	1. Poisonous constituents of tobacco 2. Health effects of tobacco smoke 3. Health effects of second-hand smoke 4. Health effects of smokeless tobacco 5. Nicotine and addiction 6. Pictorial Health warnings 7. Myths of tobacco use
	7th Session: Other issues	1. Religion and tobacco use 2. Tobacco control policies
	8th Session: Benefits of quitting	1. Benefits of quitting 2. Making healthy choices 3. Creation of tobacco-free schools

Phase II: Recruitment and training of peer educators

Gaselo school had three eight grade sections/classes (A, B and C) while Nobding school had two sections/classes (A and B). In consultation with their respective class teachers and by closely following the criteria, four students (two boys and two girls) from each class were identified. Out of the four, each class selected one boy and a girl as its peer educators through a class voting. In total, ten peer educators got selected, five of them boys and the other five girls. The following criteria were set to identify the potential peer educators:

- Non-user of tobacco

- A popular peer in the class

- One girl and a boy from each section

- Willingness to learn and open to new ideas

- Able to express themselves clearly

- Good language skills (English and Dzongkha)

- Commitment to engage in youth's issues

Therefore, two intervention schools had 10 students who took part in the peer education training. The health workers conducted the training sessions for the peer educators for three days. The training took place at the community health center (or Basic Health Unit). The major components of the training package consisted of topics

on tobacco knowledge and skills on decision making and resisting peer pressure. The

following documents were used as guides to transfer knowledge to and build skills in

peer educators:

1. Manual on Tobacco Control in Schools (WHO)

2. Booklets on 'Hazards of tobacco use'

3. Pictorial health warnings

4. Smoker's body poster

5. Peer to Peer: Using peer to peer in drug abuse prevention (UNODC)

6. Youth Initiative: discussion guide (UNODC)

The training was delivered through a variety of teaching methods, including lectures,

discussions and audio-visuals. The peer educators underwent an intense training so

that they could remember all critical information and share it with their friends. At

the end of each session, the health workers conducted a short test on the important

topics. If the scores obtained were less than the average, the peer educators

received additional sessions or briefings on the past topics. The health workers

always encouraged the peer educators to ask questions without hesitation and

interact as openly as they could with them. They were also given an opportunity to

discuss their concerns and issues, if any, regarding tobacco use. In addition, various

activities, such as debates and role plays were carried out. At the beginning of the

training on each day, the health workers summarized all the important points of the

last sessions. Booklets and presentation notes were distributed to the peer educators

for their self-learning and as guides for their NTUIS activities. All through the sessions,

the peer educators were encouraged to participate actively.

Table 3- 2. The core components of the peer education training

Duration	Sessions	Contents	Activities/materials
Day One 9am - 5pm	1st Session: Introduction	1. Introduction 2. Setting rules 3. Objectives of the training 4. What is peer education? 5. Who are peers? 6. Why peer education? 7. What are features of peer education? 8. What are roles of peer educators?	• Ice breakers • Opinion writing • Examples of peer advocates for tobacco.
	2nd Session:	1. Communication skills	• Games
	3rd Session:	1. Decision making skills	• Experimental learning
	4th Session:	1. Refusal skills	• Role plays
Day Two 9am-5pm	5th Session: Tobacco use	1. What are tobacco products? 2. Is tobacco use a serious problem? 3. Why young people use tobacco?	• Posters • Graphs
	6th Session: Health impact of tobacco use	1. Harmful substances in tobacco products 2. Smoking tobacco can kill you 3. Tobacco smoke is dangerous to health 4. Smokeless tobacco cause many diseases	• Multiple choice questions • Crossword puzzle
	7th Session:	1. Nicotine is the most addictive chemical 2. Some misunderstandings about tobacco 3. Religion's view on tobacco use 4. Tobacco control policies	• Flash cards • Pictorial Health warnings • Booklet
Day Two 9am-5pm	8th Session:	1. Why quit tobacco us? 2. Making healthy choices 3. Creation of tobacco-free schools	• Debates • Discussions
	9th Session	4. Benefits of attending the training 5. Recap of all sessions 6. Final test	
	10th Session	1. Prepare a work plan for implementing the intervention by each group in their respective schools.	

The peer educators were repeatedly familiarized with and reminded them of their roles and responsibilities they have to shoulder during the study period. The following were the specific roles that peer educators have to play:

- Be responsible for rolling out the NTUIS model in their respective schools.

- Be proactive in sharing information with peers using appropriate strategies.

- Recruit peers in the class to support the activities of the model whenever needed.

- Manage the peer education sessions (whether formal or informal).

- Refer peers to services as appropriate (clinical or counselling support).

- Seek support from the health workers whenever situation arises.

- Take ownership of the NTUIS program.

- Maintain a diary to keep track of activities every day.

- Report on the progress of activities to health workers on weekly basis.

Phase III: Implementation of NTUIS Model

The peer educators started implementing the model in the respective schools immediately after the baseline survey. They started their activities from the 9th of May 2016, and carried on for five weeks. The peer educators played their roles and conducted various peer-led activities as per their action plans. Their major tasks involved the following parts:

<u>Informal peer education</u>: the peer educators conducted a casual one-to-one or small group interaction with their peers. It was informal because the peer educators did not have to use ready-made scripts or slide presentations, making an information sharing process as natural as possible. They took opportunities at every moment to share the information with their peers over normal conversations in a variety of school settings, including hostel rooms, a playground and a dining hall. A piece of paper scribbled with one or two information on the harms of tobacco was circulated around the class every day. The classmates were encouraged to share tobacco information among themselves. The peer educators organized extracurricular activities with anti-tobacco messages.

<u>Formal peer education</u>: the peer educators held formal sessions with their classmates using power point presentations and made leaning process interesting and interactive. Following the classroom sessions, the peer educators conducted several activities for five weeks and during the two-week booster period, some of which are listed as below:

- Carried out discussions in smaller groups

- Conducted quiz on the tobacco related-topics

- Conducted art competition based on the anti-tobacco theme

- Disseminated information leaflets and displayed anti-tobacco posters

- Screened video clippings on consequences of tobacco use

Formation of secondary peers: the peer educators selected some of their friends as secondary peer educators to help them to organize events and sessions, and in reaching out to other left-out classmates.

Support and supervision of peer educators

The peer educators reported their progress to the health workers once in a week, and discussed the issues or challenges they faced. The health workers in turn provided support to them with additional materials or briefings on the subject matters. They also helped in arranging audio-visual equipment for screening of anti-tobacco video spots.

Coordination and implementation plan

The researcher and health workers coordinating activities in the intervention schools had rounds of meetings with the principals and health coordinators of the schools and discussed on how best the activities could be carried out with minimal disturbance to the students while engaging in peer education. Even though the school authorities were given the right to complain if the intervention was distracting the attention of their students in an undesirable way, the researcher did not receive

any complaint. At the same time, the researcher regularly met with and informed of the progress to the District Health Officer since this study engaged the health workers.

Control schools

For the control schools, they were only informed of the purpose of the study and the plan to carry out four assessments with the eighth grade students as part of the research. The NTUIS model was not implemented there. However, during the data collection, the health workers from the community health centers conducted health awareness sessions with the students on various public health topics except for those related to tobacco.

Period of intervention

Implementation of the model commenced on 9th May 2016 following the baseline assessment. The duration of intervention was for five weeks. The peer educators conducted booster activities for two weeks in October 2016.

3.7 Data collection

The baseline data was collected on 9th May 2016. The posttest data collection took place right after the intervention. The first follow-up after three months from the posttest, and the second follow-up after six months from the posttest. The intervention and data collection were completed by 16th December 2016, all carried out in about a little over seven months.

3.8 Instruments

The research instrument was a self-administered questionnaire with all closed ended questions. The questionnaire contained the following parts:

a. <u>Socio-demographic information</u> – It consisted of age, sex, residence, occupation of parents, tobacco use among family members and friends, and alcohol use and personality type.

b. <u>Knowledge</u> – It contained 51 questions. Students responded with 'Yes', 'No' or 'Don't know' to these questions. A 'Yes' response scored one point, while 'No' and 'Don't know' were given zero scores. All points were added up to get the total score. Higher the scores, more knowledgeable the students were considered to be. The highest score was 51 and the lowest 0. (WHO-SEARO, 2006).

c. <u>Attitude</u> – It consisted of 13 questions. Attitudes were measured by the degree to which students agreed with positive or negative statements. Attitude statements were measured on a 4-point Likert scale. If responses were in agreement to positive statements or disagreement to negative statements, students were considered as having a positive attitude towards tobacco use. If the students disagreed to positive statements, they were assumed to possess negative attitudes. The scoring was done in the following manner: For a positive statement – 'strongly agree' = 4, 'agree' = 3,

'disagree' = 2, strongly disagree=1. For negative statement – 'strongly disagree' = 4, 'disagree'= 3, 'agree' = 2, 'strongly agree' =1. All responses were summed up to get a total attitude score. A higher score indicated stronger anti-tobacco use attitudes (HSC, 2011; WHO-SEARO, 2006).

d. <u>Intentions</u> – It consisted of 3 questions. The responses were designated as 'definitely yes', 'probably yes', and 'definitely not'. If the responses were 'definitely yes' and 'probably yes', a score of one point was given. The students got a score of zero point when they did not show intention to use tobacco in the future. A total score was taken to measure the intention, and with a higher score indicating more chances of using tobacco in the future. A 7-point scale was used to measure the severity or seriousness of the intention. The higher the points scored on the scale, the higher the likelihood of intentions expressed by the students being true (Fishbein & Ajzen, 2010; C. WHO, 2012).

e. <u>Tobacco use behaviour</u> – It had 4 questions, two each on cigarettes/*bidis* and smokeless tobacco. The proportions of students who currently used tobacco were estimated at the baseline, post-test, 3-month follow-up and 6-month follow-up. The changes in proportions of tobacco users were compared between the intervention and control groups (MOH, 2017; WHO-SEARO, 2015b; C. WHO, 2012).

3.9 Students exposure to the intervention and feedback from the peer educators

Post intervention, the students were asked a few questions on the coverage of peer education on the harms of tobacco use. Specifically, whether or not they received the information in the first place, and the frequency of their contacts with the peer educators. They were also asked if the information that peer educators provided them was useful and adequate.

In order to get the feedback from the peer educators regarding their experiences in implementing the model, a set of open-ended questions was put to them. They were encouraged to share their opinions on the interactions with their peers and some major challenges they encountered while disseminating information and conducting peer education activities during the study period.

3.10 Construct validity

The conceptual framework was developed through a rigorous review of literature on the study's dependent and independent variables regarding their measurements and theoretical underpinnings. The literature indicated that each independent variable used in this study has a relation with one or more of the outcome variables. For instance, smoking is prevalent more among males than it is among female adolescents. The likelihood of smoking is higher among adolescents who have lower self-esteem, are extroverts, drink alcohol and have smoking family members and

peers as compared to those who have high self-esteem, are introverts, do not drink alcohol and have non-smoking parents, siblings and friends. For the current study, these variables have been assessed through a self-administered questionnaire only for the purpose of examining the baseline differences in the characteristics of students between the intervention and control groups in order to reduce biases being introduced due to any differences at the baseline. Six of the socio-demographic characteristics have been found to be significantly different, namely - the occupations of parents, tobacco use among siblings and friends, use of alcohol and levels of self-esteem. They (so called covariates) have been factored in during the analysis so that the study's outcomes were not affected or influenced by them.

The outcome variables of this study were knowledge, attitude, intention and behaviour related to tobacco use. Conceptually, providing or imparting of facts and information to adolescents is invariably linked to the gain of knowledge in any particular field of learning as cited in many past studies. This idea was borrowed to structure the knowledge questionnaire of this study in the context of tobacco use. The knowledge questionnaire included the components on harms of tobacco use, nicotine addiction, tobacco control regulations, religious perspectives, etc. on the other hand, the constructs of Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB) guided the process of structuring the questionnaire and measuring

the adolescent's attitude towards tobacco use, intention to stay tobacco-free and behavioral changes in tobacco use. These theories have been linked to the formation of beliefs due to knowledge gain and the alteration in adolescent's attitudes and intentions for targeted behavioral outcomes. In addition, the NTUIS model harnessed the Diffusion of Innovation Theory (DIT) to deliver the model and disseminate the information contained therein to the students by the peer educators. However, the purpose of the current study was not to measure and validate these theories. Instead, it was to apply their concepts to the independent variables of the study and support in measuring them.

3.11 Content validity of the instrument

The instrument was distributed to four experts in the fields of health promotion, tobacco control, research and public health. The experts reviewed the instrument and produced an index of item-objective congruence (IOC) value of 0.90. The items in the instrument were revised and refined based on the feedbacks from the experts (tobacco control program officer, health promotion officer, researcher and district health officer).

The materials on the model had been reviewed by 30 eighth-grade students in terms of language clarity and understanding of their contents. However, they did not make

any suggestions. They only expressed that understanding some technical terms was difficult.

3.12 Reliability of the instrument

A pre-test with a sample of 30 students was conducted to test the reliability of the instrument. The internal consistency of the instrument was estimated using Cronbach's Alpha Coefficient. The acceptable coefficient values were obtained for different components of the instrument: 0.86 for tobacco knowledge, 0.81 for attitude, 0.76 for intention and 0.80 for tobacco use behavior. One question each having lowest consistency was deleted from attitude, intention and behavior items in order to achieve higher coefficient values.

3.13 Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS version 22). All statistical tests conducted with a 95% confidence interval, and considered statistically significant only with a p-value <0.05.

Descriptive statistics such as percentage and frequency have been used to describe general characteristics of the students, including the tobacco use by their family members and peers, alcohol use and personality type. The mean and standard deviation were used for describing outcomes variables (knowledge, attitude, intention and tobacco use behaviour).

The Chi-squared, Independent t-test and Mann-Whitney test were used to compare the differences in baseline characteristics between the intervention and control groups. The Independent t-test helped in comparing the differences in tobacco knowledge and intention scores between the intervention and control groups. The Mann-Whitney test used in comparing the differences in attitudes between the groups at the posttest, 3-month and 6-month follow-ups. The Wilcoxon signed-rank test generated multiple comparisons of attitude mean ranks that indicated where the changes in attitudes had taken place in the groups. The Cochran's Q test compared the differences in proportions of tobacco users and non-users at the baseline, posttest and follow-ups. The repeated measures ANOVA was performed to test the overall changes in tobacco knowledge and intention scores between the groups after the model had been implemented. As for the non-normal data, the Friedman ANOVA was used to find out the total changes in attitudes and tobacco use among the students.

3.14 Study Ethics

The Research Ethics Board of Health, Ministry of Health, Royal Government of Bhutan approved the study proposal/protocol on 9th May 2016 vide letter No. REBH/Approval/2016/028. Since the study was conducted in schools, a formal administrative approval from the district administration (Wangdue Phodrang) was

sought before the study began. The informed consents were taken from the students and their parents. Most of the students came from different parts of the district, and their parents who were physically hard to reach were contacted by phone calls and verbal consents taken.

CHAPTER IV
STUDY RESULT

This chapter presents the findings of a quasi-experimental pretest and posttest designed study that aimed at examining the effects of the No-Tobacco Use in School (NTUIS) model on the knowledge, attitude, intention and behaviour regarding tobacco use among the eighth standard students in four high schools. A total of 186 students in the intervention group and 192 students in the control group took part in the study. The data were collected at the baseline before the model was implemented, and at the posttest, the follow-up at 3 months and the final follow-up at 6 months after its implementation. The data entry as well as statistical analysis were done in the SPSS (version 22.0). Both descriptive and inferential statistics were used to describe the data and find the group differences in the outcome variables.

The results of the study are presented in two parts: (1) general characteristics (age, sex, residence, parent's occupations, tobacco use by parents, siblings and peers, alcohol use, personality and self-esteem), and (2) the effects of the NTUIS model arranged in four sections (knowledge, attitude, intention and behavior).

4.1 General characteristics

This section consists of two sub-sections: characteristics of participants and baseline comparison of characteristics between the groups.

4.1.1 Characteristics of participants

The study enrolled a total of 378 students at the starting point (baseline). Out of

them, 186 students were in the intervention group while 192 students in the control

group. However, 363 students (96%) participated till the end of the study. There

were more female students (52.9%) than the male students (47.1%). The youngest

participants were 11 years while the oldest 19 years with the mean age of 14.9±1.39

years. The vast majority of the students lived in the school hostel (82%) and the rest

at home (15.6%) and other places (2.4%). The parents of the students were primarily

farmers working in the rural areas (63% fathers and 45.8% mothers). Apart from them

being agriculture workers, 38.4% of mothers and 17.5% of fathers were housewives

and civil servants respectively. As regards the tobacco use prevalence among the

family members and peers of the students, more of their friends (7.9%) and fathers

(4%) were currently using tobacco than their mothers (2.1%) and siblings (2.6%).

Close to one-third of students (32%) tried taking alcohol in the past while 7.9

percent took it in the last 30 days. The proportions of introvert students (55.4%)

were relatively higher than that of extrovert students (44.6%). The majority of

students rated themselves as having a moderate level of self-esteem (69.3%), with

only a few of them having a very high level (7.9%) or low level (2.1%) of self-esteem.

4.1.2 Baseline comparison of characteristics between the groups

The age, gender, residence, personality of students and tobacco use by parents did not differ significantly between the intervention and control groups. The variables such as parent's occupation, sibling's and friend's use of tobacco, student's alcohol use and levels of self-esteem differed significantly between the groups. However, the main outcome variables of the study like the knowledge on tobacco, attitude towards tobacco use, intention to use tobacco and tobacco use behavior were not different significantly at the baseline between the groups.

Table 4- 1. Demographic characteristics of the study participants (n=378)

Variables	Intervention group (n=186)	Control group (n=192)	p-value
Gender, n (%)			
Boys	88 (47.3)	90 (46.9)	0.932 [A]
Girls	98 (52.7)	102 (53.1)	
Residence, n (%)			
Home	30 (16.1)	29 (15.1)	0.537 [A]
School hostel	150 (80.6)	160 (83.3)	
Other's house	6 (3.2)	3 (1.6)	
Father's occupation, n (%)			
Agriculture/farmer	89 (47.8)	150 (78.1)	<0.001* [A]
Govt. service	44 (23.7)	22 (11.5)	
Business/private sector	28 (15.1)	8 (4.2)	
Others	25 (13.4)	12 (6.2)	
Mother's occupation, n (%)			
Housewife	70 (37.6)	75 (39.0)	<0.001* [A]
Agriculture/farmer	69 (37.1)	104 (54.2)	
Govt. service	13 (7.0)	4 (2.1)	
Business/private sector	23 (12.4)	9 (4.7)	
Others	11 (5.9)	0 (0.0)	

Table 4- 1 Demographic characteristics of the study participants (n=378) (continued...)

Variables	Intervention group (n=186)	Control group (n=192)	p-value
Tobacco use by a father, n (%)			
Never	111 (59.7)	133 (69.3)	0.063 [A]
Yes, but stopped now	52 (28.0)	32 (16.7)	
Yes, in the past	17 (9.1)	18 (9.4)	
Yes, in the last 30 days	6 (3.2)	9 (4.6)	
Tobacco use by a mother, n (%)			
Never	131 (70.4)	138 (71.9)	0.896 [A]
Yes, but stopped now	30 (16.1)	31 (16.1)	
Yes, in the past	20 (10.8)	20 (10.4)	
Yes, in the last 30 days	5 (2.7)	3 (1.6)	
Tobacco use by siblings, n (%)			
Never	132 (71.00	163 (84.9)	0.006* [A]
Yes, but stopped now	27 (14.5)	18 (9.4)	
Yes, in the past	21 (11.3)	7 (3.6)	
Yes, in the last 30 days	6 (3.2)	4 (2.1)	
Tobacco use by friends, n (%)			
Never	105 (56.5)	148 (77.1)	<0.001* [A]
Yes, but stopped now	42 (22.5)	23 (12.0)	
Yes, in the past	23 (12.4)	7 (3.6)	
Yes, in the last 30 days	16 (8.6)	14 (7.3)	

*Statistical significant at p-value <0.05. [A] Chi-square

Table 4-1. Demographic characteristics of the study participants (n=378)

(continued...)

Variables	Intervention group (n=186)	Control group (n=192)	p-value
Ever tried alcohol, n (%)			
No	118 (63.4)	141 (73.4)	0.036* [A]
Yes	68 (36.6)	51 (26.6)	
Drank alcohol in last 30 days, n (%)			
No	164 (88.2)	184 (95.8)	0.006* [A]
Yes	22 (11.8)	8 (4.2)	
Your personality, n (%)			
An extrovert	90 (48.4)	78 (40.6)	0.129 [A]
An introvert	96 (51.6)	114 (59.4)	
Your self-esteem, n (%)			
Very low	2 (1.1)	6 (3.1)	<0.001* [A]
Low	17 (9.1)	16 (8.3)	
Moderate	110 (59.1)	152 (79.2)	
High	30 (16.2)	15 (7.8)	
Very low	27 (14.5)	3 (1.6)	
Age in years, mean $\pm$SD	14.96$\pm$1.37	14.83$\pm$1.40	0.063 [B]
Knowledge scores, mean $\pm$SD	26.82$\pm$8.96	26.78$\pm$7.73	0.958 [B]
Attitude scores, mean rank	181.24	197.51	0.147 [C]
Intention to use tobacco, n (%)			
Definitely yes	7 (3.8)	7 (3.6)	0.096 [A]
Probably yes	21(11.3)	10 (5.2)	
Definitely no	158 (84.9)	175 (91.2)	
Current tobacco user, n (%)			
Smokers	21 (11.3)	20 (10.4)	0.784[A]
SLT users	20 (10.8)	22 (11.5)	0.827[A]

*Statistical significant at p-value <0.05. [A] Chi-square, [B] t-test, [C] Mann-Whitney test

4.2 Change in knowledge on tobacco use and its harmful effects

4.2.1 Knowledge on the harms of tobacco use in the intervention group

The intervention group that received the NTUIS model showed a marked increase in the mean knowledge scores at every point of measurement from the baseline till the final follow-up. The rise in mean scores from the baseline to the posttest was by about 45 percent. Further increases were observed by 13 percent from the posttest to the 3-month follow-up, and over 2 percent from the 3-month follow-up to the 6-month follow-up. Overall, there was an almost two-fold increase of knowledge from the baseline till the last follow-up at 6 months.

Table 4- 2. The mean tobacco knowledge scores in the intervention group at baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Tobacco knowledge score Mean $\pm$ SD	95%CI
Baseline	186	26.80 $\pm$ 8.96	25.52 to 28.12
Posttest	183	38.74 $\pm$ 12.97	36.98 to 40.50
3-month follow-up	183	43.90 $\pm$ 8.75	42.62 to 45.18
6-month follow-up	183	44.81 $\pm$ 9.40	43.44 to 46.18

4.2.2 Knowledge on the harms of tobacco use in the control group

There was no change in the mean tobacco knowledge scores of the control group from the baseline to the posttest. While there was a small percent (1.8%) increase in knowledge scores from the posttest to the 3-month follow-up, the mean scores fell

from the 3-month follow-up (27.07) to the 6-month follow-up (24.88). On the whole, the change in knowledge scores was not significant.

Table 4- 3. The mean tobacco knowledge scores in the control group at baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Tobacco knowledge score Mean ± SD	95%CI
Baseline	192	26.78 ± 7.73	25.68 to 27.88
Posttest	182	26.58 ± 8.06	25.40 to 27.78
3-month follow-up	180	27.07 ± 8.93	25.75 to 28.38
6-month follow-up	180	24.88 ± 11.07	23.25 to 26.51

4.2.3 Comparison of trends of knowledge scores between the groups

The tobacco knowledge scores of the intervention and control groups were almost the same at the baseline (26.80 vs 26.78). However, there was a substantial rise in the mean knowledge scores of the intervention group from the baseline to the posttest, and a gradual increase was observed from this point onwards until the last follow-up (from 38.78 to 44.81). Conversely, this was not the case with the control group. The trend of scores did not change much from the baseline except at one time during the 3-month follow-up, but again slipped down even below the baseline scores at the final follow-up. Basically, these trends invariably reflected that there were differences in the mean knowledge scores between the intervention and control groups after the baseline assessment.
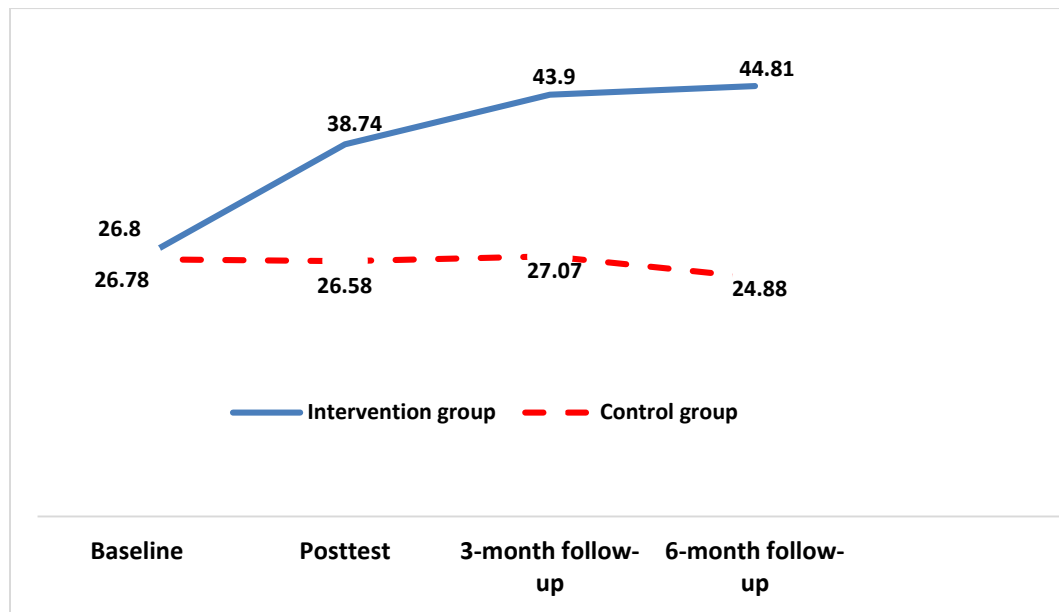
Figure 4- 1. Comparison of mean knowledge scores between the intervention and control groups

4.2.4 Differences in the mean tobacco knowledge scores between the groups at the baseline, posttest, 3- and 6-month follow-up

The independent t-test was used to find out the differences between the groups. The mean tobacco knowledge scores at the baseline did not differ between the intervention and control groups (t =-0.05, p = 0.958). However, significant differences in the mean scores were observed between the groups at the posttest (t = 11.31, p < 0.001), the 3-month follow-up (t = 18.12, p < 0.001) and at the 6-month follow-up (t = 18.48, p < 0.001). The mean knowledge scores increased in the intervention group more than the control group after the baseline assessment.

Table 4- 4. Comparison of differences in knowledge scores between the groups

Point of data collection	Tobacco knowledge score		95%CI
	Intervention group Mean $\pm$ SD	Control group Mean $\pm$ SD	
Baseline	26.80 $\pm$ 8.96	26.78 $\pm$ 7.73	- 1.73 to 1.64
Posttest	38.74 $\pm$ 12.97	26.58 $\pm$ 8.06	10.04 to 14.27*
3-month follow-up	43.90 $\pm$ 8.75	27.07 $\pm$ 8.93	15.00 to 18.66*
6-month follow-up	44.81 $\pm$ 9.40	24.88 $\pm$ 11.07	17.80 to 22.04*

*Significant at *p*-value <0.001

4.2.5 Testing the overall effect of the NTUIS model on the mean knowledge scores over time between and within the groups (adjusted for covariates)

When tested using General Linear Model repeated-measures ANOVA, the results showed that the knowledge scores were significantly different between the intervention and control groups that could conceivably be explained by the effect of the NTUIS model [$F(1,354)$ = 645.64, p <0.001, d = 0.64] after adjusting for the covariates. The variance in knowledge gain accounted for by the model's effect was high. Similarly, the statistical significance was observed in the results of the within-groups testing [$F(3, 1062)$ = 80.41, p <0.001, d = 0.02], but the effect size was negligible.

Table 4- 5. Overall effects of the NTUIS model on the tobacco knowledge scores among the groups after adjusting for covariates

Source	Sum of Squares	df	Mean Square	F	p-value
Between subjects					
Intervention	62763.39	1	62763.39	645.64	<0.001*
Error	34412.60	354	97.21		
Within subjects					
Time	2059.78	3	686.59	7.96	<0.001*
Intervention x time	20818.07	3	6939.35	80.41	<0.001*
Error	91649.50	1062	86.299		

Used Huynh-Feldt correction factor; *Significant at *p*-value <0.001

While the mean scores of the intervention group had improved considerably from the baseline to the posttest, and the successive follow-up measurements, the control group did not show improvements in its knowledge scores even at the final follow-up.
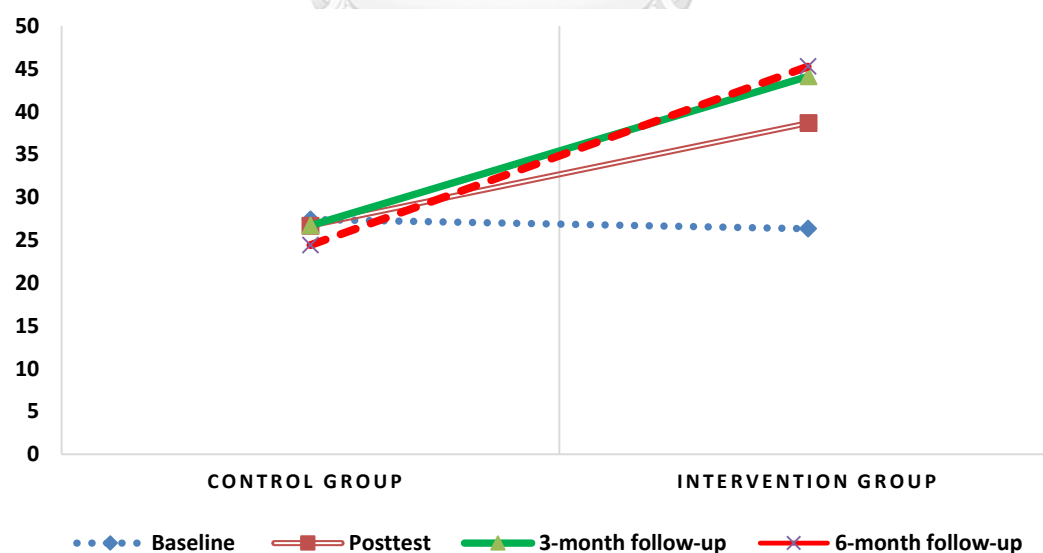
Figure 4- 2. Comparison of the trends of the between-group knowledge scores from the baseline to the last follow

4.3 Change in attitude towards tobacco use

4.3.1 Attitude towards tobacco use among the students in the intervention group

The mean attitude scores of the students in the intervention group showed only a slight increase from 32.01 (95%CI, 30.97 to 33.05) at the baseline to 34.31 (95%CI, 33.29 to 35.34) at the posttest. After the posttest onwards, the scores have remained more or less close to the baseline scores. In general, no upward trend in the attitude scores was observed.

Table 4- 6. The mean attitude scores towards tobacco use in the intervention group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Attitude score Mean ± SD	95%CI
Baseline	186	32.01 ± 7.18	30.97 to 33.05
Posttest	183	34.31 ± 7.07	33.29 to 35.34
3-month follow-up	183	32.93 ± 7.61	31.82 to 34.04
6-month follow-up	183	30.04 ± 8.97	28.73 to 31.35

4.3.2 Attitude towards tobacco use among the participants in the control group
Other than over one-point increase in the mean attitude scores from the baseline (33.31 ± 5.42) to the posttest (34.95 ± 5.32), no change in the attitude scores was observed throughout the follow-up measurements.

Table 4- 7. The mean attitude scores towards tobacco use in the control group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Attitude score Mean ± SD	95%CI
Baseline	192	33.31 ± 5.42	32.54 to 34.08
Posttest	182	34.95 ± 5.32	34.17 to 35.00
3-month follow-up	180	33.91 ± 5.99	33.03 to 34.79
6-month follow-up	180	33.34 ± 7.26	32.27 to 34.41

4.3.3 Differences in the attitudes between the groups at the baseline, posttest, 3- and 6-month follow-up

The Mann Whitney-U test was used since the results of the Levene's Test of Equality and Shapiro-Wilk test were significant across the groups, indicating the data being non-normal. Between the groups, the median attitude did not differ at the baseline [(Mdn = 34), U = 16319, p = 0.147], at the posttest [(Mdn = 36), U = 16220, p = 0.667] and at the 3-month follow-up [(Mdn = 34), U = 15599, p = 0.382]. However, significant difference in the attitude was observed at the 6-month follow-up [(Mdn = 34), U = 13439, p = 0.002].

Table 4- 8. Comparison of differences in attitudes between the groups

Point of data collection	Attitude		95%CI
	Intervention group Median	Control group Median	
Baseline	33	34	0.00 to 2.00
Posttest	36	35	-1.00 to 1.00
3-month follow-up	34	34	-1.00 to 2.00
6-month follow-up	33	34	1.00 to 4.00*

*Significant at *p*-value <0.05

4.3.4 Overall effects on attitudes of the students at the four-time points of measurements using a Friedman ANOVA test

The attitudes of the students were significantly different during the study period between the groups [χ^2 (1) = 6.890, p =0.009]. It was observed that the student's attitudes have changed significantly at the 6-month follow-up.

Table 4- 9. Test of differences in attitudes between the groups at the four-time points using a Friedman ANOVA test

Variable	Mean rank		χ^2	df	p
Attitude	Intervention = 1.45				
difference	Control = 1.55		6.890	1	0.009

*Significant at p-value <0.05

4.3.5 Multivariate tests for differences in attitudes at the baseline, posttest, 3- and 6-month follow-up

The Wilcoxon signed-rank test was conducted with a Bonferroni correction, re-setting the significance level at $p < 0.01$ to track where the changes have taken place. There were significant differences in attitudes of the intervention group between the baseline and posttest (Z = -3.542, $p<0.001$) as well as the posttest and the 6-month follow-up (Z = -4.665, $p<0.001$). There were more positive attitude counts than the negative ones towards the tobacco use at the posttest (T^+=10075.50, mean rank=96.88). However, over the six-month period, the positive attitudes had changed to negative (T=10829.50, mean rank= 93.36).

In the case of the control group, there was a statistically significant difference in attitudes between the baseline and posttest (Z = - 3.430, p=0.001) but without any

significant changes thereafter. Similar to the intervention group, positive ranks gradually decreased from the posttest (T^+=8450.50, mean rank=88.03) to the 6-month follow-up (T^-=5829.50, mean rank=79.78).

Table 4- 10. Multiple comparisons of differences in attitudes using a Wilcoxon signed-rank test

Point of data collection	Mean rank		p-value
	Negative	Positive	
Intervention group			
Baseline - Posttest	74.99	96.88	<0.001*
Baseline - 3-month follow-up	92.69	87.07	0.228
Baseline - 6-month follow-up	98.32	80.32	0.046
Posttest - 3-month follow-up	98.48	80.62	0.083
Posttest - 6-month follow-up	93.36	77.47	<0.001*
Control group			
Baseline - Posttest	69.21	88.03	0.001*
Baseline - 3-month follow-up	83.25	85.58	0.338
Baseline - 6-month follow-up	79.79	88.69	0.990
Posttest - 3-month follow-up	84.30	79.02	0.075
Posttest - 6-month follow-up	91.51	79.78	0.019

*Significant at *p*-value <0.01 (Bonferroni adjusted significance level= 0.05/5)

4.4 Change in intention to use tobacco in the future

4.4.1 Use tobacco if offered by best friends in the intervention group

On average, 86 percent of students definitely did not want to use tobacco even if offered to them by their best friends while 11.2 percent certainly wanted to accept their offers during the study period. The proportions of students who responded a 'definitely yes' to the offer of tobacco increased from 7 percent at the baseline to

13 percent at the 6-month follow-up. At the same time, those students who did not

want to accept their best friend's offer of tobacco increased slightly from the

baseline (84.9%) to the 6-month follow-up (86.3%). Overall, the student's intentions

to use tobacco if offered by their best friends were significantly different across four

time points of measurements [χ^2 (6) = 76.982, $p<0.001$], indicating that the student's

intentions have changed over time when compared with the baseline data.

Table 4- 11. Proportions of students who would use tobacco if offered by their best
friends in the intervention group at the baseline, posttest, 3-month follow-up and 6-
month follow-up

Point of data collection	Sample (n)	Definitely not n (%)	Probably yes n (%)	Definitely yes n (%)	*p*-value
Baseline	186	158 (84.9)	21 (11.3)	7 (3.8)	<0.001
Posttest	183	163 (89.1)	0 (0.0)	20 (10.9)	
3-month follow-up	183	153 (83.6)	0 (0.0)	30 (16.4)	
6-month follow-up	183	158 (86.3)	0 (0.0)	25 (13.7)	

Significant at *p*-value <0.05

4.4.2 Use tobacco if offered by best friends in the control group

More than 88 percent of students responded a 'definitely no' to the question on the

offer of tobacco by their best friends, but only 9.8 percent responded a 'definitely

yes'. While the proportions of students who said a 'definitely no' decreased steadily

from the baseline to the 6-month follow-up (91.1% Vs 83.3%), the proportions for

those who said a 'definitely yes' also increased from 3.6 percent at the baseline to

16.7 percent at the 6-month follow-up. Overall, the intentions of students in the

control group to use tobacco if offered by their best friends differed significantly across four time points of measurements [χ^2 (6) = 45.964, $p<0.001$]. So, the intentions have changed over the period of time.

Table 4- 12. Proportions of students who would use tobacco if offered by best friends in the control group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Definitely not n (%)	Probably yes n (%)	Definitely yes n (%)	p-value
Baseline	192	175 (91.1)	10 (5.2)	7 (3.6)	<0.001
Posttest	182	167 (91.8)	0 (0.0)	15 (8.2)	
3-month follow-up	180	160 (88.9)	0 (0.0)	20 (11.1)	
6-month follow-up	180	150 (83.3)	0 (0.0)	30 (16.7)	

Significant at p-value <0.05

4.4.3 Differences in the intentions between the groups at the baseline, posttest, 3-month follow-up and 6-month follow-up

The intentions of students to use tobacco whenever offered by their best friends were not significantly different between the intervention and control groups at the baseline [U = 16787, p = 0.073], at the posttest [U = 16205, p = 0.384], at the 3-month follow-up [U = 15600, p = 0.145] and at the 6-month follow-up [U = 15975, p = 0.425]. When compared between the groups, there were no changes in the intentions observed over time.

Table 4- 13. Comparisons of the student's intentions to use tobacco if offered by best friends between the groups at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Intentions to use tobacco		p-value
	Intervention group	Control group	
	Mean rank	Mean rank	
Baseline	183.76	195.07	0.073
Posttest	180.55	185.46	0.384
3-month follow-up	177.25	186.83	0.145
6-month follow-up	184.70	179.25	0.425

Significant at *p*-value <0.05

4.4.4 Intention to remain tobacco free for five years in the intervention group

The mean scores for intentions to remain tobacco free for five years in the intervention group were above the average. However, the scores decreased slightly from the baseline (*M*=5.90, *SD*=1.89) to the 3-month follow-up (*M*=5.72, *SD*=2.27), and went down further by some decimal points at the 6-month follow-up (*M*=5.05, *SD*=2.62). The results reflected that the student's intentions were not 'definite' but 'may be' that they would remain tobacco free for five years from now on.

Table 4- 14. The mean intention scores for remaining tobacco free for five years in the intervention group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Intention score Mean ± SD	95%CI
Baseline	186	5.90 ± 1.89	5.62 to 6.17
Posttest	183	5.92 ± 2.12	5.61 to 6.23
3-month follow-up	183	5.72 ± 2.27	5.38 to 6.05
6-month follow-up	183	5.05 ± 2.62	4.67 to 5.44

4.4.5 Intention to remain tobacco free for five years in the control group

The students in the control group scored above average for their intentions to remain tobacco free for five years at the baseline (*M* = 5.89, *SD* = 2.05). However, the scores dropped sharply from the posttest (*M* = 5.43, *SD* = 2.44) to the 3-month follow-up (*M* = 4.82, *SD* = 2.77). The 6-month follow-up mean scores (*M* = 4.20, *SD* = 2.86) indicated that the students were not sure of their intentions to remain tobacco free for the next five years.

Table 4- 15. The mean intention scores for remaining tobacco free for five years in the control group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Intention score Mean ± SD	95%CI
Baseline	192	5.89 ± 2.05	5.60 to 6.18
Posttest	182	5.43 ± 2.44	5.07 to 5.79
3-month follow-up	180	4.82 ± 2.77	4.41 to 5.22
6-month follow-up	180	4.20 ± 2.86	3.78 to 4.62

4.4.6 Differences in the intentions to remain tobacco free for five years between the groups at the baseline, posttest, 3- and 6-month follow-up

The mean scores for intention between the intervention and control groups at the baseline were not different [$t(376)$ = -0.036, p = 0.972]. However, the mean intention scores between the groups were significantly different at the posttest [$t(363)$= 2.071, p = 0.039], the 3-month follow-up [$t(361)$ = -3.387, p = 0.001] and at the 6-month follow-up [$t(361)$ = -2.973, p = 0.003)].

Table 4- 16. Comparison of differences in the mean intention scores for five-year tobacco free between the groups at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Intention scores		95%CI
	Intervention group Mean ± SD	Control group Mean ± SD	
Baseline	5.90 ± 1.89	5.89 ± 2.04	- 0.40 to 0.39
Posttest	5.92 ± 2.07	5.43 ± 2.44	-0.97 to -0.025*
3-month follow-up	5.72 ± 2.27	4.82 ± 2.77	-1.42 to -0.37*
6-month follow-up	5.05 ± 2.62	4.20 ± 2.86	-1.42 to -0.29*

*Significant at *p*-value <0.05

4.4.7 Overall effect of the NTUIS model on the intentions to remain tobacco free for five years between and within the groups (adjusted for covariates)

The results of the General Linear Model repeated-measures ANOVA showed that the mean scores for intentions to remain tobacco free for five years were significantly different between the groups [$F_{(1,354)}$ = 284.603, p <0.001, d = 0.446], and the variance accounted for by the NTUIS model was 44.6% after adjusting for the baseline covariates. However, the statistical significance was not observed in the within-group results [$F_{(2.9, 1048.5)}$ = 2.370, p <0.001, d = 0.072], reflecting that the student's intentions did not change over time.

Table 4- 17. Comparisons of intentions of students to remain tobacco free for five years between the groups following the NTUIS model implementation after adjusting for covariates

Source	Sum of Squares	df	Mean Square	F	*p*-value
Between subjects					
Intervention	1612.511	1	1612.511	284.603	<0.001*
Error	2005.703	354	5.666		
Within subjects					
Time	34.008	2.962	11.482	1.993	0.114
Intervention x time	40.470	2.962	13.664	2.370	0.072
Error	4060.719	1048.451	5.762		

Used Huynh-Feldt correction factor; *Significant at *p*-value <0.001

Except for the baseline, the mean intention scores of the students in the intervention group to remain tobacco free for five years were comparatively higher than those in the control group at every time line. The students in the intervention group showed improvements over time in their intentions to remain tobacco free in the next five years.
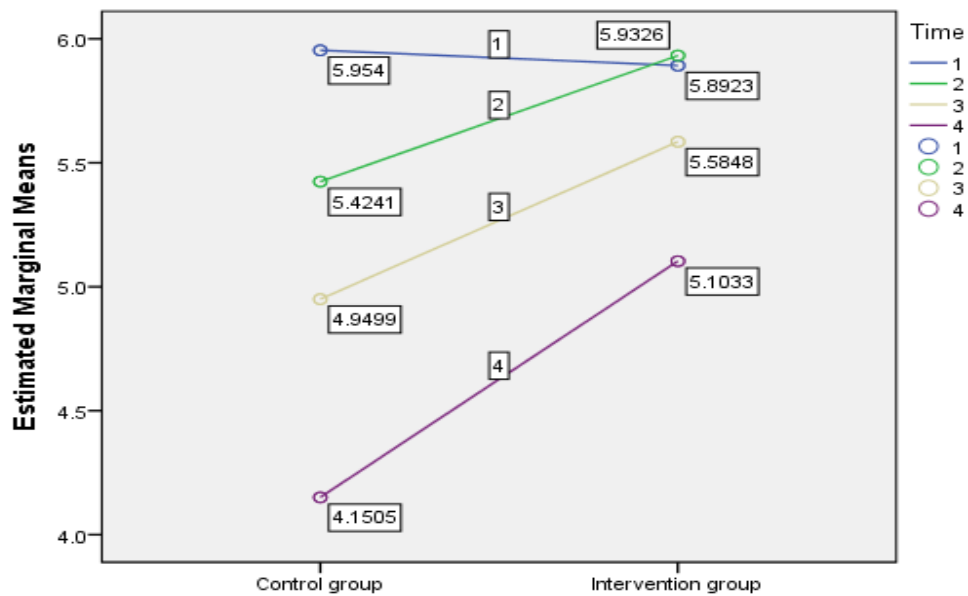
Figure 4- 3. Comparisons of mean intention scores for five-year tobacco free between the groups

4.4.8 Intention to remain tobacco free all life in the intervention group

The students in the intervention group intended to stay free from tobacco use for life at the posttest (M=6.07, SD=1.92). But their intentions got switched from 'I do' to 'may be' at the 3-month follow-up (M=5.70, SD=2.31) and at the 6-month follow (M=5.08, SD=2.60). Although more inclined towards positive points, the students did not have 'definite' intentions to stay away from tobacco for their whole life.

Table 4- 18. The mean intention scores to remain tobacco free for life in the intervention group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Intention score Mean ± SD	95%CI
Baseline	186	5.66 ± 2.06	5.36 to 5.95
Posttest	183	6.07 ± 1.92	5.79 to 6.35
3-month follow-up	183	5.70 ± 2.31	5.37 to 6.04
6-month follow-up	186	5.08 ± 2.60	4.70 to 5.46

4.4.9 Intention to remain tobacco free all life in the control group

The mean intention scores for the life-long abstinence from tobacco were above

average at the baseline (*M*=5.83, *SD*=2.08) and up to the 3-month follow-up (*M*=5.77,

SD=2.19). However, at the 6-month follow-up (*M*=4.42, *SD*=2.82), the students were

not sure of their intentions to remain free of tobacco throughout their lives,

indicating their likelihood of using tobacco in their lifetime.

Table 4- 19. The mean intention scores to remain tobacco free for life in the control
group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample (n)	Intention score Mean ± SD	95%CI
Baseline	192	5.83 ± 2.08	5.54 to 6.13
Posttest	182	5.77 ± 2.19	5.45 to 6.10
3-month follow-up	180	5.18 ± 2.65	4.79 to 5.57
6-month follow-up	180	4.42 ± 2.82	4.01 to 4.84

4.4.10 Differences in the intentions to remain tobacco free for life between the
groups at the baseline, posttest, 3- and 6-month follow-up

The mean scores for intention between the intervention and control groups were not

different at the baseline [*t*(376) = 0.833, *p* = 0.406] and at the posttest [*t*(363) = -

1.350, *p* = 0.178]. However, the mean intention scores between the groups were

significantly different at the 3-month follow-up [*t*(361) = -2.000, *p* = 0.046] and at the

6-month follow-up [*t(*361*)* = -2.320, *p* = 0.021]

Table 4- 20. Comparison of differences in the mean intention scores five-year tobacco free between the groups at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Intention scores		95%CI
	Intervention group Mean $\pm$ SD	Control group Mean $\pm$ SD	
Baseline	5.66 $\pm$ 2.06	5.83 $\pm$ 2.08	- 0.24 to 0.60
Posttest	6.07 $\pm$ 1.91	5.77 $\pm$ 2.19	- 0.71 to 0.13
3-month follow-up	5.70 $\pm$ 2.31	5.18 $\pm$ 2.65	-1.04 to -0.01[*]
6-month follow-up	5.08 $\pm$ 2.60	4.42 $\pm$ 2.83	-1.22 to -0.10[*]

[*]Significant at *p*-value <0.05

4.4.11 Overall effect of the NTUIS model on the intentions to remain tobacco free for life

The results of the General Linear Model repeated-measures ANOVA showed that the mean scores for intentions to remain tobacco free for life were significantly different between the groups [F(1,354) = 331.590, *p* <0.001, d = 0.484] and the variance accounted for by the NTUIS model was moderately high after adjusting for all the baseline covariates. However, the results for the within-group did not show any statistical significance with very negligible effect size [F (2.9, 1050.4) = 1.779, *p* = 0.150, d = 0.005]. When compared between the groups, the students in the intervention group had more chances of staying tobacco free for life than their counterparts in the control group.

Table 4- 21. Comparisons of intentions of students to remain tobacco free for life between the groups following the NTUIS model implementation after adjusting for covariates

Source	Sum of Squares	df	Mean Square	F	*p*-value
Between subjects					
Intervention	1771.955	1	1771.955	331.590	<0.001*
Error	2005.703	354	5.666		
Within subjects					
Time	31.097	2.970	10.470	1.902	0.169
Intervention x	29.085	2.970	9.793	1.779	0.150
time	5787.593	1050.367	5.505		
Error					

Used Huynh-Feldt correction factor; *Significant at *p*-value <0.001

The mean intention scores of the intervention group were higher than the control group from the posttest through to the 6-month follow-up, indicating that the intention scores have improved for the intervention over time as compared to the scores of the control group.
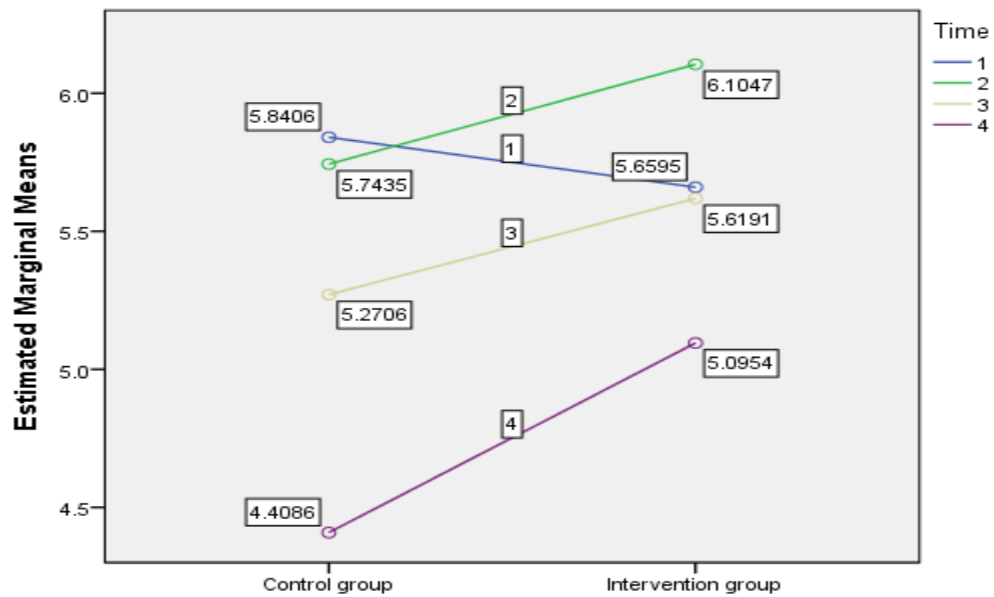
Figure 4- 4. Comparisons of mean intentions for life-long tobacco free between the groups

4.5 Change in tobacco use behavior

4.5.1 Ever experimented with cigarettes or bidis in the intervention group

There was no increase in the proportions of students in the intervention group who said they experimented with cigarettes/*bidis* from the baseline till the last follow-up. When the Chi-squared test was performed, the change in experimentation of cigarettes/*bidis* was not significant from the baseline until the 6-month follow-up [χ^2 (3) = 0.013, *p*>0.05]. During the study period, changes in the experimentation with cigarettes/*bidis* were not observed in the intervention group.

Table 4- 22. Proportion of students who ever experimented with cigarettes/bidis in the intervention group

Point of data collection	Sample	Yes n (%)	No n (%)	*p*-value
Baseline	186	25 (13.4)	161 (86.6)	>0.05
Posttest	183	24 (13.1)	159 (86.9)	
3-month follow-up	183	24 (13.1)	159 (86.9)	
6-month follow-up	183	24 (13.1)	159 (86.9)	

Significant at *p*-value <0.05

4.5.2 Ever experimented with cigarettes or bidis in the control group

The proportion of students in the control group who experimented with cigarettes/*bidis* increased by 11 percent from the baseline to the posttest, and then 1.4 percent from the posttest to the 3-month follow-up. However, it slipped to 23.9 percent at the 6-month follow-up from 26.1 percent at the 3-month follow-up. Overall, the chi-squared test indicated that the difference in experimentation with cigarettes/*bidis* was significant in the course of six months [χ^2 (3) = 12.018, *p*=0.007].

Table 4- 23. Proportion of students who ever experimented with cigarettes/bidis in the control group

Point of data collection	Sample	Yes n (%)	No n (%)	*p*-value
Baseline	192	25 (13.0)	167 (87.0)	0.007
Posttest	182	45 (24.7)	137 (75.3)	
3-month follow-up	180	47 (26.1)	133 (73.9)	
6-month follow-up	180	43 (23.9)	137 (76.1)	

Significant at *p*-value <0.05

4.5.3 Difference in experimentation with cigarettes/bidis between the groups

A Mann-Whitney test showed the proportions of students who experimented with cigarettes/*bidis* in the intervention group did not differ significantly from those in the control group at the baseline (U = 17781, p = 0.904). However, statistically significant differences were observed between the groups at the posttest (U = 14719, p = 0.005), at the 3-month follow-up (U = 14329.5, p = 0.002) and at the 6-month follow- up (U = 14695.5, p = 0.008). The control group saw an increasing trend of experimentation with cigarettes/*bidis* over the six-month period while the trend had remained constant for the intervention group.

Table 4- 24. Comparisons of the student's experimentation with cigarettes between the groups at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Intervention group n (%)	Control group n (%)	p-value
Baseline	25(13.4)	25 (13.0)	0.904
Posttest	24 (13.1)	45 (24.7)	0.005[*]
3-month follow-up	24 (13.1)	47 (26.1)	0.002[*]
6-month follow-up	24 (13.1)	43 (23.9)	0.008[*]

[*]Significant at *p*-value <0.05

4.5.4 Ever experimented with smokeless tobacco product or baba in the intervention group

The proportions of students in the intervention group who experimented with smokeless tobacco products/*baba* remained almost constant from the baseline of 16.7 percent all through to the 6-month follow-up of 16.9 percent. The chi-squared test did not show any statistical difference in the proportions of students

experimenting over the period of six months from the baseline to the 6-month follow-up [$\chi^2(3)$ = 0.007, p = 1.0].

Table 4- 25. Proportion of students who ever experimented with smokeless tobacco/baba in the intervention group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample	Yes n (%)	No n (%)	*p*-value
Baseline	186	31 (16.7)	155 (83.3)	1.000
Posttest	183	31 (16.9)	152 (83.1)	
3-month follow-up	183	31 (16.9)	152 (83.1)	
6-month follow-up	183	31 (16.9)	152 (83.1)	

Significant at *p*-value <0.05

4.5.5 Ever experimented with smokeless tobacco product or baba in the control group

Experimenting with smokeless tobacco products/*baba* among the students in the control group was not different at the four points of measurements. The chi-squared test did confirm that the proportions of students in this group experimenting smokeless tobacco products did not change significantly from the baseline up to the 6-month follow-up [χ^2 (3) = 0.084, p = 0.994].

Table 4- 26. Proportion of students who ever experimented with smokeless tobacco/baba in the control group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample	Yes n (%)	No n (%)	p-value
Baseline	192	30 (15.6)	162 (84.4)	0.994
Posttest	182	30 (16.5)	152 (83.5)	
3-month follow-up	180	28 (15.6)	152 (84.4)	
6-month follow-up	180	28 (15.6)	152 (84.4)	

*Significant at *p*-value <0.05

4.5.6 Difference in experimentation with smokeless tobacco/baba between the groups

Using a Mann-Whitney test, the between-group differences in the proportions of students who ever experimented with smokeless tobacco were tested. The results indicated that there were no significant differences in ever experimenting with smokeless tobacco among the students between the intervention and the control groups at the baseline (U = 17670, p = 0.783), at the posttest (U = 16577, p = 0.907), at the 3-month follow-up (U = 16242, p = 0.721) and at the 6-month follow- up (U = 16242, p = 0.721). Experimenting with smokeless tobacco in both the groups did not change over the period of time.

Table 4- 27. Comparisons of the student's experimentation with smokeless tobacco/baba between the groups at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Intervention group n (%)	Control group n (%)	*p*-value
Baseline	31 (16.7)	30 (15.6)	0.783[‡]
Posttest	31 (16.9)	30 (16.5)	0.907[‡]
3-month follow-up	31 (16.9)	28 (15.6)	0.721[‡]
6-month follow-up	31 (16.9)	28 (15.6)	0.721[‡]

[‡]Statistically non-significant (>0.05)

4.5.7 Current tobacco use among adolescents

Around 15 percent of students were current tobacco users, out of which 10.8 percent were males and 4.5 percent females. Of the smokers (10.8%), 8.5 percent were males and 2.4 percent females. Similarly, among the smokeless tobacco users (11.1%), more males (8.2%) than females (2.9%) used smokeless tobacco. In addition, there were users of both smoking and smokeless forms of tobacco (5.56%). Such users of both types of tobacco products are called duel users.

Table 4- 28. Proportions of students who are current tobacco users by sex and type of tobacco products

Current tobacco users	Sample	Male n (%)	Female n (%)	Total users n (%)
Total tobacco users	378	41 (10.8)	17 (4.5)	58 (15.3)
Smokers	378	32 (8.5)	9 (2.4)	41 (10.8)
SLT users	378	31 (8.2)	11 (2.9)	42 (11.1)

4.5.8 Amount of cigarettes/bidis used per day in the intervention group

On average, 11 percent of students in the intervention schools currently smoked cigarettes or *bidis*, but most of them smoked one or less than one cigarette per day (3.3% to 7.6%) and hardly any above six sticks per day (1.5% to 3.2%). A large proportion of students were non-smokers (89%). The differences in the amount of cigarettes/*bidis* smoked per day from the baseline up to the last follow-up at six months were found statistically significant [χ^2 (21) = 31.228, *p*=0.027].

Table 4- 29. Quantity of cigarettes/bidis the students in the intervention group used in the past 30 days at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Amount of cigarettes or *bidis* per day in the past 30 days				*p*-value
	0 n (%)	<1-1 n (%)	2-5 n (%)	>6 n (%)	
Baseline	165 (88.7)	14 (7.6)	3 (1.6)	4 (2.1)	0.027
Posttest	163 (89.1)	9 (4.9)	8 (4.4)	4 (1.5)	
3-month follow-up	163 (89.1)	6 (3.3)	7 (3.8)	7 (3.7)	
6-month follow-up	163 (89.1)	10 (5.5)	4 (2.2)	6 (3.2)	

Significant at *p*-value <0.05

4.5.9 Amount of cigarettes/bidis used per day in the control group

Of those who currently smoked cigarettes/*bidis* (12.5%), only small proportions of them took less than one stick per day (6.7%), between 2-5 sticks (3.1%) and more than 20 sticks (1.1%). A large proportion were non-smokers (87.5%). The differences in the amount of cigarettes/*bidis* smoked per day from the baseline until the last follow-up at six months were found statistically significant [χ^2 (18) = 34.622, *p*=0.031].

Table 4- 30. Quantity of cigarettes/bidis the students in the control group used in the past 30 days at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Amount of cigarettes or *bidis* per day in past 30 days				*p*-value
	0 n (%)	<1-1 n (%)	2-5 n (%)	>6 n (%)	
Baseline	172 (89.6)	13 (6.8)	6 (3.1)	1 (0.5)	0.031
Posttest	161 (88.5)	14 (7.6)	3 (1.6)	4 (2.1)	
3-month follow-up	153 (85.0)	16 (8.8)	5 (2.8)	6 (3.4)	
6-month follow-up	156 (86.7)	15 (8.3)	3 (1.7)	6 (3.4)	

Significant at *p*-value <0.05

4.5.10 Number of days smokeless tobacco products used in the intervention group

Among the current SLT users (10.3%), 3.5 percent of them used the SLT product for 1-2 days, 1.9 percent for all 30 days and 1.1 percent for 10-19 days. The rest used it for less than one percent. A large proportion formed a non-user group (89.7%). The differences in the number of days the SLT products was used from the baseline until the last follow-up at six months were not statistically significant [χ^2 (21) = 20.158, *p*=0.511].

Table 4- 31. Proportion of current SLT users in the intervention group with the number of days used SLT product at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Number of days used SLT products in the past days					p-value
	0 n (%)	1-2 n (%)	3-9 n (%)	10-29 n (%)	All 30 n (%)	
Baseline	166 (89.2)	7 (3.8)	6 (3.2)	1 (0.5)	6 (3.2)	0.511
Posttest	164 (89.6)	8 (4.4)	5 (2.7)	3 (1.6)	3 (1.6)	
3-month follow-up	164 (89.6)	6 (3.8)	10 (5.4)	6 (3.3)	2 (1.1)	
6-month follow-up	165 (90.2)	6 (3.3)	6 (3.3)	2 (1.0)	3 (1.6)	

Significant at *p*-value <0.05

4.5.11 Number of days smokeless tobacco products used in the control group

Close to seven percent of the current SLT users had used the SLT product for 1-2 days, 1.9 percent for 3-5 days and 1.9 percent for 6-9 days. A large proportion formed a non-user group (88.1%). The differences in the number of days the SLT products was used from the baseline until the last follow-up at six months were not statistically significant [χ^2 (18) = 17.268, *p*=0.505].

Table 4- 32. Proportion of current SLT users in the control group with the number of days used SLT product at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Number of days used SLT products in the past days					p-value
	0 n (%)	1-2 n (%)	3-9 n (%)	10-29 n (%)	All 30 n (%)	
Baseline	170 (88.5)	14 (7.3)	6 (3.1)	2 (1.0)	0 (0.0)	0.505
Posttest	162 (89.0)	11 (6.0)	4 (2.1)	0 (0.0)	3 (1.6)	
3-month follow-up	158 (87.8)	9 (5.0)	8 (4.4)	5 (2.8)	0 (0.0)	
6-month follow-up	157 (87.2)	16 (8.9)	4 (2.2)	2 (1.2)	1 (0.6)	

Significant at *p*-value <0.05

4.5.12 Effect of NTUIS model on the use of cigarettes/bidis in the intervention group

All the students who were non-smokers at the baseline (88.7%) in the intervention group had remained non-smokers at the posttest (89.1%), at the 3-month follow-up (89.1%) and at the 6-month follow-up (89.1%). At the same time, there was no visible increase in the proportions of smokers at all points of measurements. The Cochran's Q test did not indicate any significant differences among the students across all points of measurements [χ^2 (3) = 0.043, p = 0.998]. The non-smoking students did not pick up smoking after the baseline.

Table 4- 33. Proportion of current smokers in the intervention group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample	Non-smoker n (%)	Smoker n (%)	p-value
Baseline	186	165 (88.7)	21 (11.3)	0.998
Posttest	183	163 (89.1)	20 (10.9)	
3-month follow-up	183	163 (89.1)	20 (10.9)	
6-month follow-up	183	163 (89.1)	20 (10.9)	

Significant at p-value <0.05

4.5.13 Effect of NTUIS model on the use of cigarettes/bidis in the control group

There was a slight drop by about 3 percent in the proportions of students who did not smoke in the control group during the study period. Similarly, the proportions of smokers raised only marginally from 10.4 percent at the baseline to 13.3 percent at the 6-month follow-up. However, the overall differences in the smoking status over

the six-month period was not statistically significant [χ^2 (3) = 3.107, p = 0.375] as indicated by the Cochran's Q test.

Table 4- 34. Proportion of current smokers in the control group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample	Non-smoker n (%)	Smoker n (%)	p-value
Baseline	192	172 (89.6)	20 (10.4)	0.375
Posttest	182	161 (88.5)	21 (11.5)	
3-month follow-up	180	153 (85.0)	27 (15.0)	
6-month follow-up	180	156 (86.7)	24 (13.3)	

Significant at p-value <0.05

4.5.14 Overall effect of NTUIS model on the use of cigarettes/bidis

Whether the students smoked or not was not affected significantly by the NTUIS model [χ^2 (1) = 0.771, p = 0.380]. The result indicated that the model had no effect on the student's status of smoking cigarettes when compared between the groups.

Table 4- 35. Overall effect of the NTUIS model on the smoking status of students in the intervention and control groups at the four-time points of measurement using a Friedman ANOVA test

Variable	Mean rank		χ^2	df	p
Smoking status	Intervention = 1.49				
	Control = 1.51		0.771	1	0.380

Significant at p-value <0.05

4.5.15 Effect of NTUIS model on the use of smokeless tobacco/baba in the intervention group

The majority of students who were not using any smokeless tobacco or *baba* at the baseline (89.2%) maintained their non-user status until the last follow-up assessment (90.2%), though the proportions of non-users increased by a negligible percent. Correspondingly, the proportions of students who used smokeless tobacco products remained nearly constant. The Cochran's Q test showed that the differences in proportions of SLT users and non-users across all points of measurements were not statistically significant [χ^2 (3) = 0.112, p = 0.989].

Table 4- 36. Proportion of current smokeless tobacco (SLT) users in the intervention group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample	SLT non-user n (%)	SLT user n (%)	p-value
Baseline	186	163 (89.2)	20 (10.8)	0.989
Posttest	183	164 (89.6)	19 (10.4)	
3-month follow-up	183	164 (89.1)	19 (10.4)	
6-month follow-up	183	165 (90.2)	18 (9.8)	

Significant at *p*-value <0.05

4.5.16 Effect of NTUIS model on the use of smokeless tobacco/baba in the control group

There were no noticeable changes in the proportions of both the users and non-users of smokeless tobacco products over the period of six months. The Cochran's Q test showed that the differences were not statistically significant [χ^2 (3) = 0.256, p = 0.968].

Table 4- 37. Proportion of current smokeless tobacco (SLT) users in the control group at the baseline, posttest, 3-month follow-up and 6-month follow-up

Point of data collection	Sample	SLT non-user n (%)	SLT user n (%)	*p*-value
Baseline	192	170 (88.5)	22 (11.5)	0.968
Posttest	182	162 (89.0)	20 (11.0)	
3-month follow-up	180	158 (87.8)	22 (12.2)	
6-month follow-up	180	157 (87.2)	23 (12.8)	

Significant at *p*-value <0.05

4.5.17 Overall effect of NTUIS model on the use of smokeless tobacco products/baba

The NTUIS model did not have significant effect on the student's status of using smokeless tobacco products [χ^2 (1) = 0.834, *p* = 0.361]. The student's use of SLT products was not determined by the presence or absence of the model.

Table 4- 38. Overall effect of the NTUIS model on the SLT-user status of students in the intervention and control groups at the four-time points of measurement using a Friedman ANOVA test

Variable	Mean rank		χ^2	*df*	*p*
SLT use status	Intervention = 1.49				
	Control	= 1.51	0.834	1	0.361

Significant at *p*-value <0.05

4.6 Exposure and participation of students in the NTUIS model implementation

The intervention schools undertook a set of educational activities on the harms of tobacco use for a period of five weeks in May-June 2016, and a two-week booster program in October 2016. The peer educators implemented these program activities.

In order to understand the extent to which the program had covered the students in the intervention schools, a few questions were asked during every round of data collection.

It was found that 90.7 percent of students at the posttest and 92.9 percent at the 6-month follow-up have received the information on the harmful effects of tobacco use. Over a third of students have been approached 1-2 times by the peer educators and received tobacco information. And, on average, 22.2 percent of students have been approached 3-4 times and 21.5 percent more than six times. However, about nine percent of students were neither approached by the peer educators nor received any tobacco information.

The proportions of students who said the tobacco information was both useful and adequate increased from 46.4 percent at the posttest to 55.7 percent at the 6-month follow-up. On average, over one-half of students thought the information given to them were both useful and sufficient. However, close to 17 percent said that the tobacco information was neither useful nor adequate. The other few thought it was useful but not adequate (16.4%).

Over two-third of students had participated in the activities organized by the peer educators. More proportions of students took part in the program at the 3-month

follow-up (75.5%) as compared to them having participated at the posttest (66.7%) and the 6-month follow-up (65.5%).

Overall, only a small percentage of students did not receive tobacco information while substantial proportions have been approached by the peer educators for information dissemination as well as have taken part in the peer education activities.

Table 4- 39. Proportions of students exposed to and participated in the NTUIS model

Point of data collection	N	Received information n (%)	Approached >6 times n (%)	Information useful & adequate n (%)	Participated in peer education n (%)
Posttest	183	166 (90.7)	29 (15.8)	85 (46.4)	122 (66.7)
3-month follow-up	183	163 (89.1)	49 (26.8)	96 (52.5)	138 (75.5)
6-month follow-up	183	170 (92.9)	40 (21.9)	102 (55.7)	119 (65.5)

4.7 Post-intervention interview with the peer educators

The two schools that formed the intervention group were Gaselo and Nobding schools. A total of 10 peer educators were selected based on the eligibility criteria. Out of which, six were from Gaselo school while the other four from Nobding school. There were five girls and five boys aged 14 to 16 years.

In order to understand their experiences and the challenges they faced while implementing the NTUIS model in their respective schools, the peer educators were interviewed and encouraged to share their views on peer education activities as well as their opinions on tobacco use in schools. First of all, the peer educators felt that taking up the responsibility of implementing the NTUIS model in their schools was a great opportunity for them because it provided them a platform not only to learn about the health education on tobacco use but also display their skills in disseminating the health messages in various ways. The workshop on communication skills equipped them with different methods of communications and dealing with some unforeseen barriers. They said the roles they played as peer educators gave them the chance to unwrap their leadership qualities and apply them in reality. That helped them to improve their interactions with their classmates and engage in activities as a team. Amongst others, they have learnt to solve problems and manage some difficult situations. All of their teachers keenly supported this peer education initiative in their respective schools. In general, they described their experiences as educationally enriching and personally satisfying.

How much ever interesting the peer education activities might have been, the implementation of NTUIS model did not go without glitches. The biggest challenge the peer educators ever faced was to get a sustained attention of and cooperation

from their classmates. They remained either most of the time passive or maintained distance from the peer educators. It was difficult to keep them constantly engaged in the NTUIS activities, and even harder to get support particularly from the tobacco users and their friends. A handful of classmates who smoked cigarettes or chewed smokeless tobacco products showed restraint whenever the peer educators approached them. These classmates exhibited no or little interest in listening to the health messages and only reluctantly participated in the peer education activities. Sometimes, they simply avoided the peer educators or hurled at them an unfriendly behaviour. But on the whole, non-participation of a small section of their class did not affect the overall implementation of NTUIS model in the two intervention schools.

The peer educators felt that, given that the tobacco products are illegally available in the market despite the ban on their sales, the prevalence of tobacco use among the students may rise in the near future. The peer education program in schools can be one of the best approaches to reach out to students with health education program, and prevent them from picking up smoking or chewing *baba* because this program provides an in-depth understanding of the harms of the tobacco use which most of the students are only superficially aware of. Provision of full information is essential in order to make students understand clearly the long-term harmful

consequences of tobacco use and to bring about positive behavioral changes. Lastly, the peer educators said that the peer education program to propagate health education in schools may have an everlasting impact on the future health of the students by preventing many dangerous diseases and disabilities.

CHAPTER V

CONCLUSION, DISCUSSION AND RECOMMENDATION

A quasi-experimental study was conducted with the control group primarily to find out if the NTUIS model had any effects on the knowledge about the harms of the tobacco use among the students, and subsequent changes in their attitudes, intentions to use tobacco in the future, and tobacco use behaviour. The NTUIS model was designed as a prevention program that used a team of trained peer educators to execute its activities in the intervention schools. The changes in the outcome variables were measured at the baseline, posttest, first follow-up at three months and second follow-up at six months. The analysis was focused on assessing the differences in the study outcomes between the intervention and control groups before and after the implementation of the model.

The study was undertaken in the wake of the increasing prevalence of tobacco use among the Bhutanese adolescents in the past years. It is expected that the findings from this study may be of some interest and use to the concerned authorities, particularly the Ministry of Education and Ministry of Health. Any relevant government agencies could utilize the results both at the national and subnational

levels to introduce a preventive program in schools and pave a way towards dissuading our young boys and girls from initiating the use of tobacco products.

5.1 Conclusion

5.1.1 Summary of general findings

A total of 378 students belonging to 8th grade took part in the study at the baseline, and of which 363 completed till the last follow-up. The majority of the subjects were between 12 and 18 years of age (93.6%) with the mean age of 14.9 years. The ages ranged from 11 to 19 years. Since all the schools in the study had boarding facilities, over eight out of ten students lived in school hostels. Only small proportions of the parents (4% fathers, 2.1% mothers) and siblings (2.4%) currently used tobacco. The current tobacco users were highest among their peers (8%). As regards alcohol use, about 8 percent of students took alcohol in the past 30 days. Over 44 percent of students described themselves as extroverts.

The NTUIS model brought changes in the variables of interest when compared between the intervention and control groups. Those students who received the intervention showed significant improvements in their knowledge scores as compared to their peers who did not. An overall difference in the model's effect on the knowledge scores was highly distinct between the groups. However, this was not the case with the attitude scores. The students who in the beginning of the study had more positive attitudes towards tobacco use turned out to harbor more negative

attitudes by the end of the final follow-up. Although there were changes in the attitudes of both the groups from the baseline to the 6-month follow-up, they were not significant overall. On a positive note, the changes brought about by the model on the student's intentions to remain tobacco free for the next five years and for lifetime were significant.

The maintenance of non-user status among the students in the intervention group who did not smoke cigarettes/*bidis* at the baseline continued till the end of the study. But the same status was not observed among the students in the control group. However, there was no significant difference in the effects of the model when compared between the groups. Regarding the use of smokeless tobacco products, test results of both the groups were non-significant, indicating that the student's use of SLT products was not determined by the presence or absence of the model. The NTUIS intervention has managed to reach information to about 90 percent of the students. The post-study interviews with the peer educators found out that the NTUIS model that engaged a peer-to-peer interaction approach as a promising method to educate adolescents on the harms of tobacco use and potentially prevent them from using tobacco in the future.

5.1.2 Knowledge on tobacco use and its harms

The mean knowledge scores of the students in the intervention group increased substantially more than the scores of those in the control group after the baseline

assessment. The knowledge scores significantly differed between the groups after adjusting for the baseline differences [$F(1,354) = 645.64$, $p <0.001$, d = 0.64]. The model's effect was high, reflecting that 73 percent of the intervention group were above the mean of the control group. Even though the within-groups testing was significant [$F(3, 1062) = 80.41$, $p <0.001$, d = 0.02], the effect size was negligible. In a nutshell, the NTUIS model was found effective in improving the knowledge on tobacco among the students.

5.1.3 Attitudes towards tobacco use

In both the intervention and control groups, there were no substantial increases in the student's attitude scores during the study period. Nonetheless, the attitude scores were significantly different between the groups across the 6-month period [χ^2 (1) = 6.890, $p =0.009$]. The differences in attitudes for the intervention group were significant between the baseline and posttest (Z = -3.542, $p<0.001$), and the posttest and 6-month follow-up (Z = -4.665, $p<0.001$). Whereas for the control group, the difference was significant only between the baseline and posttest (Z = - 3.430, $p=0.001$). But, at the final follow-up, the attitudes of students had changed from positive to negative for both the intervention (T =10829.50, mean rank=93.36) and control groups (T =5829.50, mean rank=79.78).

5.1.4 Intentions to remain tobacco free

The students in the intervention group had comparatively higher mean intention scores on remaining tobacco free for five years than those of their counterparts in the control group. The scores between the groups were significantly different at the posttest [$t(363)$= 2.071, p = 0.039], the 3-month follow-up [$t(361)$ = -3.387, p = 0.001] and the 6-month follow-up [$t(361)$ = -2.973, p = 0.003)]. The between-group difference was significant [$F(1,354)$ = 284.603, p <0.001, d = 0.446] after adjusting for the baseline covariates. However, the within-group results did not show any statistical significance [$F (2.9, 1048.5)$ = 2.370, p <0.001, d = 0.072].

Regarding the intentions to remain free of tobacco for their lifetime, the students in the intervention group had scored higher on this outcome as compared to their peers in the control group. Evidently, the mean scores were significantly different between the groups [$F(1,354)$ = 331.590, p <0.001, d = 0.484] after adjusting for all the baseline covariates. On the other hand, the within-group results did not show any statistical significance [$F (2.9, 1050.4)$ = 1.779, p = 0.150, d = 0.005].

5.1.5 Tobacco use behaviour

The proportions of non-smokers in the intervention group did not increase all through the six-month period, indicating that there were no additional smokers after the baseline assessment. More or less, the control group also showed similar results. There was only a slight drop in the proportions of students who did not smoke

across the follow-up time points. However, the overall result indicated that the NTUIS model had no effect on the student's status of smoking cigarettes/*bidis* because the between-group difference was not statistically significant [χ^2(1) = 0.771, p = 0.380].

Regarding the use of smokeless tobacco products, the students did not show much changes in their non-user status from the baseline till the last follow-up in both the intervention group [χ^2(3) = 0.112, p = 0.989] and control group [χ^2(3) = 0.256, p = 0.968]. Evidently, the NTUIS model did not have any significant effect on the student's status of using smokeless tobacco products [χ^2(1) = 0.834, p = 0.361], indicating that the student's use of smokeless tobacco was not determined by the presence or absence of the model.

5.2 Discussion

The primary objective of the study was to explore the model for its potential in preventing the uptake of tobacco among students by equipping them with knowledge on the harms of tobacco use through a peer-based health education program in schools. It was anticipated that the findings from this study could be of some use to the concerned authorities in refocusing their efforts on preventive measures for students to delay or not to start tobacco use in schools by utilizing the new evidence.

According to the report of the World Health Organization (WHO-SEARO, 2015a) compiled for Bhutan, 39 percent of boys and 23.2 percent of girls were currently using tobacco products. Of these current users, 26.3 percent of boys and 6.6 percent of girls smoked while 25 percent of boys and 18.9 percent of girls used smokeless tobacco. The national tobacco use prevalence is almost four times higher than that of current study findings for the boys (10.8%) and over five times higher for the girls (4.5%). Similarly, only 8.5 percent of boys and 2.4 percent of girls were current smokers in the current study, which are much lower than the national average (18.9%). Bhutan has one of the highest users of smokeless tobacco among adolescents (23.2%) in the WHO region of South-East Asia, which fails to feature this in the current study finding (11.1%). Interestingly, this study detected a proportion of the users of both smoking and smokeless forms of tobacco (5.56%), for which there is no such national figure for the duel users. In all, the tobacco use prevalence at the national level and the prevalence figure of the study finding are not comparable. The schools only having a fewer number of tobacco users could be one of the probable reasons behind the insignificant change in the tobacco use behaviour among the students post intervention.

The study results indicated that the model was effective in increasing the student's tobacco harm knowledge. Indeed, this finding is largely in consistent with the past

studies that a school-based tobacco prevention program had a positive effect on student's tobacco related knowledge. A 6-month follow-up cluster randomized trial in Germany implemented a school-based smoking prevention program in 45 public secondary schools involving 3444 students resulted in an increase in smoking-related knowledge (Isensee et al., 2014). Another similar interventional study in Aceh, Indonesia rolled out a prevention program in schools engaging 7th and 8th graders and saw drastic improvement in their smoking knowledge scores post intervention (Tahlil et al., 2013). A review of 11 schools in South Korea found out that 73% of smoking prevention programs helped in improving participant's knowledge about smoking (E. Park, 2006). Many school-based prevention studies carried in different countries yielded similar results on knowledge scores (Isensee et al., 2014; Lee et al., 2007; Perry, Stigler, Arora, & Reddy, 2009; Sun et al., 2007; Tahlil et al., 2013; Wen et al., 2010). However, the effect size of the current study for knowledge gain was much higher (d=0.64) as compared to those of other studies where their effect sizes ranged from 0.36 to 0.45 (Ganley & Rosario, 2013; Hwang, Yeagley, & Petosa, 2004; Tobler & Stratton, 1997).

In much contrary to the results from the past studies where such a peer-based prevention intervention in schools improved anti-smoking attitudes among students (Hwang et al., 2004; Koumi & Tsiantis, 2001; Lee et al., 2007; E. Park, 2006; Tobler &

Stratton, 1997; Wen et al., 2010), the current study had a negative effect on the student's attitudes. The past findings from a few studies also suggested that school-based interventions might not affect attitudes because they are more stable and resistant to change as compared to knowledge (Heimann, 2000; Wen et al., 2010). Another study in the United Kingdom found out that attitudes of young adolescents did not follow any standard pattern. Instead, attitudes were found to be less rational and even less associated with behavioral outcomes (Eileen, 1992). This could be due, in part, to the adolescent's inability to fully comprehend their susceptibility to tobacco use and the severity of the addictive nature of tobacco (CDC, 2004).

According to the global atlas tobacco report, 19 percent of adolescents said that they were susceptible to taking up cigarette smoking in the following year. In South-East Asia, more boys (16%) than girls (13%) thought they might initiate cigarette smoking within next year. Among Bhutanese adolescents who were never-users of tobacco, 6.5 percent of them said they might be susceptible to tobacco use in the future and 6.9 percent said they might even enjoy cigarette smoking (WHO-SEARO, 2015b). Adolescents who are thinking that they might become smokers in the future may intent to use tobacco in real time. The current study also revealed that the proportions of students who would use tobacco products if offered by their best friends increased from 3.8 percent to 13.7 percent in the intervention group and 3.6 percent to 16.7 percent in the control group. This is a likely indication that students

may give in to the influence or pressure of peers and start using tobacco. However, in case of the current study, when students were asked if they would use tobacco in the next five years and for lifetime, the probabilities of student's taking up tobacco were higher in the control group than in the intervention group for both the times. When a peer-based tobacco use prevention model was implemented, more students intended to remain tobacco free. However, in actuality, it is difficult to make out whether such pledged intentions would be true. Because the adolescents have an increased vulnerability to tobacco use due to their biological reasons and various psychological predispositions. Adolescents exhibit risk taking behaviour that may potentially harm their health and life. Such behaviours may include substance abuse, risky sexual behaviour, violent tendencies, eating disorders, etc. (Igra & Irwin, 1996). In addition, a host of factors that influence tobacco use among youth, including a lack of skills to resist peer pressure, accessibility, availability, and price of tobacco products and exposure to tobacco advertising (CDC, 2004, 2012; WHO, 2017). In one study, young primary school children, when asked about their smoking behaviour in the future, believed that they would end up being a smoker one day (7.4%) and belong to the smoker's group (2.1%). Even at such a young age, children held a strong perception of becoming a smoker one day (Brook, Mendelberg, Galili, Priel, & Bujanover, 1999). In the physical activity study, despite young people having good intentions to engage in more exercise, they failed to do it in reality (Poobalan, Aucott,

Clarke, & Smith, 2012). This points out to the fact that good intentions do not always translate into anticipated behaviours. Evidently, findings from a meta-analysis revealed that intentions cannot influence behaviours, particularly those that are of habit forming and not having control over them (Webb & Sheeran, 2006). Also, intentions and behaviours become less consistent over time (Paschal & Sheina, 1998). In general, there is a great scarcity of literature on intentions to use tobacco among adolescents in Bhutan as there has not been any model-based study carried out on the subject so far. Hence, comparison of intentions among similar studies in the Bhutanese context is not feasible.

For the tobacco use behaviour, since the proportions of non-users of cigarettes/*bidis* and smokeless tobacco/*baba* remained similar in both the groups at all follow-up assessments, this only indicated that the effect of NTUIS model on tobacco use behavior was not significant. This outcome is in agreement with many studies showing only insignificant changes in the tobacco use behaviour (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Isensee et al., 2014; E. Park, 2006; Tahlil et al., 2013; Wen et al., 2010). The pooled results from one meta-analysis consisting of 49 studies followed up to one year or less found no overall effect of interventions, including the peer-led program, on the onset of smoking (E. et al., 2013). As opposed to the school-based program, one systematic review of individualized interventions found that a health care setting to be an ideal site for conducting cigarette smoking

prevention programs for children and adolescents (Duncan, Pearson, & Maddison, 2018).

5.3 Study limitations

1. Smoking is a strong gender-related human behaviour that manifests differently among males and females, particularly in Asian cultures. An important limitation of this study is that the data analysis was performed without analyzing the dependent and independent study variables separately for males and females.

2. Due to the lack of biochemical validation (salivary or urine cotinine test), the strength of the study may have been lowered. The cotinine test kit is not available in Bhutan, and bringing in from other countries was not feasible. Otherwise, this would have confirmed the actual status of tobacco use among the students at the baseline and the final follow-up assessments.

3. Tobacco use is prohibited in all schools. As a result, there is a likelihood of underreporting the use of tobacco by students, fearing reprisals from their school authorities. The self-reported tobacco use behaviour may possibly have affected the accuracy of the results even though the students were assured of complete confidentiality of their information obtained from them, and were encouraged to give their actual tobacco use status.

4. The shorter duration of the intervention period may have restrained the ability of the study to detect and observe the model's long term effectiveness.

5. Generalizability of the findings is limited due to the social, economic and demographic variations across the student populations in different schools. Only four schools were chosen for this study from one district and they may not represent schools in other districts.

6. The quality control for implementation of the model was limited due to the lack of a designated supervisor in the schools to oversee the peer education activities, particularly the informal sessions. The peer educators maintained a diary to record the activities they conducted on the daily basis. However, whether or not they actually carried out their planned activities was hard to make out. This would have inadvertently affected the effective delivery of the intervention.

7. The students were not engaged in the planning and developmental phase of the model. Relevant issues concerning adolescents would have been left out or inadequately addressed in the model.

8. In the questionnaire, the knowledge questions had the following weaknesses:

    a. There was not a single question in reverse sequence (negative statements), making it easier for the students to guess the correct responses over the time. This would have falsely inflated the knowledge scores of those who responded correctly to the questions because of the same pattern of questions being framed.

b. There was no question on exposure to third-hand smoke given its growing public health importance and in the context of the body of evidence emerging on its potential harmful nature.

c. Some questions on knowledge and attitude were exactly the same.

5.4 Recommendation

5.4.1 Policy implications

Given the current situation of tobacco use among adolescents in Bhutan and its wide-ranging consequences the country may face down the line, the government ministries may give priority to the prevention part of the tobacco control policy, firmly supporting the Article 12 of the WHO Framework Convention on Tobacco Control (FCTC). Since the NTUIS model has successfully helped the students to improve their tobacco knowledge and their intentions to refrain from tobacco use in the future, it could be used as one of the approaches to educate students about tobacco and influence them to abstain from tobacco use in school settings. The tobacco control policy that focuses on prevention may have potential to prevent thousands of school children from becoming fresh users of tobacco. This in turn may bring numerous long-term health and other benefits to the country.

5.4.2 Programmatic applications

Currently, there is no formal tobacco education program in schools. The Ministries of Education and Health may collaborate and design a peer-based educational program

for students adopting the methods of the NTUIS model. The program could be piloted for two years in selected schools. Then the outcomes of the pilot study could be evaluated for its effectiveness and to give further guidance. This program will be particularly relevant to those schools that are intending to remain strictly tobacco-free in the future. By default, all schools in Bhutan are supposed to be tobacco-free. However, they are not. Application of this model to schools may give a healthy lift to the existing tobacco control measures.

5.4.3 Future research

1. A larger confirmatory randomised trial designed to detect the model's long term effectiveness with appropriate study duration and nationally representative sample is recommended for generalizability.

2. Future research should have improved methodology with the inclusion of the following elements:

   a. Complement the weakness of self-reporting by ensuring bio-chemical validation.

   b. Use well-validated questions on knowledge and attitudes addressing all the limitations mentioned above.

   c. Duration of the study should be at least one year.

3. Conduct qualitative research on the topic to get a deeper insight into the underlying factors that may be prompting adolescents to start using tobacco.

4. The peer education program in the future should take care of the following points:

    a. Involve the target groups while developing the program.

    b. Prepare and implement a quality control plan.

    c. Improve coordination between the teachers and peer educators.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. doi:https://doi.org/10.1016/0749-5978(91)90020-T

Antonio, T., & T., C. P. (2004). Smoking and the Five-Factor Model of personality. *Addiction, 99*(4), 472-481. doi:doi:10.1111/j.1360-0443.2004.00687.x

Ariza, C., Nebot, M., Tomás, Z., Giménez, E., Valmayor, S., Tarilonte, V., & De Vries, H. (2008). Longitudinal effects of the European smoking prevention framework approach (ESFA) project in Spanish adolescents. *European Journal of Public Health, 18*(5), 491-497. doi:10.1093/eurpub/ckn050

Arrazola, R. A., Singh, T., Corey, C. G., Husten, C. G., Neff, L. J., Apelberg, B. J., . . . Prevention. (2015). Tobacco use among middle and high school students - United States, 2011-2014. *MMWR. Morbidity and Mortality Weekly Report, 64*(14), 381-385.

Azagba, S., Baskerville, N. B., & Minaker, L. (2015). A comparison of adolescent smoking initiation measures on predicting future smoking behavior. *Preventive Medicine Reports, 2*, 174-177. doi:https://doi.org/10.1016/j.pmedr.2015.02.015

Bailey, Z. D., Slopen, N., Albert, M., & Williams, D. R. (2015). Multidimensional religious involvement and tobacco smoking patterns over 9–10 years: A prospective study of middle-aged adults in the United States. *Social Science & Medicine, 138*, 128-135. doi:https://doi.org/10.1016/j.socscimed.2015.06.006

Bank, T. W. (1999). Curbing the epidemic: governments and the economics of tobacco control. *Tob Control, 8*(2), 196-201.

BNCA. (2010). *Tobacco Control Programme*. Thimphu: Bhutan Narcotic Control Agency

Borgia, P., Marinacci, C., Schifano, P., & Perucci, C. A. (2005). Is peer education the best approach for HIV prevention in schools? Findings from a randomized controlled trial. *Journal of Adolescent Health, 36*(6), 508-516. doi:10.1016/j.jadohealth.2004.03.005

Breslau, N., & Peterson, E. L. (1996). Smoking cessation in young adults: age at initiation of cigarette smoking and other suspected influences. *American Journal of Public Health, 86*(2), 214-220. doi:10.2105/ajph.86.2.214

Brook, U., Mendelberg, A., Galili, A., Priel, I., & Bujanover, Y. (1999). Knowledge and attitudes of children towards cigarette smoking and its damage. *Patient Education and Counseling, 37*(1), 49-53. doi:10.1016/S0738-3991(98)00101-3

Campbell, R., Starkey, F., Holliday, J., Audrey, S., Bloor, M., Parry-Langdon, N., . . . Moore, L. (2008). An informal school-based peer-led intervention for smoking prevention in adolescence (ASSIST): a cluster randomised trial. *The Lancet, 371*(9624), 1595-1602. doi:https://doi.org/10.1016/S0140-6736(08)60692-3

CDC. (1994). *MMWR - Preventing Tobacco Use among Young People: A Report of the Surgeon General (Executive Summary)* (43). Retrieved from Atlanta, GA: https://www.cdc.gov/mmwr/PDF/rr/rr4304.pdf

CDC. (2004). *The Health Consequences of Smoking: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and

Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health

CDC. (2006). *The health consequences of involuntary exposure to tobacco smoke : a report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

CDC. (2012). *Preventing Tobacco Use among Youth and Young Adults: A Report of the Surgeon General* Atlanta, GA: Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health

Cheki, K. (2018). About 180 fined for non-compliance to trade and tobacco law. *Kuensel*. Retrieved from http://www.kuenselonline.com/about-180-fined-for-non-compliance-to-trade-and-tobacco-law/

Chen, X., Fang, X., Li, X., Stanton, B., & Lin, D. (2006). Stay Away from Tobacco: A Pilot Trial of a School-Based Adolescent Smoking Prevention Program in Beijing, China. *Nicotine & Tobacco Research, 8*(2), 227-237. doi:10.1080/14622200600576479

Crone, M. R., Spruijt, R., Dijkstra, N. S., Willemsen, M. C., & Paulussen, T. G. W. M. (2011). Does a smoking prevention program in elementary schools prepare children for secondary school? *Preventive Medicine, 52*(1), 53-59. doi:https://doi.org/10.1016/j.ypmed.2010.11.003

Crossley, M. (2000). *Rethinking health psychology*. Buckingham: Open University Press

CTFK. (2017). How schools can help students stay tobacco-free.   Retrieved from https://www.tobaccofreekids.org/assets/factsheets/0370.pdf

CTFK. (2018a). Comprehensive tobacco prevention and cessation programs effectively reduce tobacco use Retrieved from https://www.tobaccofreekids.org/assets/factsheets/0045.pdf

CTFK. (2018b). Tobacco Harms to Youth Retrieved from https://www.tobaccofreekids.org/assets/global/pdfs/en/APS_youth_harms_en.pdf

D'Avanzo, B., La Vecchia, C., & Negri, E. (1994). Age at starting smoking and number of cigarettes smoked. *Annals of Epidemiology, 4*(6), 455-459. doi:https://doi.org/10.1016/1047-2797(94)90005-1

D., V. P., Fátima, S. M., A., S. S., & Hein, d. V. (2011). Social influence, intention to smoke, and adolescent smoking behaviour longitudinal relations. *British Journal of Health Psychology, 16*(4), 779-798. doi:doi:10.1111/j.2044-8287.2010.02014.x

Dobbins, M., DeCorby, K., Manske, S., & Goldblatt, E. (2008). Effective practices for school-based tobacco use prevention. *Preventive Medicine, 46*(4), 289-297. doi:https://doi.org/10.1016/j.ypmed.2007.10.003

Duncan, L. R., Pearson, E. S., & Maddison, R. (2018). Smoking prevention in children and adolescents: A systematic review of individualized interventions. *Patient Education and Counseling, 101*(3), 375-388. doi:https://doi.org/10.1016/j.pec.2017.09.011

E., T. R., Julie, M., & Rafael, P. (2013). School-based programmes for preventing smoking. *Evidence-Based Child Health: A Cochrane Review Journal, 8*(5), 1616-2040. doi:doi:10.1002/ebch.1937

Eileen, G. (1992). Why children start smoking. *British Journal of Addiction, 87*(1), 17-18. doi:doi:10.1111/j.1360-0443.1992.tb01893.x

EMRO. (2012). *Health education: theoretical concepts, effective strategies and core competencies*. Cairo: WHO Regional Office for the Eastern Mediterranean

Eriksen, M., Mackay, J., Schluger, N., Gomeshtopeh, F. I., & Drope, J. (2015). *The Tobacco Atlas* Atlanta: American Cancer Society and World Lung Foundation

Everett, S. A., Warren, C. W., Sharp, D., Kann, L., Husten, C. G., & Crossett, L. S. (1999). Initiation of Cigarette Smoking and Subsequent Smoking Behavior among U.S. High School Students. *Preventive Medicine, 29*(5), 327-333. doi:https://doi.org/10.1006/pmed.1999.0560

FCTC-Secretariat. (2015). The WHO Framework Convention on Tobacco Control: an overview Retrieved from http://www.who.int/fctc/about/WHO_FCTC_summary_January2015.pdf?ua=1&ua=1

Fishbein, M., & Ajzen, I. (2010). *Predicting and Changing Behavior: The Reasoned Action Appraoch* New Work Psychology Press.

Ganley, B. J., & Rosario, D. I. (2013). The smoking attitudes, knowledge, intent, and behaviors of adolescents and young adults: Implications for nursing practice. *Journal of Nursing Education and Practice, 3*(1), 40-50. doi:https://doi.org/10.5430/jnep.v3n1p40

Ghrayeb, F. A., Rusli, A. M., Rifai, A. A., & Isma, I. M. (2013). The Impact of Education Program on Smoking Prevention: An Intervention Study among 16 to 18 Years Old in Palestine. *Pakistan Journal of Nutrition, 12*(8), 782-786.

Gilpin, E. A., Choi, W. S., Berry, C., & Pierce, J. P. (1999). How many adolescents start smoking each day in the United States? *Journal of Adolescent Health, 25*(4), 248-255. doi:https://doi.org/10.1016/S1054-139X(99)00024-5

Gingiss, P. M., Roberts-Gray, C., & Boerm, M. (2006). Bridge-It: A System for Predicting Implementation Fidelity for School-Based Tobacco Prevention Programs. *Prevention Science, 7*(2), 197. doi:10.1007/s11121-006-0038-1

Glanz, K., Riner, B. K., & Viswanath, K. (1997). *Health behaviour and health education: Theory, research and practice* (Second edition ed.). California Jossy-Bass Inc.

Gold, R. S., & Miner, K. R. (2001). Report of the 2000 Joint Committee on Health Education and Promotion Terminology. *American Journal of Health Education, 32*(2), 89-94. doi:10.1080/19325037.2001.10609405

Gough, B., Fry, G., Grogan, S., & Conner, M. (2009). Why do young adult smokers continue to smoke despite the health risks? A focus group study. *Psychology & Health, 24*(2), 203-220. doi:10.1080/08870440701670570

Griffin, K. W., Botvin, G. J., Doyle, M. M., Diaz, T., & Epstein, J. A. (1999). A Six-Year Follow-Up Study of Determinants of Heavy Cigarette Smoking Among High-School Seniors. *Journal of Behavioral Medicine, 22*(3), 271-284. doi:10.1023/a:1018772524258

Griffiths, W. (1972). Health Education Definitions, Problems, and Philosophies. *Health Education Monographs, 1*(31), 7-11. doi:10.1177/109019817200103103

Harden, A., Oakley, A., & Oliver, S. (2001). Peer-delivered health promotion for young people: A systematic review of different study designs. *Health Education Journal, 60*(4), 339-353. doi:10.1177/001789690106000406

Harrison, J. A., Mullen, P. D., & Green, L. W. (1992). A meta-analysis of studies of the Health Belief Model with adults. *Health Education Research, 7*(1), 107-116. doi:10.1093/her/7.1.107

Heimann, K. J. (2000). A School-Based Intervention Program to Prevent Adolescent Smoking. *The Journal of School Nursing, 16*(4), 22-27. doi:10.1177/105984050001600403

Hemming, K., Girling, A. J., Sitch, A. J., Marsh, J., & Lilford, R. J. (2011). Sample size calculations for cluster randomised controlled trials with a fixed number of clusters. *BMC Medical Research Methodology, 11*(1), 102. doi:10.1186/1471-2288-11-102

Hou, S.-I. (2014). Health Education:Theoretical Concepts, Effective Strategies and Core Competencies. *Health Promotion Practice, 15*(5), 619-621. doi:10.1177/1524839914538045

HSC. (2011). *Our smokefree school: He Kura Auahi Koe*. Wellington: Learning Media Limited

Hwang, M. S., Yeagley, K. L., & Petosa, R. (2004). A Meta-Analysis of Adolescent Psychosocial Smoking Prevention Programs Published Between 1978 and 1997 in the United States. *Health Education & Behavior, 31*(6), 702-719. doi:10.1177/1090198104263361

IFRC. (2010). *Sexual Reproductive and Life Skills for youth peer education: A guide for trainers of facilitators*. Geneva: International Federation of Red Cross and Red Crescent Societies

Igra, V., & Irwin, C. E. (1996). Theories of Adolescent Risk-Taking Behavior. In R. J. DiClemente, W. B. Hansen, & L. E. Ponton (Eds.), *Handbook of Adolescent Health Risk Behavior* (pp. 35-51). Boston, MA: Springer US.

Isensee, B., Hansen, J., Maruska, K., & Hanewinkel, R. (2014). Effects of a school-based prevention programme on smoking in early adolescence: a 6-month follow-up of the 'Eigenständig werden' cluster randomised trial. *British Medical Journal, 4*, e004422. doi:10.1136/bmjopen-2013-004422

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A Decade Later. *Health Education Quarterly, 11*(1), 1-47. doi:10.1177/109019818401100101

Johnson, C. A., Unger, J. B., Ritt-Olson, A., Palmer, P. H., Cen, S. Y., Gallaher, P., & Chou, C.-P. (2005). Smoking prevention for ethnically diverse adolescents: 2-year outcomes of a multicultural, school-based smoking prevention curriculum in Southern California. *Preventive Medicine, 40*(6), 842-852.

doi:https://doi.org/10.1016/j.ypmed.2004.09.032

Kirsten, W. (1990). *Health promotion: an international phenomenon*. Washington DC: National Center for Health Fitness, American University

Komro, K. A., McCarty, M. C., Forster, J. L., Blaine, T. M., & Chen, V. (2003). Parental, Family, and Home Characteristics Associated with Cigarette Smoking among Adolescents. *American Journal of Health Promotion, 17*(5), 291-299. doi:10.4278/0890-1171-17.5.291

Koumi, I., & Tsiantis, J. (2001). Smoking trends in adolescence: report on a Greek school-based, peer-led intervention aimed at prevention. *Health Promotion International, 16*(1), 65-72. doi:10.1093/heapro/16.1.65

Larsen, J. T., & Cohen, L. M. (2009). Smoking attitudes, intentions, and behavior among college student smokers: Positivity outweighs negativity. *Addiction Research & Theory, 17*(6), 637-649. doi:10.3109/16066350802068854

Lee, P.-H., Wu, D.-M., Lai, H.-R., & Chu, N.-F. (2007). The impacts of a school-wide no smoking strategy and classroom-based smoking prevention curriculum on the smoking behavior of junior high school students. *Addictive Behaviors, 32*(10), 2099-2107. doi:https://doi.org/10.1016/j.addbeh.2007.01.018

Lhamo, P. (2017). Tobacco inspectors fine 41 for noncompliance. *Kuensel*. Retrieved from http://www.kuenselonline.com/tobacco-inspectors-fine-41-for-noncompliance/

M., C. K., R., F. B., & DAVID, H. (1992). Why children start smoking cigarettes: predictors of onset. *British Journal of Addiction, 87*(12), 1711-1724. doi:doi:10.1111/j.1360-0443.1992.tb02684.x

Ma, G. X., Shive, S., Legos, P., & Tan, Y. (2003). Ethnic differences in adolescent smoking behaviors, sources of tobacco, knowledge and attitudes toward restriction policies. *Addictive Behaviors, 28*(2), 249-268. doi:https://doi.org/10.1016/S0306-4603(01)00225-8

Maggs, J. L., Almeida, D. M., & Galambos, N. L. (1995). Risky Business:The Paradoxical Meaning of Problem Behavior for Young Adolescents. *The Journal of Early Adolescence, 15*(3), 344-362. doi:10.1177/0272431695015003004

Martini, S., & Sulistyowati, M. (2005). *The Determinants of Smoking Behavior among Teenagers in East Java Province, Indonesia. HNP discussion paper;economics of tobacco control paper* (Vol. 32). Washington DC: World Bank

McDonald, D. (2004). *Alcohol and Other Drug Peer Education in Schools: A review for the ACT Alcohol, Tobacco and Other Drug Strategy Evaluation Group*. Retrieved from Woden

Mellanby, A. R., Newcombe, R. G., Rees, J., & Tripp, J. H. (2001). A comparative study of peer-led and adult-led school sex education. *Health Education Research, 16*(4), 481-492. doi:10.1093/her/16.4.481

Milburn, K. (1995). A critical review of peer education with young people with special reference to sexual health. *Health Education Research, 10*(4), 407-420. doi:10.1093/her/10.4.407

Minh An, D. T., Van Minh, H., Huong, L. T., Bao Giang, K., Thanh Xuan, L. T., Thi Hai, P., . . . Hsia, J. (2013). Knowledge of the health consequences of tobacco smoking: a cross-sectional survey of Vietnamese adults. *Global Health Action, 6*(1), 18707. doi:10.3402/gha.v6i0.18707

MOE. (2015). *Annual Education Statistics* Thimphu: Ministry of Education

MOH, W.-S. a. (2017). *Report on Bhutan Global School-based Student Health Survey (GSHS) 2016*. New Delhi: WHO-SEARO.

Montano, D., & Kaspryzk, D. (2008). Theory of Reasoned Action, Theory of Planned Behavior, and the Integrated Behavioral Model. In K. Glanz, B. K. Rimer, & K.Viswanath (Eds.), *Health Behavior and Health Education, Theory, Research, and Practice* (pp. 67-97). San Francisco: Jossey-Bass.

Morgan, M., & Eiser, R. J. (1990). Smoking, education and peer group influence. In M. Morgan & H. Shute (Eds.), *Children helping children London* (pp. 17–25). London: John Wiley

NAB. (2004). *Translation of the Proceedings and Resolutions of the 82nd Session of the National Assembly of Bhutan, 2004*. Thimphu: National Assembly of Bhutan

NAB. (2010). *Tobacco Control Act of Bhutan, 2010*. Thimphu: National Assembly of Bhutan, Royal Government of Bhutan

NAB. (2014). *Tobacco Control (Amendment) Act of Bhutan, 2014*. Thimphu: National Assemby of Bhutan

Naylor, P., & Cowie, H. (1999). The effectiveness of peer support systems in challenging school bullying: the perspectives and experiences of teachers and pupils. *Journal of Adolescence, 22*(4), 467-479. doi:https://doi.org/10.1006/jado.1999.0241

Ng, M., Freeman, M. K., Fleming, T. D., & et al. (2014). Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA, 311*(2), 183-192. doi:10.1001/jama.2013.284692

NSB. (2015). *Annual Dzongkhag Statistics* Thimphu: National Statistical Bureau

Öberg, M., Jaakkola, M. S., Woodward, A., Peruga, A., & Prüss-Ustün, A. (2011). Worldwide burden of disease from exposure to second-hand smoke: a retrospective analysis of data from 192 countries. *The Lancet, 377*(9760), 139-146. doi:https://doi.org/10.1016/S0140-6736(10)61388-8

Onrust, S. A., Otten, R., Lammers, J., & Smit, F. (2016). School-based programmes to reduce and prevent substance use in different age groups: What works for whom? Systematic review and meta-regression analysis. *Clinical Psychology Review, 44*, 45-59. doi:https://doi.org/10.1016/j.cpr.2015.11.002

Park, E. (2006). School-based smoking prevention programs for adolescents in South Korea: a systematic review. *Health Education Research, 21*(3), 407-415. doi:10.1093/her/cyl038

Park, H.-Y., Dent, C., Abramsohn, E., Dietsch, B., & McCarthy, W. J. (2010). Evaluation of California's in-school tobacco use prevention education (TUPE) activities using a nested school-longitudinal design, 2003–2004 and 2005–2006 *Tobacco Control, 19*(suppl 1), i43ei50. doi:10.1136/tc.2009.030700

Paschal, S., & Sheina, O. (1998). Do intentions predict condom use? Metaanalysis and examination of six moderator variables. *British Journal of Social Psychology, 37*(2), 231-250. doi:doi:10.1111/j.2044-8309.1998.tb01167.x

Perry, C. L., Stigler, M. H., Arora, M., & Reddy, K. S. (2009). Preventing Tobacco Use Among Young People in India: Project MYTRI. *American Journal of Public Health, 99*(5), 899-906. doi:10.2105/ajph.2008.145433

Pokhrel, N. (2018). BNCA collects Nu 299,528 penalty from three dzongkhags. *Kuensel*. Retrieved from http://www.kuenselonline.com/bnca-collects-nu-299528-penalty-from-three-dzongkhags/

Poobalan, A. S., Aucott, L. S., Clarke, A., & Smith, W. C. S. (2012). Physical activity attitudes, intentions and behaviour among 18–25 year olds: A mixed method study. *BMC Public Health, 12*(1), 640. doi:10.1186/1471-2458-12-640

R., K. C., & Caroline, F. (2008). Recent Evaluations of the Peer-Led Approach in Adolescent Sexual Health Education: A Systematic Review. *Perspectives on Sexual and Reproductive Health, 40*(3), 144-151. doi:doi:10.1363/4014408

R.S.Downie, Fyfe, C., & Tannahil, A. (1990). *Health Promotion: Models and Values*. New York: Oxford University Press.

Rao, S., Aslam, S. K., Zaheer, S., & Shafique, K. (2014). Anti-smoking initiatives and current smoking among 19,643 adolescents in South Asia: findings from the Global Youth Tobacco Survey. *Harm Reduction Journal, 11*(1), 8. doi:10.1186/1477-7517-11-8

Reidpath, D. D., Davey, T. M., Kadirvelu, A., Soyiri, I. N., & Allotey, P. (2014). Does one cigarette make an adolescent smoker, and is it influenced by age and age of smoking

initiation? Evidence of association from the U.S. Youth Risk Behavior Surveillance System (2011). *Preventive Medicine, 59*, 37-41.

doi:https://doi.org/10.1016/j.ypmed.2013.11.011

Rew, L., & Wong, Y. J. (2006). A systematic review of associations among religiosity/spirituality and adolescent health attitudes and behaviors. *Journal of Adolescent Health, 38*(4), 433-442. doi:10.1016/j.jadohealth.2005.02.004

Notification, (2004).

RGOB. (2009). *National Policy and Strategic Frame-Work on Prevention and Control of Non Communicable Diseases*. Thimphu: Royal Government of Bhutan, Ministry of Health

RGOB. (2010). *Brief Profile on Tobacco Control in Bhutan*. Thimphu: Royal Government of Bhutan, Ministry of Health

Rogers, E. M. (1983). *Diffusion of Innovations* (Third Edition ed.). New York: The Free Press.

Rondina, R. d. C., Gorayeb, R., & Botelho, C. (2007). Características psicológicas associadas ao comportamento de fumar tabaco. *Jornal Brasileiro de Pneumologia, 33*, 592-601.

Rooney, B. L., & Murray, D. M. (1996). A Meta-Analysis of Smoking Prevention Programs After Adjustment for Errors in the Unit of Analysis. *Health Education Quarterly, 23*(1), 48-64. doi:10.1177/109019819602300104

Rosendahl, K. I., Galanti, M. R., Gilljam, H., & Ahlbom, A. (2005). Knowledge about tobacco and subsequent use of cigarettes and smokeless tobacco among Swedish adolescents. *Journal of Adolescent Health, 37*(3), 224-228. doi:10.1016/j.jadohealth.2004.08.021

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Quarterly, 15*(2), 175-183. doi:10.1177/109019818801500203

Sharma, M. K., Suman, L. N., Manjula, M., Marimuthu, P., & Ahmad, M. (2011). Exploring the role religion in smoking cessation. *Delhi Psychiatry Journal, 14*(1), 129-132. .

Sheeran, P., & Abraham, C. (2003). Mediator of Moderators: Temporal Stability of Intention and the Intention-Behavior Relation. *Personality and Social Psychology Bulletin, 29*(2), 205-215. doi:10.1177/0146167202239046

Simantov, E., Schoen, C., & Klein, J. D. (2000). Health-compromising behaviors: Why do adolescents smoke or drink? identifying underlying risk and protective factors. *Archives of Pediatrics & Adolescent Medicine, 154*(10), 1025-1033. doi:10.1001/archpedi.154.10.1025

Simons-Morton, B. G., & Farhat, T. (2010). Recent Findings on Peer Group Influences on Adolescent Smoking. *The Journal of Primary Prevention, 31*(4), 191-208. doi:10.1007/s10935-010-0220-x

Sinha, D., Palipudi, K., Rolle, I., Asma, S., & Rinchen, S. (2011). Tobacco use among youth and adults in member countries of South-East Asia region: Review of findings from surveys under the global tobacco surveillance system. *Indian Journal of Public Health, 55*(3), 169-176. doi:10.4103/0019-557x.89946

Sinha, J. W., Cnaan, R. A., & Gelles, R. J. (2007). Adolescent risk behaviors and religion: Findings from a national study. *Journal of Adolescence, 30*(2), 231-249.

doi:https://doi.org/10.1016/j.adolescence.2006.02.005

Starkey, F., Audrey, S., Holliday, J., Moore, L., & Campbell, R. (2009). Identifying influential young people to undertake effective peer-led health promotion: the example of A Stop Smoking In Schools Trial (ASSIST). *Health Education Research, 24*(6), 977-988. doi:10.1093/her/cyp045

Sun, P., Miyano, J., Rohrbach, L. A., Dent, C. W., & Sussman, S. (2007). Short-term effects of Project EX-4: A classroom-based smoking prevention and cessation intervention program. *Addictive Behaviors, 32*(2), 342-350.

doi:https://doi.org/10.1016/j.addbeh.2006.05.005

Tahlil, T., Woodman, R. J., Coveney, J., & Ward, P. R. (2013). The impact of education programs on smoking prevention: a randomized controlled trial among 11 to 14 year olds in Aceh, Indonesia. *BMC Public Health, 13*(1), 367. doi:10.1186/1471-2458-13-367

Tannahill, A. (2009). Health Promotion: The Tannahill model revised. *Public Health, 123*(5), 397.

Tobler, N. S., & Stratton, H. H. (1997). Effectiveness of School-Based Drug Prevention Programs: A Meta-Analysis of the Research. *Journal of Primary Prevention, 18*(1), 71-128. doi:10.1023/a:1024630205999

Tolli, M. V. (2012). Effectiveness of peer education interventions for HIV prevention, adolescent pregnancy prevention and sexual health promotion for young people: a systematic review of European studies. *Health Education Research, 27*(5), 904-913. doi:10.1093/her/cys055

Tones, K., & Green, J. (2004). *Health Promotion: Planning and Strategies* London: Sage publications.

Tsai, W.-C., Kung, P.-T., Hu, H.-Y., Ho, C.-S., Lin, D.-J., Hsieh, C.-L., . . . Yang, T.-J. (2005). Effects of a Tobacco Prevention Education Program on Adolescents'Knowledge of and Attitudes Toward Smoking *Mid-Taiwan Journal of Medicine, 10*(4), 171-180.

Tshomo, D. (2016a). Ten detained for selling tobacco products. *Kuensel*. Retrieved from

http://www.kuenselonline.com/ten-detained-for-selling-tobacco-products/

Tshomo, D. (2016b). Tobacco: BNCA nabs 12 shop owners. *Kuensel*. Retrieved from

http://www.kuenselonline.com/tobacco-bnca-nabs-12-shop-owners/

Tyas, S. L., & Pederson, L. L. (1998). Psychosocial factors related to adolescent smoking: a critical review of the literature. *Tobacco Control, 7* 409–420.

Ukwayi, J. K., Eja, O. F., & Unwanede, C. C. (2012). Peer pressure and tobacco smoking among undergraduate students of the University of Calabar, Cross River State. *Higher Education Studies, 2*(3), 92. doi:http://dx.doi.org/10.5539/hes.v2n3p92

UNDOC. (2003). *PEER TO PEER using peer to peer strategies in drug abuse prevention*. New York United Nations Office for Drugs and Crime

Walker, S. A., & Avis, M. (1999). Common reasons why peer education fails. *Journal of Adolescence, 22*(4), 573-577. doi:https://doi.org/10.1006/jado.1999.0250

Wang, M. Q., Fitzhugh, E. C., Westerfield, R. C., & Eddy, J. M. (1995). Family and peer influences on smoking behavior among American adolescents: An age trend. *Journal of Adolescent Health, 16*(3), 200-203. doi:https://doi.org/10.1016/1054-139X(94)00097-X

Ward, J., Hunter, G., & Power, R. (1997). Peer education as a means of drug prevention and education among young people: an evaluation. *Health Education Journal, 56*(3), 251-263. doi:10.1177/001789699705600305

Warren, C. W., Lea, V., Lee, J., Jones, N. R., Asma, S., & Mckenna, M. (2009). Change in tobacco use among 13-15 year olds between 1999 and 2008: Findings from the

Global Youth Tobacco Survey. *Global Health Promotion, 16*(2_suppl), 38-90. doi:10.1177/1757975909342192

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268.

Wen, X., Chen, W., Gans, K. M., Colby, S. M., Lu, C., Liang, C., & Ling, W. (2010). Two-year effects of a school-based prevention programme on adolescent cigarette smoking in Guangzhou, China: a cluster randomized trial. *International Journal of Epidemiology, 39*(3), 860-876. doi:10.1093/ije/dyq001

WHO-SEARO. (2006). *Manual on tobacco control in schools*. New Delhi: WHO Regional Office for South East Asia

WHO-SEARO. (2012). *Regional Strategy for Tobacco Control* New Delhi WHO Regional Office for South-East Asia

WHO-SEARO. (2014). *Monitoring tobacco control among youth in countries of the South-East Asia Region: 2014*. New Delhi WHO Regional Office for the South-East Asia Region

WHO-SEARO. (2015a). *Country profiles on implementation of the WHO Framework Convention on Tobacco Control in South-East Asia Region* New Delhi WHO Regional Office for South-East Asia

WHO-SEARO. (2015b). *Global Youth Tobacco Survey, GYTS Bhutan Report, 2013*. New Delhi: WHO Regional Office for South-East Asia

WHO. (1997). *Life skills education for children and adolecents in schools* Geneva World Health Organization

WHO. (1998). *Health Promotion Glossary* Geneva: World Health Organization

WHO. (2005). *WHO Framework Convention on Tobacco Control* Geneva World Health Organization

WHO. (2008). *Tobacco industry interference with tobacco control* Geneva World Health Organization

WHO. (2009). *Global health risks: Mortality and burden of disease attributable to selected major risks*. Geneva: World Health Organization

WHO. (2012). *WHO Global Report - Mortality attributable to tobacco* Geneva World Health Organization

WHO. (2013). *WHO Global Action Plan for the prevention of control of noncommunicable diseases, 2013-2020*. Geneva: World Health Organization

WHO. (2015a). The Ottawa Charter for Health Promotion.   Retrieved from http://www.who.int/healthpromotion/conferences/previous/ottawa/en/

WHO. (2015b). Tobacco use: Data by country Retrieved from http://apps.who.int/gho/data/node.main.65

WHO. (2017). *WHO Report on the Global Tobacco Epidemic,2017: Monitoring tobacco use and prevention policies* Geneva World Health Organization

WHO. (2018). Factsheet: Tobacco Retrieved from http://www.who.int/en/news-room/fact-sheets/detail/tobacco

WHO. (n.d). Health Education Retrieved from http://www.who.int/topics/health_education/en/

WHO, C. (2012). *Global Youth Tobacco Survey (GYTS): Core Questions with Optional Questions*. Altanta Centers for Disease Control and Prevention

Whooley, M. A., Boyd, A. L., Gardin, J. M., & Williams, D. R. (2002). Religious involvement and cigarette smoking in young adults: The cardia study. *Archives of Internal Medicine, 162*(14), 1604-1610. doi:10.1001/archinte.162.14.1604

Wiist, W. H., & Snider, G. (1991). Peer education in friendship cliques: prevention of adolescent smoking. *Health Education Research, 6*(1), 101-108. doi:10.1093/her/6.1.101

Xi, B., Liang, Y., Liu, Y., Yan, Y., Zhao, M., Ma, C., & Bovet, P. (2016). Tobacco use and second-hand smoke exposure in young adolescents aged 12–15 years: data from 68 low-income and middle-income countries. *The Lancet Global Health, 4*(11), e795-e805. doi:https://doi.org/10.1016/S2214-109X(16)30187-5

Xu, X., Liu, L., Sharma, M., & Zhao, Y. (2015). Smoking-Related Knowledge, Attitudes, Behaviors, Smoking Cessation Idea and Education Level among Young Adult Male Smokers in Chongqing, China. *International Journal of Environmental Research and Public Health, 12*(2), 2135.

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

ANNEX A: <u>Questionnaire (baseline assessment)</u>

Date ……………….

QUESTIONNAIRE

This survey is about <u>your knowledge on, attitude towards, intention and behaviour regarding tobacco use</u>. Your answers will be used for future programs meant for young people like yourself. Completing the survey is voluntary.

Do not write your name on this survey. All of your answers will be kept confidential. No one will know what you write. So, please answer the questions honestly based on what you really know. This is not a test. There are no right or wrong answers. Whether or not you answer the questions will not affect your marks in the class.

Please try answering all the questions.

Instructions:

Please read each question carefully before you answer it.

Choose only <u>one answer</u> for each question.

On the answer sheet, locate the statement that corresponds to your answer and tick (√) it with your pencil/pen.

Just in case you want to change your answer, <u>erase or cross the previous answer completely</u> and tick your new response.

When you are finished, <u>follow the instructions of the person giving you this survey</u>.

THANK YOU VERY MUCH FOR YOUR PARTICIPATION

I. YOUR BACKGROUND INFORMATION

1. How old are you? Write it below.

    I am ……………years old

2. What is your sex?
    Male   Female

3. Where do you currently stay?
    Home   School hostel   Other's house

4. What is the occupation of your father?
    Agriculture/farmer
    Government service
    Business/private sector
    Others

5. What is the occupation of your mother?
    Housewife
    Agriculture/farmer
    Government service
    Business/private sector
    Others

6. Have you seen any of your family members and friends using tobacco products?
    Please tick (√) as appropriate.

Person	Never	Yes, I saw him/her using tobacco, but stopped now	Yes, I saw him/her using tobacco in the past years	Yes, I saw him/her using tobacco in the last 30 days
Father	☐	☐	☐	☐
Mother	☐	☐	☐	☐
Brother/sister	☐	☐	☐	☐
Close friends	☐	☐	☐	☐

7. Have you ever tried any alcohol?
    Yes   No
8. Have you taken alcohol in the past 30 days?
    Yes   No
9. How do you view yourself as?
    An extrovert (somebody who is expressive, outgoing and talkative)
    An introvert (somebody who is reserved, like to stay alone and quite)

10. How do you evaluate your self-esteem?
    Very high   High   Moderate   Low   Very low

II. YOUR KNOWLEDGE ABOUT THE HARMS OF TOBACCO USE AND OTHER ASPECTS OF TOBACCO PRODUCTS

	A. Tobacco products and their use among adolescents	Yes	No	Don't know
1.	Tobacco products can be smoked, chewed, sucked or sniffed.	☐	☐	☐
2.	*Baba* is a smokeless tobacco.	☐	☐	☐
3.	Bhutanese are not allowed to cultivate tobacco plants.	☐	☐	☐
4.	Use of smokeless tobacco among Bhutanese boys and girls is the highest in South-East Asia.	☐	☐	☐
5.	Tobacco use is higher among boys than among girls in Bhutan.	☐	☐	☐

	B. Harms of tobacco use	Yes	No	Don't know
6.	Tobacco contains more than 4000 chemicals.	☐	☐	☐
7.	Cigarettes contain arsenic which is also found in rat poison.	☐	☐	☐
8.	Cigarettes with filters are not safe to smoke.	☐	☐	☐
9.	All tobacco products are harmful.	☐	☐	☐
10.	Smoking cigarette is very addictive.	☐	☐	☐
11.	It is difficult to quit once someone starts smoking any tobacco products.	☐	☐	☐
12.	Smoking tobacco can damage your lungs.	☐	☐	☐
13.	Smoking tobacco increases the risk of lung cancer.	☐	☐	☐
14.	Smoking tobacco can cause heart attacks.	☐	☐	☐
15.	Smoking tobacco can cause many types of cancers.	☐	☐	☐
16.	Smoking tobacco causes stained teeth and bad breath.	☐	☐	☐
17.	Smoking can cause infertility in both men and women.	☐	☐	☐
18.	Men who smoke will have difficulty in having sex.	☐	☐	☐
19.	Smokers are more likely to be depressed than non-smokers.	☐	☐	☐
20.	Smoking tobacco can cause blindness.	☐	☐	☐
21.	Smoking tobacco can cause wrinkles on your face.	☐	☐	☐
22.	Cigarette smoke is harmful to the health of non-smokers.	☐	☐	☐
23.	Second-hand smoke can cause breathing problem in children.	☐	☐	☐

24.	Children whose parents smoke have high risk of ear infections.	☐	☐	☐
25.	Using *baba* or *khaini* is very addictive.	☐	☐	☐
26.	Smokeless tobacco can cause cancer in the mouth.	☐	☐	☐

	C. Nicotine	Yes	No	Don't know
27.	Nicotine is a chemical found in tobacco products.	☐	☐	☐
28.	Nicotine is used in fertilizers.	☐	☐	☐
29.	Nicotine is highly addictive.	☐	☐	☐
30.	Nicotine can cause dependency like other drugs.	☐	☐	☐
31.	Sudden stopping of tobacco use can produce a withdrawal syndrome.	☐	☐	☐

	D. Myths of tobacco use	Yes	No	Don't know
32.	*Bidi* is as harmful as cigarettes.	☐	☐	☐
33.	*Baba* is as harmful as cigarettes.	☐	☐	☐
34.	It is not safe to smoke cigarettes with filters.	☐	☐	☐
35.	Second-hand smoke is dangerous to people who do not smoke.	☐	☐	☐
36.	Tobacco use is bad for teeth and does not help in cleansing.	☐	☐	☐
37.	Smoking does not help in losing weight and staying slim.	☐	☐	☐
38.	It is never too late to quit tobacco.	☐	☐	☐

	E. Benefits of quitting tobacco use	Yes	No	Don't know
39.	Stop smoking reduces the risk of getting diseases and dying early.	☐	☐	☐
40.	Your blood pressure will drop right after quitting smoking.	☐	☐	☐
41.	Carbon monoxide level in blood will get normal after quitting.	☐	☐	☐
42.	Quitting of smoking reduces the risk of exposure to second-hand smoke among non-smokers.	☐	☐	☐

	F. Tobacco control regulations	Yes	No	Don't know
43.	It is illegal to sell tobacco products in Bhutan.	☐	☐	☐
44.	Nobody is allowed to smoke in any government offices/facilities.	☐	☐	☐
45.	People are not allowed to smoke in all public	☐	☐	☐

	transportations.			
46.	People are not allowed to smoke in a vegetable market.	☐	☐	☐
47.	A minor cannot buy cigarettes for his/her personal consumption.	☐	☐	☐

	G. Religious views on tobacco	Yes	No	Don't know
48.	Buddhism plays an important role in the control of tobacco use in Bhutan.	☐	☐	☐
49.	Zhabdrung Rinpoche wrote the anti-tobacco message in his first legal code of Bhutan.	☐	☐	☐
50.	Buddhism says that using tobacco is bad.	☐	☐	☐
51.	People are not allowed to smoke cigarettes in religious places.	☐	☐	☐

III. YOUR ATTITUDES TOWARDS TOBACCO USE
(1= Strongly disagree, 2= Disagree, 3= Agree, 4= Strongly agree)

Perceived susceptibility

	Statements	1	2	3	4
1.	Trying cigarettes just once or twice is not a problem.	☐	☐	☐	☐
2.	My friends use tobacco and nothing happened to them.	☐	☐	☐	☐
3.	Smoking cigarettes looks cool.	☐	☐	☐	☐
4.	Second-hand smoke is not harmful to children.	☐	☐	☐	☐

Perceived severity

	Statements	1	2	3	4
5.	Not all tobacco products are harmful to our health.	☐	☐	☐	☐
6.	Smoking cigarette is very addictive.	☐	☐	☐	☐
7.	It is difficult to quit once someone starts smoking cigarettes or *bidi*.	☐	☐	☐	☐

Perceived benefits

	Statements	1	2	3	4
8.	It is good never to start using tobacco.	☐	☐	☐	☐
9.	My health is more important than illness.	☐	☐	☐	☐
10.	Stopping tobacco use will prevent many diseases.	☐	☐	☐	☐

Perceived barriers

	Statements	1	2	3	4
11.	Shops around our schools should not be	☐	☐	☐	☐

	allowed to sell any tobacco products.				
12.	Parents should not give lots of money to their children because they might misuse it.	☐	☐	☐	☐
13.	There should be trained health workers available to help us quit tobacco use.	☐	☐	☐	☐

IV. YOUR INTENTION TO USE TOBACCO

1. If one of your best friends was to offer you a cigarette or *baba*, would you smoke/use it?

Definitely yes,

Probably yes,

Definitely not.

2. Evaluate the following statements:

   a) I intend to remain tobacco free for the next 5 years.
   Definitely do not: 1: 2: 3: 4: 5: 6: 7: Definitely do

   b) I intend to remain tobacco free all my life.
   Definitely do not: 1: 2: 3: 4: 5: 6: 7: Definitely do

V. YOUR TOBACCO USE BEHAVIOUR

1. Have you ever tried or experimented with smoking cigarette or *bidi*?
   a. Yes
   b. No

2. Please think about the days you smoked cigarettes or *bidi* during the past 30 days. How many cigarettes or *bidi* did you usually smoke per day?
   a. I did not smoke cigarettes during the past 30 days.
   b. Less than 1 cigarette/*bidi* per day
   c. 1 cigarette/*bidi* per day
   d. 2 to 5 cigarettes/*bidi* per day
   e. 6 to 10 cigarettes/*bidi* per day
   f. 11 to 20 cigarettes/*bidi* per day
   g. More than 20 cigarettes/*bidi* per day

3. Have you ever tried or experimented with any smokeless tobacco (*baba/khaini*)?
   a. Yes
   b. No

4. During the past 30 days, on how many days did you use smokeless tobacco (*baba/khaini*)?
   a. 0 days

b. 1 or 2 days
c. 3 to 5 days
d. 6 to 9 days
e. 10 to 19 days
f. 20 to 29 days
g. All 30 days

ANNEX B: Questionnaire (posttest/follow-up assessments for the intervention schools)

II. YOUR KNOWLEDGE ABOUT THE HARMS OF TOBACCO USE AND OTHER ASPECTS OF TOBACCO PRODUCTS

A. Tobacco products and their use among adolescents	Yes	No	Don't know

1.	Tobacco products can be smoked, chewed, sucked or sniffed.	☐	☐	☐
2.	*Baba* is a smokeless tobacco.	☐	☐	☐
3.	Bhutanese are not allowed to cultivate tobacco plants.	☐	☐	☐
4.	Use of smokeless tobacco among Bhutanese boys and girls is the highest in South-East Asia.	☐	☐	☐
5.	Tobacco use is higher among boys than among girls in Bhutan.	☐	☐	☐

	B. Harms of tobacco use	Yes	No	Don't know
6.	Tobacco contains more than 4000 chemicals.	☐	☐	☐
7.	Cigarettes contain arsenic which is also found in rat poison.	☐	☐	☐
8.	Cigarettes with filters are not safe to smoke.	☐	☐	☐
9.	All tobacco products are harmful.	☐	☐	☐
10.	Smoking cigarette is very addictive.	☐	☐	☐
11.	It is difficult to quit once someone starts smoking any tobacco products.	☐	☐	☐
12.	Smoking tobacco can damage your lungs.	☐	☐	☐
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	E. Benefits of quitting tobacco use	Yes	No	Don't know
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Perceived severity

	Statements	1	2	3	4
5.	Not all tobacco products are harmful to our health.	☐	☐	☐	☐
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7.	It is difficult to quit once someone starts smoking cigarettes or *bidi*.	☐	☐	☐	☐

Perceived benefits

	Statements	1	2	3	4
8.	It is good never to start using tobacco.	☐	☐	☐	☐
9.	My health is more important than illness.	☐	☐	☐	☐
10.	Stopping tobacco use will prevent many diseases.	☐	☐	☐	☐

Perceived barriers

|	Statements	1	2	3	4
11.	Shops around our schools should not be allowed to sell any tobacco products.	☐	☐	☐	☐
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13.	There should be trained health workers available to help us quit tobacco use.	☐	☐	☐	☐

I.   YOUR INTENTION TO USE TOBACCO

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   a. Definitely yes,
   b. Probably yes,
   c. Definitely not.
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   a. I intend to remain tobacco free for the next 5 years.
      i. Definitely do not: 1: 2: 3: 4: 5: 6: 7: Definitely do

   b. I intend to remain tobacco free all my life.
      i. Definitely do not : 1: 2: 3: 4: 5: 6: 7: Definitely do

II.   YOUR TOBACCO USE BEHAVIOUR

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   a. I did not smoke cigarettes during the past 30 days.
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   d. 2 to 5 cigarettes/*bidi* per day
   e. 6 to 10 cigarettes/*bidi* per day
   f. 11 to 20 cigarettes/*bidi* per day
   g. More than 20 cigarettes/*bidi* per day

3. Have you ever tried or experimented with any smokeless tobacco (*baba/khaini*)?
   a. Yes   b. No

4. During the past 30 days, on how many days did you use smokeless tobacco (*baba/khaini*)?
   a. 0 days
   b. 1 or 2 days
   c. 3 to 5 days
   d. 6 to 9 days
   e. 10 to 19 days
   f. 20 to 29 days
   g. All 30 days

III. **YOUR EXPOSURE TO PEER EDUCATION**

1. Have you received some information about tobacco use and its effects on health from peer educators or your friends?
    a. Yes   b. No

2. If yes, how many times have you been approached by peer educators in the last one month?
    a. 1-2 times
    b. 3-4 times
    c. 5-6 times
    d. More than 6 times

3. Was the information given to you about harms of tobacco use adequate and useful?
    a. It was both adequate and useful
    b. It was not adequate but useful
    c. It was adequate but not useful
    d. It was neither adequate nor useful

4. Have you participated in the peer education activities conducted by your friends/peers?
    a. Yes   b. No
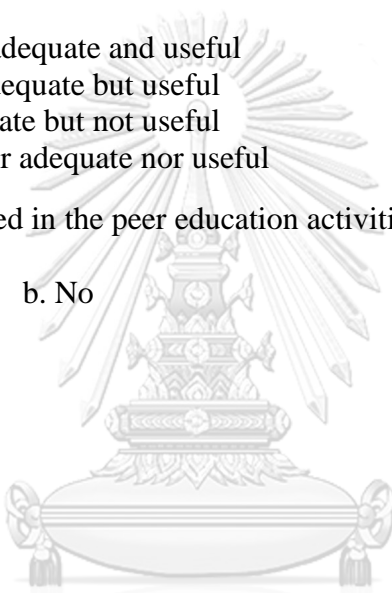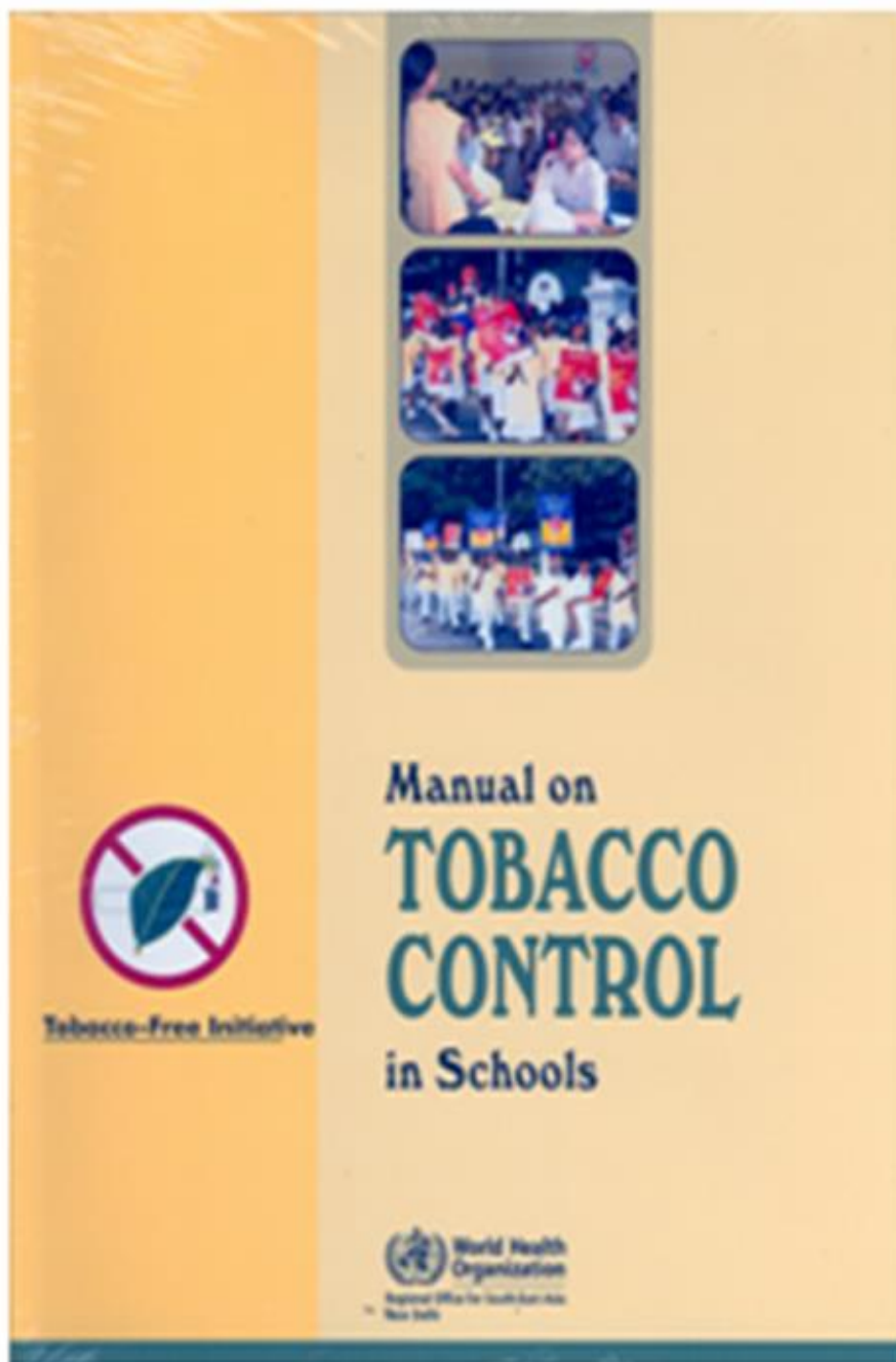
ANNEX C: Intervention materials (a)

Health Hazards
Of
Tobacco Use

ANNEX D: Intervention materials (b)

**HARMS OF TOBACCO USE:
PICTORIAL HEALTH WARNINGS**

ANNEX E: Intervention materials (c)

ANNEX F: Ethical approval

ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF HEALTH
RESEARCH ETHICS BOARD OF HEALTH
THIMPHU : BHUTAN
P.O. BOX : 726

REBH/Approval/2016/028   9th May, 2016

REBH Approval Letter

PI: Mr Sonam Rinchen	**Study Title:** MODEL OF NO-TOBACCO-USE-IN-SCHOOL (NTUIS) ON TOBACCO USE KNOWLEDGE, ATTITUDE AND BEHAVIOUR AMONG ADOLESCENTS IN WANGDUE PHODRANG, BHUTAN: A QUASI-EXPERIMENTAL STUDY
Institute: College of Public Health Sciences, Chulalongkorn University, Bangkok, Thailand	

Co-PI: -

Mode of Review: ✓ *Full Board Review (Meeting No. 2/2016-27th) for version 01*
                              ✓ *Expedited review for version 02*

Decision: Approved (Note: Abide by the conditions of approval)

Conditions for Approval

1. *This approval is granted for the scientific and ethical soundness of the study. The PI shall be responsible to seek all other clearances/approvals required by law/policy including permission from the study sites before conducting the study.*

2. *Report serious adverse events to REBH within 10 working days after the incident and unexpected events should be included in the continuing review report or the final report.*

3. *Any changes to the proposal or to the attachments (informed consent and research tools such as forms) should be approved by REBH before implementation.*

4. *Final report of the study should be submitted to REBH at the end of the study for protocol file closure.*

5. *This approval is valid through 08/05/2017. If the study has to continue beyond the approved period the PI has to apply for the continuing review two months before the validity of the approval expires.*

(Dr. Tashi Tobgay)
Officiating Chairperson

For further information please contact: *REBH Member Secretary @ E-mail:*
msgurung@health.gov.bt/tashidema@health *Tel: +975-2-322602 ext 333*

PABX: + 975-2-322602, 322351, 328091, 328092, 328093 (Extension 333) Fax: 324649

ANNEX G: Study work plan

Work plan for study implementation and completion

	Activities	2016												2017			2018		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb - May	Jun-Dec	Jan - May	Jun	Jul
1.	**Preparatory work**																		
-	Meeting with district officials	■	■																
-	Review literature		■																
-	Write thesis proposal		■	■															
-	Finalize and submit to the thesis exam committee			■															
-	Take thesis proposal exam			■															
-	Revise proposal			■															
-	Pretest the questionnaire																		
-	Request for ethical approval				■														
2.	**Background work for research**																		
-	Meeting with the district administration				■														
-	Training of health educators on peer education and NTUIS model				■														
-	Training of peer educators on peer education and NTUIS model				■														
3.	**Research work**																		
-	Cary out a baseline survey				■														
-	Implement the Model					■	■												
-	Carry out the follow up assessments							■	■	■	■	■	■						
4.	**Data management & analysis**																		
-	Data entry and management													■					
-	Data analysis														■				
5.	**Thesis writing & submission**																		
-	Writing the study report															■			
-	Information dissemination & publication																■		
-	Thesis defense/ exam																	■	
-	Revision & finalization of thesis																		■
-	Submit the final thesis																		■

REFERENCES

APPENDIX

VITA

Name: Sonam Rinchen

Date of birth: 25th September

Nationality: Bhutanese

Address: Babesa, Thimphu, Bhutan

Mobile No.: 00975-77411196

Email: sonamrinchen9@gmail.com

EDUCATION

Doctor of Philosophy - College of Public Health Sciences, Chulalongkorn University

Master of Public Health - College of Public Health Sciences, Chulalongkorn University

Bachelor of Science - Sherubtse College, Delhi University

EMPLOYMENT HISTORY

2013 till now   Public Health Consultant, Thimphu, Bhutan

2011-2012   Technical Officer, WHO-SEARO, New Delhi, India

2009-2011   Junior Public Health Professional, WHO-SEARO, New Delhi, India

2005-2009   Program Officer, Ministry of Health, Thimphu, Bhutan

2000-2004   Assistant Planning Officer, Ministry of Health, Thimphu, Bhutan

PUBLICATION

1.   Prevalence and predictors of tobacco use among Bhutanese adolescents [Journal of Health Research, Vol.32/issue 4, 2018]

2.   Model of No-Tobacco-Use-in-School (NTUIS) on tobacco use knowledge, attitude, intention and behaviour among Bhutanese adolescents. [Journal of Medical Association of Thailand, Vol. 101, 2018]

3.   Smokeless tobacco use in Nepal [Indian Journal of Cancer, Vol.49/issue 4, Oct.-Dec. 2012, p. 352]

4.   Smokeless tobacco use in Sri Lanka [Indian Journal of Cancer, Vol.49/issue 4, Oct.-Dec. 2012, p. 357]