ADVERSE TRANSITION OF SMOKING STAGES AMONG LOWER SECONDARY SCHOOL STUDENTS OF KINTA, PERAK: A PROSPECTIVE COHORT STUDY

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FACULTY OF MEDICINE
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ABSTRACT

Smoking behaviour normally begins with initiation during adolescence and progress through different stages. Yet, few prospective longitudinal researches have been conducted to examine the influence of various factors on progression to a higher smoking stage. The aim of this study was to describe the factors associated with adverse transition of smoking stages among adolescents. A school-based study among a cohort of 2552 secondary students aged 12 to 13 years old was conducted. Data collection was conducted twice, 12 months apart. Students answered a self-administered questionnaire. In this study, adverse transition was defined as transition from one smoking stage to a more adverse stage during follow up. The procedures in the complex samples add-on module were used in the analyses after adding appropriate student and school weights that were adjusted for non-response. The predictors of the four adverse transitions were tested using multinomial logistic regression analysis. The results at Time 1 indicated that there were never smokers, 474 susceptible never smokers, 168 experimenters and 83 ex-smoker in this study. At Time 2, 77.2% of the never smokers remained stable never, while 22.8% had Adverse Transition I. Adverse Transition II was 27.8 % among the susceptible never smokers. Among the experimenters, 43.5% had adverse Transition III and 36.0% of the ex-smokers had adverse Transition IV. The analysis of this study demonstrates that adverse transition of smoking stages was associated with various socio-demographic, school, peer, parental and personal factors. Among these variables, five factors were associated with all four adverse transitions groups.This study demonstrates the presence of different groups of adverse transition among adolescents and the various factors that can influence these transitions. Ethnicity, school adjustment, having a best friend who smokes, self-efficacy and perceived ease of accessibility to purchase cigarettes were associated with all four adverse transitions groups. Development of interventions against adverse transition among adolescents should be

multi-faceted and consideration should be given to using different strategies based on the various influencing factors to target the different smoking stages.

ABSTRAK

Tingkahlaku merokok biasanya bermula di kalangan remaja dan melalui beberapa tahap yang berbeza. Namun, tidak banyak kajian prospektif dijalankan untuk memahami pengaruh pelbagai faktor terhadap peralihan tabiat merokok ke tahap yang lebih tinggi atau peralihan negatif. Matlamat kajian ini adalah untuk meneliti faktor-faktor yang boleh mempengaruhi peralihan tingkahlaku merokok di kalangan remaja dari suatu tahap yang rendah ke tahap yang lebih tinggi (peralihan negatif). Satu kajian prospektif dijalankan di kalangan 2552 pelajar sekolah menengah yang berumur 12 hingga 13 tahun. Penggumpulan data dijalankan sebanyak 2 kali dalam 12 bulan. Semua pelajar yang terlibat menjawab satu soal selidik yang disediakan. Dalam kajian ini, peralihan negative di definisikan sebagai peralihan dari satu tahap merokok ke tahap merokok yang lebih buruk. Analisis kajian ini menggunakan prosedur dalam *complex sample add-on module* dengan mengambilkira dan menyelaras weights untuk bilangan pelajar serta bilangan sekolah untuk non-response. Faktor penyumbang untuk empat jenis peralihan negative di teliti dengan menggunakan analisa multinomial logistic regression. Hasil kajian **p**ada Peringkat I kajian, terdapat 1669 pelajar dengan status bukan perokok, 474 bukan perokok tetapi berisiko, 168 perokok tahap percubaan dan 83 bekas perokok. Pada Peringkat 2 kajian, 77.2% daripada bukan perokok, kekal tidak merokok manakala 22.8% mempunyai Peralihan Negatif I. Peralihan Negatif II adalah 27.8% di kalangan bukan perokok tetapi berisiko. Antara perokok tahap percubaan, 43.5% mempunyai Peralihan Negatif III dan 36.0% daripada bekas perokok mengalami Peralihan IV. Analisa kajian menunjukkan bahawa peralihan negative tahap merokok dipengaruhi oleh pelbagai faktor sosio-demografi, faktor sekolah, faktor rakan sebaya, faktor ibu-bapa dan faktor peribadi. Antara ini, lima faktor dikaitkan dengan keempat-empat kumpulan peralihan yang negatif. Kajian ini telah membuktikan kehadiran beberapa kumpulan peralihan negatif di kalangan remaja. Faktor bangsa, keselesaan di sekolah,

jika kawan karib merokok, *self-efficacy* dan anggapan bahawa rokok mudah didapati mempegaruhi ke empat-empat tahap peralihan dalam kajian ini. Intervensi untuk pencegahan peralihan negative harus mengambilkira pelbagai faktor penyumbang dan turut pertimbangkan penggunaan strategi yang berbeza berdasarkan variasi tahap merokok di kalangan remaja.

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This work is dedicated to my mother – Mrs.Kamala Thevi; my father – Mr. Jeganathan; my husband - Dr.Thirugana Kumeren; my children- Shavitashree, Thanushree, and Aggatiyen; and my siblings.

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LIST OF SYMBOLS AND ABBREVIATIONS

WHO	:	World Health Organizatin
FCTC	:	Framework Convention on Tobacco Control
NTB	:	National Tobacco Board
GATS	:	Global Adult Tobacco Survey
GYTS	:	Global Youth Tabacco Survey
CTPR	:	Control of Tobacco Products Regulations
HBM	:	Health Belief Model
TRA	:	Theory of Reasoned Action
TPB	:	Theory of Planned Behaviour
SLT	:	Social Learning Theory
SCT	:	Social Cognitive Theory
PBT	:	Problem behaviour theory
UNICEF	:	United Nations Children's Fund
IARC	:	International Agency for Research on Cancer
RSC	:	Religiosity Personality Scale
SLSS	:	Students' Life satisfaction scale
BSSS	:	Brief Sensation Seeking Scale
CI	:	Confidence Interval
OR	:	Odds ratio

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CHAPTER1: INTRODUCTION

Introduction of this chapter

This chapter begins with a brief history on tobacco use, an overview of the burden of smoking in Malaysia and the problem statement of the current study. This is followed by theories and models used in studies related to cigarette smoking. This chapter also presents the objectives, outline of this study, the conceptual framework, the significance of this research and the structure of this thesis. This chapter concludes with a summary of this chapter.

1.1 Tobacco history and Global Tobacco Situation

At the end of the 15th century, tobacco was introduced to Europe by Christopher Columbus. However, tobacco use in the form of cigarettes was popular only since the 19th century and its use became widespread during World War I and II. By the end of the Second World War, cigarette became a social norm (Doll, 1999). Nonetheless,, advocacy against tobacco use was noted since 1600 as illustrated by a Counterblaste to Tobacco (Hamilton, 1927; World Health Organization, 2002b) and King Louis X1V who discouraged the use of tobacco (Hamilton, 1927; Doll, 1999;). The historical moment for anti-tobacco movements was the release of findings from five case control studies on smoking and lung cancer (Doll, 1998; Musk & De Klerk, 2003). This was followed by reports on the causal link between smoking and lung cancer in 1957 and 1962 (Musk & De Klerk, 2003) and subsequently in the next thirty years, cigarette smoking was found to be associated with forty to fifty various causes of morbidity and mortality (Doll, 1998).

World Health Organization (WHO) estimates the death toll caused by tobacco use to increase to 10 million by the year 2020 (Shibuya, K. et al., 2003; World Health Organization, 2008). Globally, the number of smokers is over 1.25 billion and this figure represents the world's population aged 15 years old and above (Nabilla Al-Sadat et al., 2005; World Health Organization, 2007). World market for tobacco is mainly monopolized by British, American and Japanese multinational companies (World Health Organization, 2007). These companies have controlling presence worldwide and their wide reach is helped by international trade liberalization (World Health Organization, 2007). The prevalence of smoking is growing in the Asian markets but declining in the Western population (Parkinson et al., 2009). Among WHO Regions, the Western Pacific Region which covers East Asia and the Pacific has the highest smoking rate. About one in three cigarettes are consumed in the Western Pacific Region (http://www.wpro.who.int/mediacentre/factsheets/fs20020528.htm, 2009). In response to the globalization of the tobacco epidemic, World Health Assembly, WHO's policymaking body, developed what became the 2003 WHO Framework Convention on Tobacco Control (FCTC) (World Health Organization, 2008).

1.2 Malaysian scenario

Tobacco, though not a native crop of Malaysia, has been present since first cultivated in Sabah in 1883 (Clearinghouse for Tobacco Control, 2005). A systematic development of tobacco cultivation was introduced in 1959 in Kelantan (Rosnah Ramly. 2006). Kelantan became the largest tobacco producing state followed by Terengganu. Initially, the tobacco industry in Malaysia was unorganized. However in 1973, the National Tobacco Board (NTB) regulated and protected the tobacco industry (Nabilla Al-Sadat et al., 2005).

In the early 1970s, the Malaysian government started its formal regulation for tobacco use (Dorotheo, C. & Dorotheo, U., 2007). Malaysia's first involvement in the FCTC process was in March 2000 at the Second Working Group Meeting and it became the 63rd country to sign the FCTC on 23rd September, 2003. Malaysia then ratified the Convention two years later on 16 September, 2005. Subsequently, to ensure adherence to provisions in all the articles a national secretariat was established in 2004 (Faridatul Citra Md Isa, 2006).

A comprehensive tobacco control program came into act in 1993 (Morrow & Barraclough, 2003). A large national anti-tobacco campaign, known as "TAK NAK" begun in 2004 with the objective to increase public awareness and educate

The Malaysian government through its Ministry of Health and Ministry of Education also executes various other programmes such as school-based programmes and cessation clinics (Morrow & Barraclough, 2003; Nabilla Al-Sadat et al., 2005; Tohid et al., 2011).

Various forms of smoking and smokeless tobacco products are used world wide. Prevalence rates of tobacco use and pattern of types of tobacco use differ greatly. High prevalent rates of smoking and smokeless tobacco users were found in Bangladesh, Maldives, Nepal and Myanmar (Kyaing, N.N., Islam, M.A., Sinha, D.N., & Rinchen, S., 2011). The use of other tobacco products or smokeless tobacco is less prevalent in Malaysia compared to countries such as Indonesia, Vietnam and Singapore (Global Youth Tabacco Survey Collaborative, G., 2002; Hammond, D. et al., 2008).

1.2.1 Burden of smoking in Malaysia

Smoking is an addiction that causes hazardous effects on smokers and also an economic burden. In the United States, smoking contributes to 440, 000 deaths yearly

and US $157 billion in health related economic cost. A recent study, Global Adult Tobacco Survey (GATS) in 2011 (Global Adult Tobacco Survey (GATS) Malaysian., 2011) reported current smoking among Malaysian males aged 15 years old and above to be 43.6%. The GATS study also reported that on the average, daily smokers smoked up to 14 cigarettes per day. Addiction to cigarettes may lead lower income families to be at risk for malnutrition as instead of purchasing basic family necessities, limited resources were directed towards buying cigarettes (Nabilla Al-Sadat et al., 2005).

Healthcare cost of adverse effects of smoking due to ischaemic heart disease, lung cancer and chronic obstructive pulmonary disease amounted to RM 2,924, 756,050 or nearly 17% of our country's total health care budget (Syed Muhamed Al Junid Syed Junid., 2007). The findings of this economic study show that unless serious measures are taken to prevent tobacco use, Malaysia will have to spend more to treat smoking related diseases (Syed Muhamed Al Junid Syed Junid, 2007).

1.2.2 Challenges in Tobacco Control

Multinational tobacco industries have been focusing on expanding their market towards low and middle income countries such as Asia, Africa and Eastern Europe causing increasing tobacco use in the countries from these regions (Glynn, T., Seffrin, J.R., Brawley, O.W., Grey, N., & Ross, H., 2010). Tobacco cultivation generates significant revenue for many developing countries and is grown in 80 countries (Jha, P. & Chaloupka, F.J., 2000b). These countries may not be keen in implementing strong tobacco control policies as it may impact their earnings gained through taxes and exportation of tobacco crops (Garcia, G.J., 2008; Jha, P. & Chaloupka, F.J., 2000b). Similar to other countries that grow tobacco, a common argument raised is that tobacco control will cause job and economy losses (Jha, P. & Chaloupka, F.J., 2000a).

Initially, tobacco industry in Malaysia was unregulated and the National Tobacco Board (NTB) protected the industry since its establishment in 1973 (Nabilla Al-Sadat et al., 2005). Advocacy for tobacco control and policies progressed slowly (Yasin, S.M. et al., 2013) and lag behind Thailand and Singapore (Nabilla Al-Sadat et al., 2005). In 1993, Malaysia enacted the Control of Tobacco Products Regulations (CTPR) in 1993. CTPR has been amended a number of times but remains as an important legislation used for tobacco control in Malaysia. Only after Malaysia's ratification on the Framework Convention of Tobacco Control (FCTC), it began to use multiple strategies for tobacco control (Yasin, S.M. et al., 2013). Legislation has been introduced to restrict tobacco advertisement and establish smoke-free environments (Nabilla Al-Sadat, Misau, A.Y., Zarihah, Z., Maznah, D., & Tin, T.S., 2010; Yasin, S.M. et al., 2013). Even so, Malaysia has become an example of tobacco industry's success when allowed to operate with minimal restrictions (Assunta, M. & Chapman, S., 2004) and this country continues to be seen as having tobacco friendly environment (Hammond, D. et al., 2008).

Cigarette smuggling is a problem that is present worldwide (Joossens, L. & Raw, M., 2000) and is also of concern in Malaysia (Nabilla Al-Sadat et al., 2005) . The illegal trade makes cheap cigarettes more available in the market. Cheap cigarettes discourage cessation efforts by smokers and encourage youth to begin smoking (Garcia, G.J., 2008; Glynn, T. et al., 2010; Wiltshire, S., Bancroft, A., Amos, A., & Parry, O., 2001). Tobacco smuggling in Malaysia ranges from 10% to 18% of the local market and is even estimated to be higher by the tobacco industry (Nabilla Al-Sadat et al., 2005). Smuggling causes loss of revenue and poses yet another threat to anti-smoking activities aimed at reducing tobacco consumption.

Multi-lateral trade organizations or country to country trade agreements often include tobacco during discussion or negotiations. Normally these negotiations aim towards reducing restrictions on importation and exportation of tobacco products (Garcia, G.J., 2008; Glynn, T. et al., 2010). When more tobacco products are allowed to enter the country, marketing of the product will expand and the price will decrease (Jha, P. & Chaloupka, F.J., 2000b). A decrease in tobacco price will have a negative impact on smoking cessation and smoking initiation (Glynn, T. et al., 2010).

In Asia, prevalence of smoking among adolescents and young adults is used to benchmark tobacco control policy (Hammond, D. et al., 2008). Although some countries in Southeast Asia show a decline in smoking prevalence, the absolute number is on an increasing trend (Nabilla Al-Sadat et al., 2010). Thailand and Singapore have lower prevalence of smoking compared to Malaysia (Gainroj, P. et al., 2010). Thailand was one of the first countries to implement restrictions on tobacco advertisements (Hammond, D. et al., 2008) and has some very strict anti smoking laws (Zawahir, S. et al., 2013). It serves as a role model for tobacco control in Asia (Hammond, D. et al., 2008). Adding to the adolescents smoking problems, available data suggests an increase in smoking among women (Mackay, J. & Amos, A., 2003). This increase could be due to many reasons for example; emancipation of the female gender, modernization or women specifically being targeted by the tobacco industry as ways to expand the demand for their product (Mackay, J. & Amos, A., 2003; Morrow, M. & Barraclough, S., 2003). In addition to other challenges, anti-tobacco activities needs to be comprehensive to include smoking cessation, prevention of smoking initiation among adolescents and address the issue of smoking among women.

Tobacco control faces many other barriers and is unique in public health as it comprises of various issues (Glynn, T. et al., 2010). Smoking has been accepted as part

of culture in many countries (Glynn, T. et al., 2010) and over two third of the world's 1.1 billion smokers are in developing countries. More than 50% of these smokers are in Asia (Hammond, D. et al., 2008). Developing countries can learn from the negative experiences of high income countries and need not repeat similar mistakes (Glynn, T. et al., 2010).

1.3 Problem Statement

Mortality due to smoking is 400% higher than deaths caused by homicide, suicide, motor vehicle accident and HIV/AIDS (Brownell & Warner, 2009). If tobacco was a new pharmaceutical drug it would not have been approved for public use (Musk & De Klerk, 2003) and this product causes more preventable deaths than any other drugs (Mokdad, Marks, Stroup, & Gerberding, 2004). Therefore, it is of major concern that the initiation of this habit which usually occurs during adolescence (Giovino, 2002; Seo, R.Torabi, & Weaver, 2008) needs to be halted. In addition, studies have shown that early experimentation increases the risk of becoming a regular smoker (Harrell, Bangdiwala, Deng, Webb, & Bradley, 1998; Simons-Morton & Haynie, 2003; Tjora, Hetland, Aarø, & Øverland, 2011) and becoming addicted to nicotine (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Hazards of smoking manifest itself earlier among those who initiate smoking from a younger age (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012).

Similar to other countries, tobacco use is also a pressing issue in Malaysia. Cigarette smoking accounts for 25% of all deaths in Malaysia with smoking related deaths comprising three out of five top mortality causes. In Malaysia, the National Health Morbidity and Mortality Survey III, 2006 identified the prevalence of smoking among adolescents aged between 13 to 18 years old to 8.7% and Malaysian Global Youth

Tobacco Survey, 2009 reported the prevalence to be 18.2%. There are also several other local studies that have investigated not only on prevalence of smoking but also examined the factors associated with smoking. Unfortunately, most of these studies are cross-sectional and lack information on progression of smoking stages among adolescents.

1.4 Theories and Models Related To Tobacco Use among Adolescents

Adolescent smoking behaviour is multi-factorial. In line with this, a number of theories have been used to explain adolescent smoking behaviours. Some have argued that these theories can be consolidated to emit one common idea but the actual merging to form one general theory remains a challenge (Kristjánsson, 2010; Spelman, 2007). Although studies often base their research on single theory, there are studies (Flay et al., 1994; White, Pandina, & Chen, 2002) that combine the theories or different aspects from many theories to allow for a more complete determination of associated factors or risk factors. Below is brief description of some of the most commonly used theories used to explain substance use.

Health Belief Model (HBM) was developed in the 1950s by a group of psychologists. This group was seeking to explain the differences in why some individuals participate in health services and others don't. Perceived susceptibility to risks of disease, perceived severity of consequences, perceived barrier that deter from making a behaviour change and perceived benefits of actions that can reduce the risk of diseases are the four core constructs of this theory. A study using this theory normally links adolescents' perception of how smoking can affect their health, acceptance into social groups and their social status (Simons-Morton, 2004).

Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980) is based on the assumption that individuals are quite rational and make systematic use of the information available to them. This theory postulates that individuals' behavioural intention is an important determinant of behaviour. Behavioural intention is determined by attitude towards the behaviour and subjective norms. TRA implies that in order to influence behaviour, people have to be exposed to information which will produce changes in their beliefs. With regards to research on tobacco, adolescents who believe cigarette smoking helps move up their social status among their peers have higher possibility to start smoking (Kristjansson, Sigfusdottir, Allegrante, & Helgason, 2008).

Theory of Planned Behaviour (TPB) (Ajzen, 1991) is an extension of TRA. In addition to TRA's attitude towards the behaviour and subjective norm, Theory of Planned Behaviour adds the construct of perceived behavioural control. This enables the theory to predict behaviours where people have incomplete control over their actions and takes into consideration factors outside of personal control. Therefore, TPB postulates three conceptually independent determinants of intention. Perceived behavioural control refers to perceived ease or difficulty in performing behaviour.

Social norms found in both these theories play an important role in adolescent smoking behaviour. Social norm explains why smoking behaviour of a close friend and peers have an impact on adolescent smoking behaviours. The smoking behaviours of friends have been recognized as a main influencing factor for adolescent smoking (Hoffman, Sussman, Unger, & Valente, 2006).

Social Learning Theory (SLT) posits that social interaction, reinforcement, imitation and attitude towards the behaviour to be the primary mechanisms through which

behaviour is learned. Social learning occurs by observation of behaviours and attitudes of parents, family members and peers and striving to imitate their behaviour (Won S Choi, Gilpin, Farkas, & Pierce, 2001). Social Learning theory principals are often used to explain the effect on adolescents' smoking exposure to smokers who serve as role models. Proof of SLT's observational learning is seen from many studies where smoking onset and maintenance is higher among adolescents who are surrounded by either parents who smoke or peers who smoke (Flay, Hu, & Richardson, 1993; Otten, Engels, van de Ven, & Bricker, 2007). SLT also suggests the possibility that smoking behaviour can be learned and reinforced by punishment and reward. This can be done via parenting skills (R. Van Zundert, 2009).

Social Cognitive Theory (SCT) originated from SLT and core determinants included in this theory are knowledge of health risks and benefits of different health behaviours, belief's in efficacy to control behaviour, expectancies about pros and cons, concrete plans and strategies, perceived social and structural facilitators (Van Zundert, 2009). In the context of smoking, outcome expectations can be operationalized as pros and cons of smoking. The key construct in SCT is self-efficacy. SCT emphasizes that self-efficacy often affects health functioning. Many models of health behaviour include self-efficacy as an important influence in adoption and maintenance of behavioural changes for example in smoking cessation.

According to the Social Norms Approach, a person is motivated to behave in ways similar to those around them meaning perception of behaviour of others can influence a person's behaviour (Berkowitz, A., 2004). When an individual behaves according to non-existent norm, it means that individual has misperceived the behaviour of those around them. This is by over or under estimating the prevalence of certain behaviour.

Adolescents who had higher estimates of peer smoking behaviour also had higher levels of smoking and smoking susceptibility (Moran, 2009).

The Social Attachment Model or Social Development Model is based on criminological theory that incorporates different forms of antisocial behaviour. This model posits that children learn different patterns of behaviour from socializing agents such as family, peer, school, and other community institutions. Depending on the norms and values of socializing agents, and the strength of relationship between adolescents and agents, individual's behaviour can either be prosocial or antisocial. Thus, adolescent's attachment with their parents and peers can be used to predict their smoking behaviour.

Problem behaviour theory (PBT) is a psychosocial framework that was developed to understand the differences in adolescents' behaviour and involvement in various problems such as drug use, delinquency, alcohol and sexual activity. This theory takes into account risk and protective factors that influences behaviours. Risk factors included here are models risk, opportunity risk and vulnerability risk. Models risks include unhealthy role modelling from family, schools, peers, and neighbourhood (Jessor et al., 2003). Individual level characteristics such as low self-esteem, stress and depression are considered as vulnerability risk (Vazsonyi, A.T. et al., 2010). Opportunity risk is exposure to gang memberships. Protective factors include family attributes, dispositional attributes, and support protection (Vazsonyi, A.T. et al., 2010). PBT argues that low involvement with conventional behaviours such as strong religiosity and non-smoker parents places adolescents at risk for deviant behaviours (Collins, L.R. & Ellickson, P.L., 2004).

Theories make generalizations and help organize or interrelate a set of concepts. Although there are many theories and constructs on smoking, behavioral scientist are unable to piece them together (Kristjánsson, Á.L., 2010). Most theories show some similarities and together these theories form a foundation to understand smoking among adolescents (Kristjánsson, 2010; Sutton, 2001). For example in HBM and SCT, self-efficacy is a key construct. Perceived susceptibility is mentioned in HBM as well as PMT.

In addition to the theories mentioned above there is a plethora of other models and theories used to explain health behaviour. Research has also postulated that adolescents' behaviour is influenced by impacts caused by key life domains. Key life domains of any adolescent include family, peer, school and neighbourhood (M. Wen, Van Duker, & Olson, 2009). Years of research involving adolescence has centred on parents and family; school; peer influence and individual factors influences (Kristjánsson, 2010; M. Wen et al., 2009). It would be a difficult task to include all aspects of every behavioural model into a questionnaire.

This study does not intend to test specific theories; instead the aim is to identify factors influencing adverse transition by incorporating various factors from key life domains of adolescents based on the theories above and literature review. Although many studies have been based on various theories, four main domains remain as the main focus of many researches. The domains consist of parents and family; peer group, academic and school setting; and individual factors (Kristjánsson, 2010). There are many tobacco studies based on some or all of these domains (Ariza-Cardenal & Nebot-Adell, 2002; Bernat, Erickson, Widome, Perry, & Forster, 2008). This study's questionnaire covers key life domains and also includes constructs such as self-efficacy, self-esteem and perception of smoking.

1.5 Study Objectives

The general objective of this research is to describe the adverse transition of smoking stages and factors influencing the transitions after the first year of secondary school. The current study has four specific objectives as mentioned below:

1) To describe the prevalence and initial stages of smoking among Form One students in Kinta, Perak.

2) To determine the factors influencing the stages of smoking among Form One students in Kinta, Perak at the beginning of secondary school.

3) To identify adverse transitions of smoking stages among Form One students in Kinta, Perak after 12 months

4) To study the factors influencing the adverse transition of smoking stages among Form One students in Kinta, Perak after 12 months

1.6 Outline of This Study

This study has two main aims. The first aim was to identify the different stages of smoking among adolescents. The second was to examine the adverse transition of the smoking stage after one year. Therefore, a cohort of adolescent was asked to complete a self-administered questionnaire twice.

This study was carried out in several phases (Figure 1.1). The first phase was the development of a questionnaire. Literature review was conducted to help develop the questionnaire. Then the reliability of the questionnaire was tested using test retest method. The second phase which was data collection was conducted twice. Data analysis was phase three followed by synthesis of results. The final phase was discussion and conclusion of this study.

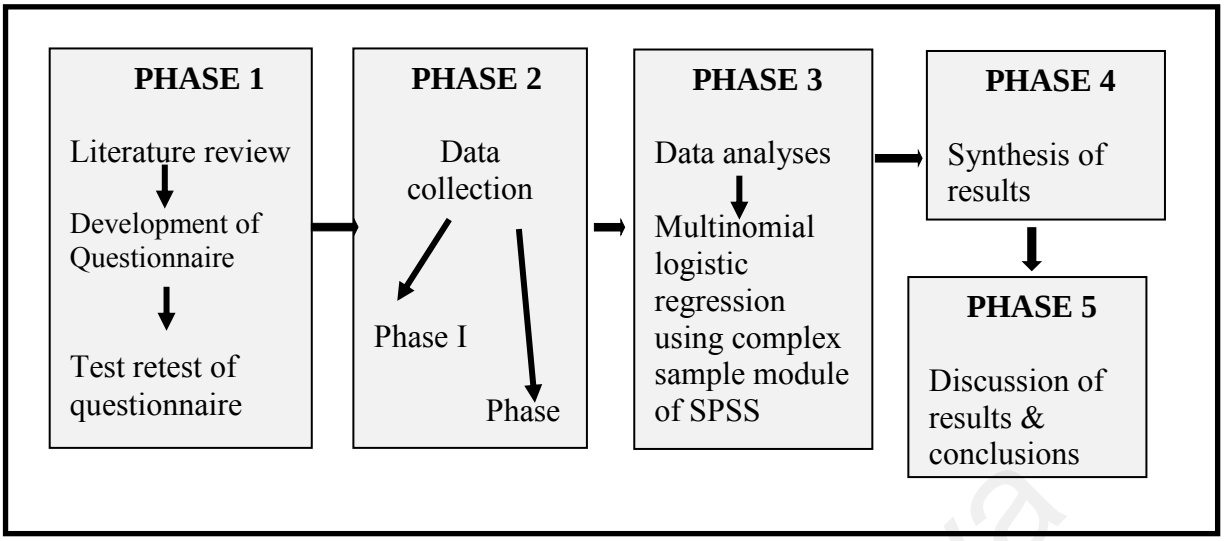

Figure 1.1 Thesis Outline

1.7 Conceptual Framework

The conceptual framework of this study is based on a multidisciplinary approach that includes individual factors together with family, peer, school and external environmental factors (Figure 1.2). This study contains six domains with the inclusion of socio-demographic factors. Each domain has different number of independent variables. Cigarette smoking has been explored by dividing the smoking behaviour into several stages. The current study divided the process of smoking into five stages beginning with never smokers, followed by susceptible never smokers, experimenters, current smokers and ending with ex-smokers. This study examined the progression from one smoking stage to a more detrimental stage (adverse transition). The outcome or dependent factor includes four adverse transition groups. Adverse Transition I includes a never smoker progressing to become either a susceptible never smoker, experimenter, current smokers or ex-smoker. Adverse Transition II covers susceptible never smokers moving up to become experimenters, current smokers or ex-smokers. Adverse Transition III is progression of experimenter to current smoker. Adverse Transition IV is ex-smokers who escalated back to current smoking. The current study considers the influences of all the independent variables on all four adverse transitions groups simultaneously.

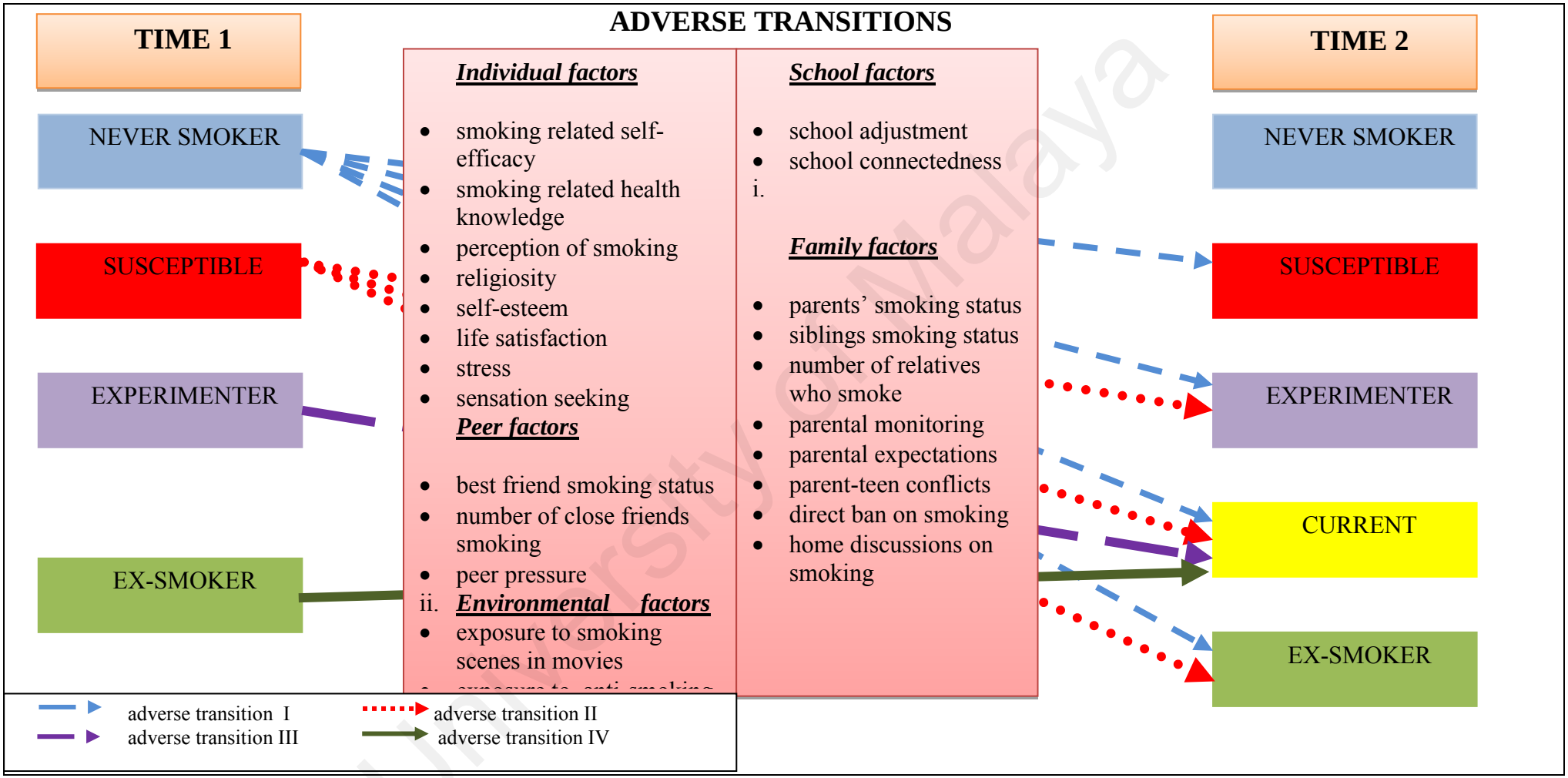

Figure 1.2: Conceptual Framework

1.8 Significance of this study

Cigarette smoking poses serious health risk. Even if tobacco use is not an immediate life threatening behaviour, it is an important health issue that should not be ignored. Although prevalence of smoking is declining, the majority of adolescents still initiate and later progress to a higher smoking stage (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). There is no doubt that prevention of uptake of smoking among adolescents is crucial to beat the epidemic of tobacco use. Therefore, it is important to understand the dynamics of adolescents smoking behaviour. Smoking behaviour among adolescents is a complex multi determined process (Leventhal, H. & Cleary, P.D., 1980) that is conceptualized as progressing through a sequence of developmental stages (Pierce, J.P., Distefan, J.M., Kaplan, R.M., & Gilpin, E.A., 2005) from early cigarettes experimenters, to intermittent use, to regular use and finally nicotine dependence (Elders, M.J., 1997). To intervene smoking behaviour pattern one needs to understand the factors that influence

Prior research examining adolescent smoking was primarily cross-sectional and compares adolescent non-smokers with smokers on socio-demographic characteristics and other health related variables. These studies lack information on progression of smoking stages among adolescents. This current research prospectively examined the association between various independent variables and the adverse transition of smoking stages in a cohort of adolescents. Identifying progression or adverse transition of smoking stages is an efficient way to understand the development of smoking behaviour among adolescents (Hampson, S.E., Tildesley, E., Andrews, J.A., Barckley, M., & Peterson, M., 2013) and it is important to explore patterns of smoking behaviour and changes of the behaviour in any population (Mosavi-Jarrahi, A. et al., 2004).

Among the non-smokers there are susceptible never smokers. Many of the local studies on prevalence of adolescents smoking behaviour usually overlook this stage. Identifying adolescents at the susceptible stage provides a good opportunity to prevent smoking initiation and reduce prevalence of current smoking by targeting susceptible adolescents who are more prone to smoke in the near future. This study takes into account the susceptible never smokers and explores the factors associated with adverse transition among adolescents in this stage. This study aims to examine the factors associated with adverse transition of the smoking stages among adolescents. Findings from this study can provide some evidence to help develop interventions targeting prevention of smoking initiation, smoking progression and relapse among adolescents.

1.9 Need for this study

There are several reasons why it is important to study the factors associated with adverse transition of smoking stages. There have been a number of studies on transition of smoking stages in many developed countries. However, no studies have been conducted locally eventhough the problem of smoking among adolescents remains a pressing issue in Malaysia. This is the first study to explore adverse transition of smoking stages among adolescents and the factors associated with the transition.

Firstly, factors associated with cessation of smoking may be different from factors that influence smoking initiation and subsequently factors involved with initiation of smoking may not be the same as factors associated with transition to a higher stage (Lloyd-Richardson, E.E., Papandonatos, G., Kazura, A., Stanton, C., & Niaura, R., 2002). Secondly, studies have shown that experimenters have higher risk of becoming a regular smoker and the risk of becoming a smoker increases with the progression of smoking stages (Park, S., Weaver, T.E., & Romer, D., 2009). Smoking cessation

becomes harder after progression to a higher stage (Kaplan, C.P., Nápoles-Springer, A., Stewart, S.L., & Pérez-Stable, E.J., 2001).

In Malaysia compared to cessation and initiation, not much is known regarding transition of smoking stages. Current knowledge may not be enough to tackle the problem of smoking initiation and progression. Malaysia is a developing country with a multi-ethnic population of different religious background, different cultures and social norms from western developed countries. Gaining insights through research done locally on adverse transitions of smoking stages has implications for prevention and intervention programmes. This study aims to fill this gap.

1.10 Structure Of This Thesis

This thesis contains six chapters. The figure below presents the general contents of each chapter.

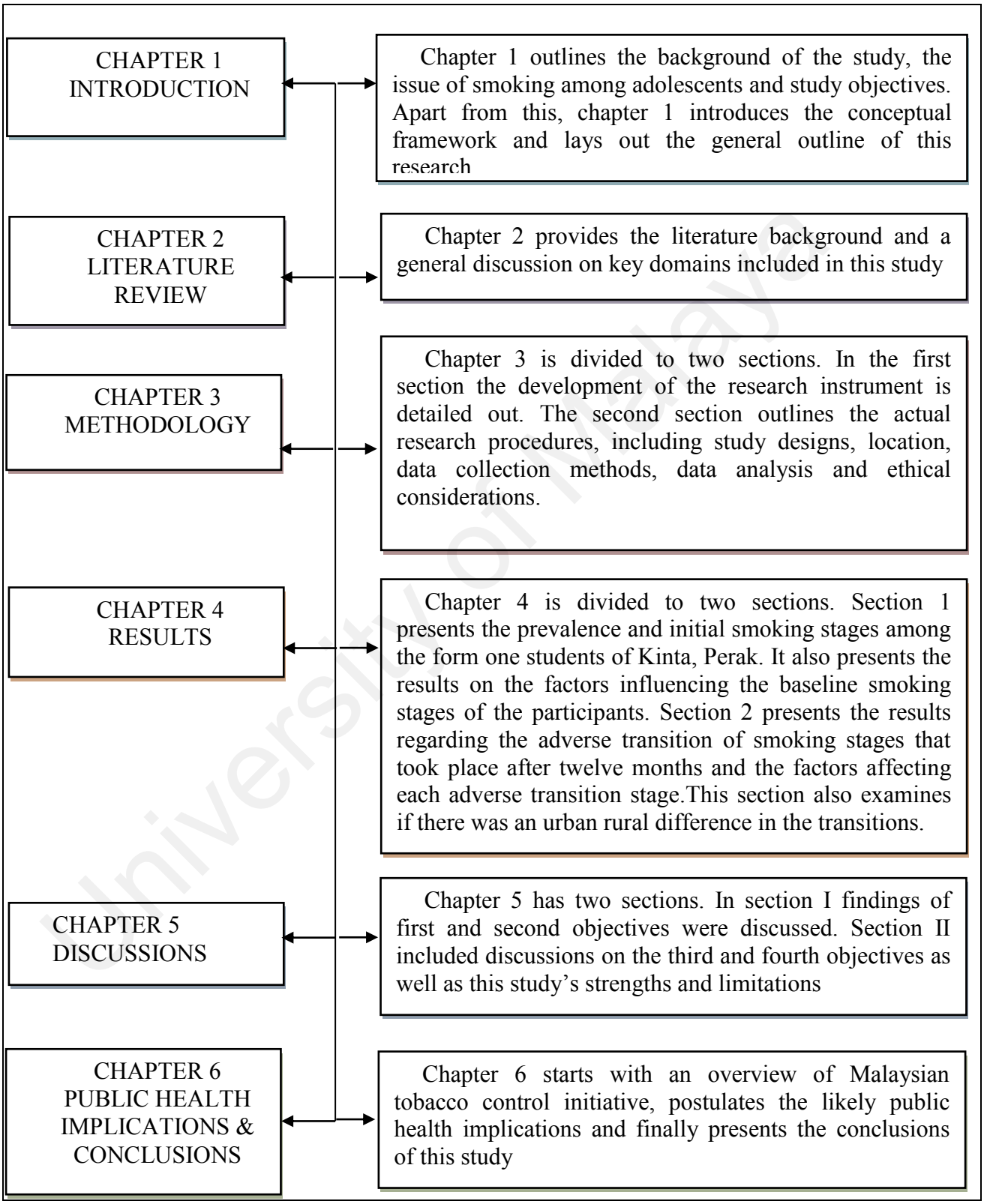

Figure 1.3: Structure of this thesis

Summary of Chapter 1

In summary, this chapter presents the introduction to the current study. This chapter describes the history of tobacco use in general and in Malaysia. This chapter highlights the burden of cigarette smoking in Malaysia and the need for research on adverse transition of smoking stages. |The objectives of study are then presented. This chapter also examines details on theories and model used in tobacco research. The chapter finally closes with a simplified outline and structure of this thesis.

CHAPTER 2: LITERATURE REVIEW

Introduction of this chapter

This chapter begins with a description of prevalence of smoking among adolescents in general and in particular the adolescent smoking problem in Malaysia. This is followed by an overview of smoking stages. This chapter provides two reviews of smoking studies among adolescents. The first review is on studies on smoking conducted among Malaysian adolescents.

Cross-sectional studies will not be able to identify progression or transition of smoking stages. In line with the objective to examine the progression of smoking stages among adolescents, the second review focuses on previous literature on prospective studies on smoking. An all inclusive search for references was conducted to look for all other relevant studies pertinent to this research.

This chapter also details out predictors of smoking progression described in previous literature.

2.1 Prevalence and trends of adolescent smoking behavior

Smoking related-diseases kill one in ten adults globally, or cause four million deaths. By 2030, if this current trend continues, smoking will kill one in six people (http://www.wpro.who.int/mediacentre/factsheets/fs20020528.htm, 2009). Initiation of cigarette smoking and the development of addiction normally occurs during adolescence and 80% of adult tobacco users started smoking regularly before the age of 18 (Seo, D.C., R.Torabi, M., & Weaver, A.E., 2008). Smoking habituation is mostly due to adolescent experimentation (Simons-Morton, B.G. & Haynie, D.L., 2003). Research findings reveal that young people may not recognize the health effects of

smoking and underestimate the addictiveness of nicotine (http://www.tobaccofreeasia.net, 2001).

The prevalence of smoking is decreasing among the Western population but among the Asian regions it is increasing (Parkinson, C.M. et al., 2009) National studies in United States report the prevalence of current smoking among adolescents ranges between 5.2% - 17.5%. The wide range of prevalence is due to the age variation (11 to 18 year old) of the adolescents in the study (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). The prevalence of current smoking among 13 to 15 year old in European and African countries was 8.4% and 4.0% respectively (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012).

Tobacco consumption among the developing countries is rising by 3.4% per year (http://www.wpro.who.int/mediacentre/factsheets/fs20020528.htm, 2009). The Western Pacific Region which covers East Asia and the Pacific has the highest smoking rate, with nearly two-thirds of men smoking. The Global Youth Tobacco Survey has been conducted in several countries worldwide. Percentage of current smoking adolescents between 13 to 15 years old in India, Singapore, Thailand and Indonesia has been reported as 3.8%, 9.1%, 11.7% and 11.8% respectively (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Global prevalence of tobacco use is four times higher in males compared to females (Mackay, J., 2001) and smoking among females remains low in many developing countries (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). The large population of young people in Asia

presents ample opportunity to recruit potential tobacco users (http://www.tobaccofreeasia.net, 2001).

2.1.1 Prevalence of adolescents smoking in Malaysia

Similar to many other countries, Malaysia too faces the tobacco control problem. Cigarettes are legally sold and easily available in this country (Clearinghouse for Tobacco Control., 2005). The national drug agency of Malaysia reported that 100% of drug addicts are smokers which is in line with the theory that illicit drug use starts with the use of soft drugs such as tobacco (Lim, K.H., Amal, N.M., et al., 2006). The national prevalence of smoking among adults 18 years and above obtained from the Third National Health and Morbidity Survey conducted in 2006 was 21.5% and smoking was higher among male adults.

The Third National Health and Morbidity Survey, 2006 found prevalence of current smoking to be as low as 3% among 13 year olds but among 17 year old the prevalence was as high as 15%. Amongst current and frequent smokers the mean initiation age was 13.6 years, and it was similar between urban and rural participants ("The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008) .

The Malaysian Global Youth Tobacco Survey (GYTS) was conducted in 2003 (Krishnan, M., 2003) and 2009 ("Global Youth Tobacco Survey (GYTS), 2009 - Malaysia," 2009) among students aged 13 to 15 years. The 2009 Malaysian GYTS found 30.9% of the male students were current smokers while 5.3% of the female students were current smokers. This study also found that 22.8% of the students started smoking before 10 years old. Around 10% were not smokers but planned to smoke within the next one year. Although there was a drop in the prevalence of smoking among students compared to the 2003 Malaysian GYTS from 20.2% to 18.2%, there

was an increase in female students who smoke. This survey also revealed that almost 50% of the students were able to purchase cigarettes even though they were underage.

2.1.2 Adolescent smoking research in Malaysia

A review for studies on smoking among adolescents in Malaysia was carried out using four online databases. We searched on the Science Direct, Web of Science, Pub Med, and Embase in August 2013. Only studies on adolescents were included. The search term used was: Smoking OR tobacco AND adolescents OR teenagers AND Malaysia. Total hit from four databases was 162 and potentially related articles were 47. Finally 17 articles were included in this review after excluding duplicates and articles that were not eligible (articles on adults or commentaries). The table of evidence (Table 2.1) presented below illustrates the studies sample size as well as the age of adolescents. The study design of each study was also included in this table.

Among these studies 13 were cross sectional studies, three were qualitative studies and only one longitudinal study. Sample size of studies that were carried out only in Malaysia ranged from 26 for a qualitative study to 4500 for a cross sectional study. Prevalence of smoking was as high as 32.8% among adolescents aged 11-18 year old. Lim KH et al, (2006) was the only longitudinal study carried out among Form four students aged 16 years old and revisited in 2006. This study identified factors associated with smoking initiation and smoking cessation.

This review demonstrates the limitations in prior research in Malaysia. Most smoking studies among adolescents in Malaysia has been cross-sectional in nature. There is a clear lack of longitudinal studies on transition of smoking stages in Malaysia. Most studies in Malaysia looked at the health status (prevalence and distribution of smoking or smoking cessation among adolescents). Only one study so far assessed

smoking initiation determinants. None examined adverse transition of smoking stages. This is the first study to describe distribution of adverse transition of smoking stages among adolescents. This study is also the first study to determine the factors associated with these adverse transitions.

Although there are studies on transition of smoking stages carried out in other countries, the epidemiology of smoking transition in Malaysia is not fully understood. It is important to describe the adverse transition of smoking stages and to examine the factors associated with the adverse transitions among Malaysian adolescent population. The findings can assist efforts to reduce smoking in the local population. Understanding the different stages of smoking and predictors of adverse transition of smoking stages can be useful for prevention and control programmes.

Table 2.1: Systematic review of smoking among adolescents in Malaysia

No	Author	Published Year	Study design	Population	Sample size	Results	Summary of Paper
1.	Abidin E Z et al.	2011	Cross sectional	School children (10-11years old)	1064	Cotine levels were positively associated with smokers, urban residence, fathers occupation, fathers education and parent report on SHS	Study on second hand smoke exposure
2.	Sirirassamee, T., et al.	2011	Cross sectional	Adolescents aged 13-18 years old	1704	Five percent of Thai and Malaysian adolescents were current smokers.	Study on smoking behavior of Thai and Malaysian adolescents
3.	Muthupalaniappen, L. et al.	2012	Cross sectional	Sarawak adolescents aged 11-18 years old	399	Smoking prevalence was 32.8%	Study comparing smokers and non-smokers on emotional, behavioural problems and help-seeking behaviour.
4.	Zawahir ,S., et al.	2013	Cross sectional	Adolescents in ITC-SEA project aged 13-17 years old	2008	Anti smoking education in schools is associated with reduction in smoking among female adolescents in Malaysia. Higher knowledge of smoking harm was associated with reduction in smoking susceptibility among Malaysian male adolescents.	Study examining the association of reported exposure to anti smoking media messages and education with knowledge of the health effects of smoking, perceived health risks of smoking, and susceptibility to smoking among adolescents. This study explores the possible moderating effect of country and gender.
5.	Parkinson, C.M.	2009	Cross sectional	Adolescents 13-17 years old	2002	Prevalence of ever smoking was 13.7% and current smoking 2.4%	Study to characterize the beliefs of youth, to explore gender and country differences, and to determine the association with

							antismoking media and behaviour
6.	, D., et al.	2008	Cross sectional	Adolescents of 13-17 years old	2002	Prevalence of current smoking was reported as nil among 13 year olds and 4.9% among 17 year old Malaysian adolescents	Study patterns of smoking among Thai and Malaysian youth; to examine product use, purchasing patterns among current smokers; to examine intentions to quit and cessation behaviour; and to examine measures of susceptibility among non-smokers. Identified different stages of smoking
7.	Lim, K.H., et al.	2010	Cross sectionl	Form four students of secondary schools in Petaling district	1300	Prevalence of current smoking was 14.3%.	Study examining prevalence of smoking and factors associated with smoking
8.	Lim, K.H., et al.	2006	Longitudinal	Secondary schools students aged 16 years old of Kota Tinggi	337	Prevalence of smoking was 29.7%	Study on initiation and cessation rate after one year and change in smoking status from non smoker to smoker and factors associated with the change.
9.	Sirichotiratana . N. et al.	2008	Cross sectional	Adolescents of 13-15 years old from GYTS survey	Sample Varied according to countries. Malaysia was 2443	Prevalence of current smoking in Malaysian 20.2%.	Study examined the differences and similarities in adolescents tobacco use in 9 Asian countries
10.	Lee, L.K. et al.	2005	Cross sectional	Secondary school students aged 12-19 year old	4500	Prevalence of smoking was 14%	Study on prevalence of smoking and factors associated with smoking. Examined smoking stages: smoker, current, frequent smoker, tried smoker
11.	Naing, N.N. et	2004	Cross	Form four and	451	Prevalence of current	Identified factors associated with smoking

	al.		sectional	Form five male adolescents from 3 schools		smokers was 35.92%. Mean duration of smoking was 2.49 years	among secondary school boys in Kelantan
12.	Tohid, H. et al.	2012	Qualitative	12 adolescents aged 16 years old, 8 teachers, 8 doctors	28	The current national tobacco control programme was perceived as ineffective in advocating smoking cessation among teenagers	Study examining impact of national tobacco control programme on smoking cessation.
13.	Tohid, H. et al.	2011	Qualitative	16 year old Malay adolescents	26	74% started smoking after age of 12 year old. Majority admitted to smoking daily.	Study on smoking behaviour, smoking initiation, cigarette consumption, quit intention, and quit attempts.
14.	Al Sadat, N. et al.	2008	Qualitative	16 year old adolescents		Reasons for smoking can be grouped as influence by peers, influence from parents smoking, reduce stress, and impress others.	Study on factors that influenced the initiation of smoking and the smoking habit among teenage girls in the urban city of Kuala Lumpur
15.	Noor, N.M. et al.	2008	Cross sectional	14 and 16 year old Malay adolescents	1364	Prevalence of smoking 6.7%	Study on self-esteem association with smoking in Kelantan
16.	Nor Afiah Z et al	2006	Cross sectional	Form 6 students	136	Prevalence of smoking 22.8%	Prevalence study that examine smoking and drinking habits among adolescents in Petaling, Selangor
17.	Shamsuddin, K. et al.	2000	Cross sectional	Male adolescents 15-16 years old	460	Prevalence of current smoking 33.2%	Family influence on adolescent smoking behaviour comparing smokers to non-smokers

2.2 Over view of smoking stages

This study on adolescent smoking behaviour is grounded in analysing the different stages of smoking and the transition of these stages. By operationalizing smoking into several stages and not just as a dichotomous outcome, potentially important differences between different stages of smoking can be identified. Different factors may play a role at different points along the pathway of developing the smoking behaviour and not all those who experiment with smoking become regular users. This further supports the usefulness of stage concept to help gain additional insights on why some adolescents are at higher risk of progressing to a higher stage and has implications for prevention programmes.

Smoking in adolescents is a complex behaviour. This behaviour is conceptualized as progressing through multiple developmental stages (Pierce, J.P. et al., 2005). Leventhal and Cleary (1980) proposed a model using four primary stages of smoking onset among adolescent, which included the preparation stage, the initiation stage, the experimentation stage and the active or maintenance stage (Leventhal, H. & Cleary, P.D., 1980). In this model, the preparation stage is when an individual has never smoked but observes and anticipates the experience of smoking (Cleary, P.D., Hitchcock, J.L., Semmer, N., Flinchbaugh, L.J., & Pinney, J.M., 1988). Initiation stage is the adolescents' first experience where they begin to try the first few cigarettes. When they start smoking on a more regular basis they are said to be in the experimentation stage.The maintenance stage involves daily smoking and addiction. Flay et al, (1983) expanded on this model and suggested five stages where the maintenance stage in Leventhal's model was divided to regular use or daily smoking and the fifth stage as nicotine dependence stage.

The Transtheoretical Model of Change describes smoking acquisition as a gradual progression through a series of discrete stages of cognitive and behaviour change. This model has been applied to smoking cessation, other behaviour modifications in adults and adapted to model smoking initiation among adolescents (Prokhorov, A.V. et al., 2002). This model divides the smoking stages into precontemplation phase, contemplation phase, preparation and acquisition.Those not intending to smoke in the future are in the precontemplation stage. Those intending to smoke are in the contemplation stage. Preparatory stage is for those who intend to smoke in the immediate future and those in the acquisition stage are initiating or regular smokers (Park, S. & June, K.Y., 2006).

Individuals who smoked all or part of one cigarette were identified as trier in Flay's study (Flay, B.R., Hu, F.B., & Richardson, J., 1998; "The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008). However various other studies have defined 'trier' as 'having smoked only once', (Murray, M., Swan, A., Johnson, M., & Bewley, B., 1983)'smoked first two or three cigarettes' (Dent, C.W. et al., 1993)or 'smoked first few cigarettes'(Mayhew, K.P., Flay, B.R., & Mott, J.A., 2000). The experimenter stage has been defined as 'having smoked less than 20 days for the past 30 days and not smoked for the last 7 days ("The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008), 'smoked 1-100 cigarettes in lifetime but not in the last 30 days (Wang, M.Q. et al., 1999) and 'smoked more than once, less than monthly or weekly'(Mayhew, K.P. et al., 2000).

Susceptibility to smoking integrates intentions and expectations of future behaviour. The susceptibility construct has been used in the California Tobacco Survey and other studies (Pierce, J.P., Choi, W.S., Gilpin, E.A., Farkas, A.J., & Merritt, R.K., 1996).

Susceptibility to smoking construct is a strong predictor for tobacco use (Pierce, J.P. et al., 1996) and can also predict established smoking among experimenters (Distefan, J.M., Gilpin, E.A., Choi, W.S., & Pierce, J.P., 1998). Some studies used susceptibility concept only among never smokers (Gritz, E.R. et al., 2003; Sun, P., Unger, J.B., & Sussman, S., 2005).

The Third Malaysian National Health Morbidity and Mortality Survey, 2006 analysed smoking among adolescents using CDC and NHMS II, 1996 definitions. NHMS II defined ever smokers as those who reported to have smoked at least once in his or her lifetime even one puff and current smokers as those who reported to be smoking at the time of survey. Ex-smokers were those who reported to have stopped smoking. The Global Youth Tobacco survey has been conducted in Malaysia in 2003 and 2009. The GYTS survey used the same definition as NHMS II to identify ever smokers and current smokers.

2.2.1 Definition of adverse transition

In this study which was conducted among adolescents aged 12-13 years old, number of cigarettes smoked was not used to define the stages. Instead similar definitions as GYTS and NHMS II were used to define never smokers, ever smokers, current smokers and ex-smokers. This study also incorporated susceptibility among never smokers as an additional stage and experimenter were defined as ever smokers who did not smoke 30 days prior to the survey. In this study the experimenter stage included those identified as trier and experimenters in other studies. Further descriptions of definitions of the smoking stages used in this study can be found in chapter 3.

Transition in general means any shifts or changes. Smoking stage transitions includes initiation of tobacco use among non-smokers; progression to a higher stage or

higher level of smoking; regression to a lower stage and relapse from cessation. The progression to a higher level of smoking can be identified by examining the number of cigarettes smoked within a time frame, frequency of smoking or both number and frequency. The focus of this study is on adverse transition which means transition from one smoking stage in baseline to a more adverse stage at second data collection (Kim, H. & Clark, P.I., 2006). This study included never smokers progressing to become susceptible and any other higher level of smoking; and ex-smokers who relapse back to current smoking into the adverse transition groups.

2.3 Systematic review of smoking transition studies

2.3.1 Literature search

Identifying various smoking stages and factors that influence progression of these stages can be useful to the success of prevention efforts. A search for previous studies on smoking stages transitions from four main databases (Pubmed, Embase, Web of Science and Science Direct) was conducted. No review protocol was developed for this literature review. Key search terms used were: predictor OR factor; transition OR progression; smoking stages; adolescent OR teenagers. A Boolean search was performed on each database using the search terms. We searched for duplicates after all citations were exported to the Endnote software. Table 2.2 presents the summary of the literature search

Table 2.2: Systematic search of articles

Database	Search terms (title / abstract)	Total hits	Final total
Pubmed	#1 predictor OR factor	1728417	
	#2 transition OR progression	458156	
	#3 smoking stages	21	
	#4 adolescent OR teenagers OR school children OR students	260648	
	#1 AND #2 AND #3 AND #4		4
Embase	#1 predictor OR factor	4124137	
	#2 transition OR progression	617126	
	#3 smoking stages	41	
	#4 adolescent OR teenagers OR school children OR students	314223	
	#1 AND #2 AND #3 AND #4		33
Web of Science	#1 predictor OR factor	4923218	
	#2 transition OR progression	1348614	
	#3 smoking stages	8988	
	#4 adolescent OR teenagers OR school children OR students	856376	
	#1 AND #2 AND #3 AND #4		78
Science direct	#1 predictor OR factor	6833927	
	#2 transition OR progression	253	
	#3 smoking stages	96749	
	#4 adolescent OR teenagers OR school children OR students	152711	
	#1 AND #2 AND #3 AND #4		100
	Total		212

2.3.2 Study selection

Among the 212 articles, 40 duplicates were identified and discarded. Abstracts of 175 articles out of 212 were reviewed before excluding any other study. The purpose of this section was to review studies on adverse transition of smoking stages. Thus, studies that focused on smoking cessation, other smoking related diseases, or only on smoking stages were excluded. Since this review was on adverse transition of smoking stages, studies based on cross sectional design were excluded.

Majority of the articles were published from the year 2000 onwards. Twelve articles were published between the years 2000 to 2004, nine articles were from the year 2005 to 2009, six articles were from the year 2010 to 2013 and only five articles were from

the year 1994 to 1999. Of the 34 articles reviewed, 22 were articles from various studies conducted in United States, three were from a six European countries project and two articles were from Netherlands. The remaining five articles were from studies conducted in Iran, China, Denmark, Spain and Czech Republic.

Among the articles from the United States, six articles were based on the National Longitudinal Study of Adolescent Health or AddHealth and three were from a national cohort sample of adolescents who participated in the Teenage Attitudes and Practices Survey or TAPS. Three articles were from the European Smoking Prevention Framework Approach (ESFA) project. Although these studies were based on the same cohort of adolescents they explored different groups of predictors. The study selection process is summarised in Figure 2.1.

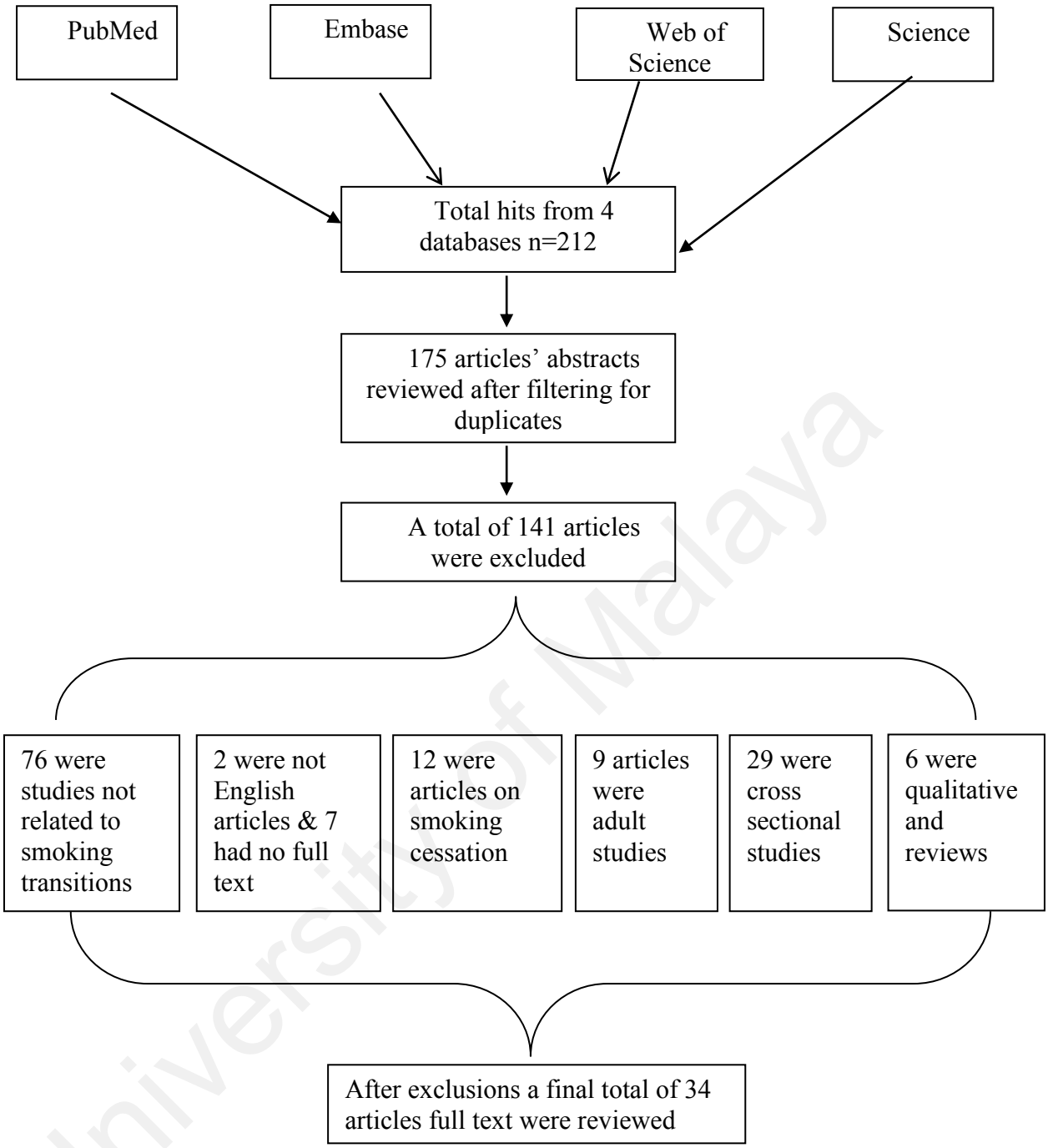

Figure 2.1: Flow chart of the final study selection

2.3.3 Review of transition studies

These studies examined different pathways of smoking stage transitions which included progression to higher stage or higher use of cigarettes, regression to a lower stage, initiation of tobacco use and developing nicotine dependence and the predictors of the transitions. There were differences in definitions of the smoking stages and age of the study population. This made it difficult to compare findings across the studies. Three studies focused only on smoking initiation (Bidstrup, P.E. et al., 2009; Khoddam, R. & Doran, N., 2013; Mahabee-Gittens, E.M., Xiao, Y., Gordon, J.S., & Khoury, J.C., 2013) among never smokers.

Progression studies based the changes in the smoking stages by measurements taken at multiple points in time over a specific period of time. More than two third of the studies explored the changes in the smoking stages over a period of one to three years. Five studies (de Leeuw, R.N., Engels, R.C., Vermulst, A.A., & Scholte, R.H., 2009; Dierker, L.C., Avenevoli, S., Merikangas, K.R., Flaherty, B.P., & Stolar, M., 2001; Flay, B.R., Phil, D., Hu, F.B., & Richardson, J., 1998; Mahabee-Gittens, E.M. et al., 2013; Park, S., Weaver, T.E., & Romer, D., 2010) examined the changes in smoking stages after five years and two other studies after seven years (Burt, R.D., Dinh, K.T., Peterson Jr, A.V., & Sarason, I.G., 2000; Kim, H. & Clark, P.I., 2006).

The escalation from one smoking stage to another was characterized using several different developmental pathways. Studies examined progression of smoking stages by examining quantity of cigarettes smoked, frequency of cigarettes smoked and some studies used both quantity and frequency. Some studies examined the progression among never smokers only (Blitstein, J.L., Robinson, L.A., Murray, D.M., Klesges, R.C., & Zbikowski, S.M., 2003; Flay, B.R. et al., 1994; Hoving, C., Reubsaet, A., & de

Vries, H., 2007). There were also studies that included other stages of smoking (for example: experimenter or light smoker) at baseline and examined the progression to a higher stage (for example: current smoking, regular smoking or nicotine dependence) (Ariza-Cardenal, C. & Nebot-Adell, M., 2002; Bauman, K.E., Carver, K., & Gleiter, K., 2001; Dierker, L.C., Avenevoli, S., Goldberg, A., & Glantz, M., 2004; Mohammadpoorasl, A., Fakhari, A., Shamsipour, M., Rostami, F., & Rashidian, H., 2011).

Bernat et al, 2008 categorized the changes in the smoking stages into six groups which included non-smokers, triers, occasional users, early established smokers, late established smokers and decliners (Bernat, D.H., Erickson, D.J., Widome, R., Perry, C.L., & Forster, J.L., 2008). Non-smokers were those that showed no tobacco use whereas triers and occasional users were adolescents who used tobacco intermittently. Early established smokers are a group of adolescents who became regular smokers by the age of 16 years old. Late established smokers are those who became regular users by the age of 18 years old. Decliners were adolescents who were regular smokers by the age of 14 and showed a decline in smoking around the age of 17.

Another study divided the progression as rapid progressors for those who escalated from non-smoking to regular smoking and slow progressors for those who progressed to experimental smoking within the same period of time (Blitstein, J.L. et al., 2003). Similarly the study by Gabrehelik et al, (2012) identified two different groups of smoking progression, after an intervention (slow cigarette smoking escalators and rapid/moderate cigarette smoking escalators) (Gabrhelik, R. et al., 2012).

Among the many studies that were conducted in United States, one study defined progression of smoking stages as adverse transition (Kim, H. & Clark, P.I., 2006).

Adverse transition was explained as transition from one smoking stage at baseline to a more detrimental stage during the next data collection. This study also included those who initiated smoking as one of the subgroups of adverse transitions. This study grouped all progression to a more detrimental stage as one large group of adverse transtioners and compared these adverse transitioners against those who remained as never smokers.

This study used similar definition as the study by Kim H et al, 2006. The focus of this study was adverse transition of smoking stages which means a transition from one smoking stage at Time1 to a more adverse stage in Time 2. However, this study did not group all adverse transitions into one group; instead we examined adverse transition among each smoking stage separately. We also included ex-smokers who became current smokers as adverse transitioners. This study examined four groups of adverse transitions. Adverse Transition I included never smokers who progressed to become either a susceptible never smoker, experimenter, current smokers or ex-smoker. Adverse Transition II covered susceptible never smokers moving up to become experimenters, current smokers or ex-smokers. Adverse Transition III was progression of experimenter to current smoking. Adverse Transition IV included ex-smokers who went back to current smoking. Further descriptions and illustrations of adverse transitions definitions used in this study are written in Chapter 3.

Table 2.3: Systematic review of smoking transition studies

Bibliographic Citation	Study Type & Methodology	Study & Characteristics	Smoking Stages	Transitions	Duration	Factors
Ariza, et al. (2002) Spain	Longitudinal	T1(n)= 1741 T1(n)= 1236	1)Non-smoker 2)Current smoker i)Regular ii)Occasional	1)Progression: Occasional smoker to Regular smoker 2)Regression : Occasional or Regular smoker and Quit	1 year	• Age : >15 ; < 15 • Gender • Type of school • Pocket Money • Alcohol • Peer smoking • Attitude to smoke • Subjective norms • Self-efficacy • Intention to smoke
Bauman, et al. (2001) United States	Longitudinal	T1(n)= 8273 T1(n)= 9884	1)Non-smoker 2)Experimenter 3)Occasional smoker 4)Frequent smoker	1)Non-smoker to Any smoking 2)Progression Experimenter to Occasional or Frequent smoking 3)Continued Occasional smoker 4)Continued Frequent smoker	1 year	• Parent smoking • Peer smoking • Ethnicity • Gender
Bernat. et al. (2008) United States	Longitudinal Minnesota Adolescent Community Cohort (MACC) Study	T1(n)= 3637 T1(n)= 3386	1)Never smoker 2)Trier 3)Less than monthly 4)Experimenter 5)Regular smoker 6)Established smoker	1)Non smoker 2)Triers 3)Occasional smokers 4)Early established 5)Late established 6)Decliners	Every 6 monthly for 3 years	• Socio-demographic • Social influences -parent smoking -peer smoking • Attitude and beliefs -number of adults and teens who smoke

						-difficulty smoking in public places -perceptions of tobacco industry -functional meaning of tobacco use • Home smoking policies
Bidstrup, et al. (2009) United States	Qualitative & Longitudinal	13 year olds n= 442	1)Never smoked 2)Experimenter 3)Light smoker	1)Smoking 2)Initiation	3 years	• Attitude towards smoking • Social Influence • Mother smoker • Father smoker • Best friend smoking • Social Norms • Pressure • Self-efficacy
Blitstein, et al. (2003) United States	Longitudinal	n=653	1)Non smoking 2)Experimenter 3)Regular smoker-smoking weekly or more	1)Rapid progressor 2)Slow progressor	1 year	• Social influences • Rebelliousness • Social success • Social value • Weight concerns • Initial reaction to smoking
Burt, et al. (2000) United States	Longitudinal Intervention	n= 3130	1)Smoking students at 5th grade	1)Daily smoking at 12th grade	2 point data collection carried out during 5th grade and 12th grade	• Personality Variables • Rebellious • Risk taking • Early maturation • Problem/ helplessness • Affect regulation

						• Peer appraisal • Peer Compliance
de Leeuw RNH, et al.(2009) United States	Longitudinal	n= 175	1)Daily smoking 2)Occasional Smoking	1)Smoking daily to Nicotine Dependence 2)Occasional smoker to Nicotine Dependence	5years	• Baseline smoking • Sibling smoking • Best friend smoking • Having smoking friend • Parental smoking • Age first smoke
Dierker, et al. (2004) United States	Longitudinal	n= 9449	1)Non-smoker 2)Experimenter 3)Regular Smoker	Non to experimenter vs continue non smoker Non to regular vs Non to experimenter Experimenter to Regular vs continue experimenter	1 year	• Age • Gender • Race • Poverty • Alcohol • Cocaine or Marijuana use • Smoking Frequency • Smoking Quantity • Alcohol Problem • Violence • Deviance • Depression • Self-esteem • Cigarette available • Family connection • Parent activities

						• Parent preserve • History of explosion • 19)GPA • 20)School connection • 21)Friends smoking
Dierker, et al. (2001) United States	Retrospective & Prospective	n= 115 – children of parents with substance use & anxiety	1)Never smoker 2)Experimenter – smoked 1 or more 3)Regular – weekly use 4)Nicotine Dependent – daily smoking of more than 10/day	Progression to Nicotine Depends Progression to Initiation	5-6 years	• Anxiety • Affective • ADHD • Conduct • ODD • Alcohol abuse / dep. • Drug abuse/ dependent • >1 disorder • Any disorder
Flay, et al. (1998) United States	Longitudinal & Retrospective	n=2912	Never- never tried Triers- part or 1 cig Exp - smoked more than 1cig but did not smoke past week Regular – smoking past week	1)Trying to experimenting 2)Experimenting to regular	6 years	• Parent smoking • Perceived parent approval for smoking • Number of smoking friends • Perceived for friend approval • Cig offers • Family conflict • Intention to smoke • Attitude or belief • Risk taking

						• Refusal self-efficacy • Grades • Use of other substance
Flay, et al. (1994) United States	Longitudinal	n=4896	Only never smoker & smoking one or less cigarettes at baseline	1)Initiation – never smoking to smoking more than 1 cigarette 2)Escalation-Experimenting to cig or more	15mths	• Friends smoking • Parental smoking • Negative outcomes/ expectation • Perceived friend approval • Perceived parental approval • Refusal self-efficacy • Smoking Intention
Gabrhelik, et al. (2012) Czech Republic	Interventional study	n=1874	Number of cigarettes in the past 30 days	1)Slow cigarette smoking 2)Rapid cigarette smoking	2 years	• Gender differences
Hoving, et al. (2007) United States	Longitudinal	n=4055	Never smoker	Never smoker to Smoker	1 year	• Gender • Religiosity • Age • Ethnic • Alcohol • Perceived level of spending money • Attitude – pros of smoking • Attitude cons of smoking • Social Norms • Social Pressure

						• Modelling friend • Modelling parent • Self-efficacy expectation • Intention • Study status
Khoddam RDN, et al. (2013) United States	Longitudinal	n= 400	Only never smoked more than a puff	Initiators	15mths	• Ethnicity • Positive reinforcing expectancies • Negative reinforcing expectancies • Negative consequences • Family history of smoking
Kim HC et al. (2006) United States	Longitudinal	n= 2697 female adolescents	1)Never smoker 2)Intermittent 3)Regular smoker 4)Experimenter 5)Former	Adverse Transitions	7 years	• Individual level • Race • Ethnicity • Parents structure • Family bonding • Availability • Best friend smoking • School level • State level control policies
Kremers, et al. (2004) United States	Longitudinal	T1(n)=10170 T2(n)=7117	1)Committer 2)Immotives 3)Progressive 4)Contemplaters 5)Smoker	Progressed -Stable -Regressed	1year	• Attitude towards smoking -pro -con • Perceived social norm to smoke

						• Perceived social pressure to smoke • Perceived smoking behavior - Parent - Peers • Self-efficacy
Kremers, et al. (2004) United States	Longitudinal	T1(n)=10170 T2(n)=6729	1)Never smokers 2)Triers 3)Experimenters 4)Regular 5)Quitters i)Acquicontemplater ii)Immotives iii)Committer	Progression	1 year	• Pro of smoking • Con of smoking • Social norm • Social pressure • Perceived behaviour-parent • Self-efficacy
Mahahee, et al. (2013) United States	Longitudinal	9-16 years old T1(n)=5705 (never smoker) T2(n)=4875 T3(n)=4372 T4 (n)=3829	1)Never smoker 2)Smoking Initiator 3)Current smoker	Initiation never smoker to yes to smoking during any follow-up	5 years	• Socio-demo • Peer smoking • Parent smoking • Parent • Connectedness • Monitoring • Perceived punishment
Mohamed Poorasi et al. (2011) Iran	Longitudinal	n=785	1)Never smoker 2)Experimenter 3)Regular	Transition from Never Smoker to Experimenter Transition from Never Smoker to Regular Smoker	1 year	• Age • Socio-eco • Smoker in family • Number of friend who smokers

				Transition from Experimenter to Regular Smoker		• Participation grp with at least one smoker • Risk taking • Drug use • Alcohol use -self-injury -positive attitude - low smoking
Nonnemeker, et a.l (2006)	Longitudinal	n=11707	1)None smoker 2)Experimenter 3)Regular smoker 4)Quit	1)None -> regular 2)None -> experimenter 3)Regular -> exp 4)Regular -> none	1 year	• Public religiosity • Private religiosity • Socio-demo
Otten R et al (2007)	Longitudinal	n=3822	1)Non-smoker/NS 2)Trier 3)Monthly 4)Daily	NS –> Trier NS –> Monthly NS –> Daily Trier –> Monthly Trier –> Daily	2 years	• Family Structure • Intact family • Single Family • Parental life time smoking • Time of cessation by parents
Park, et al. (2010) United States	Longitudinal 2nd and 3rd wave of National Longitudinal Study of Adolescent Health (Add Health)	n=3318 Experimenters	1)Experimenter 2)Daily smoker 3)Former daily 4)Current daily	Transition to current daily	5years	• Friend smoking • Family connectedness • Expectation of academic achievement • Self esteem • Religiosity • Marijuana use • Other illicit drug use • Delinquency

						• Alcohol use • Church attendance • Grade Point Average • Seat belt use • Exercise • Risk taking • Depression • Perceived General Health • Parental smoking • School connectedness • Cigarette availability at home
Selya, et al. (2012) United States	Longitudinal Social and Emotional Contexts of Adolescent Smoking Patterns (SECASP) Study	n=746	Smoke last 90 day but < 100 cigarette lifetime Smoke past 30 day >100 cigarette lifetime but < 5 cig/arête per day	Increase in smoking frequency and quantity	48 months	• Mother's smoking status • Father's smoking status • Smoking frequency • Smoking quantity • Nicotine dependence • Other tobacco use • Gender
Simons-Morton B et al United States	Intervention	6th to 9th grade n=1320	1)Never smoking 2)Intent 3)12 mth smoker 4)Recent smoker 5)Frequent smoking	Progression to higher stage	3years	• Socioeconomic status • Friends with problem • Parenting practices • Involvement • Expectation • Monitoring

Sun, et al. (2006) China	Longitudinal China Seven Cities Studies(CSCS)	Age 12-14 years old – n= 4842 Age 15-18 years old – n=5806	1)Never Smokers 2)Lifetimes ever smokers 3)30 day ever smoking 4)Daily smoking	Progression from never smoker Progression from lifetime ever smoker Progression from 30day ever smoker	1 year	• Gender • Type of school • Health status • Peer smoking • Academic • Age • Pocket money
Van Bree, et al. (2004) United States	Longitudinal	n=14333	1)Non smoker 2)Experimental 3)Regular smoker	-Experimental initiation -Regular smoking initiation -Progressed to Regular smoking -Discontinuation of Experimenter -Discontinuation of Regular smoking	1year	• Active pastime • Passive pastime • Somatic symptoms • Positive emotion • Depressive symptoms • Self-doubt • Irrational decision making • Problem avoidance • Dissatisfaction with school • Trouble in school • Relations with mother • Activities with mother • Relation with father • Activities with father • Family relation • Independent decision making • Substance • involvement • Violence

						• Delinquent • Religion • Neighbourhood
Wang, et al. (1999) United states	Longitudinal Teenage Attitudes and Practices Survey (TAPS I&II)	n=4032 – non-smokers only	Non smoker Experimental smoker Regular smoker	Non-smoker --> experimenter Non-smoker –-> Regular smoker	3 years	• Smoking belief • Smoking attitude • Parent smoking • Number of friend smoking • Parental appraisal of smoking • Perceived norms • Perceived no of teachers who smoke • Depressive • Risk taking • No fights • No of night out • Missing school days
Wang , et al. (1997) United states	Longitudinal Teenage Attitudes and Practices Survey (TAPS I & II)	n=6519	1)Non smoker 2)Experimental smoker 3)Regular smoker	Non-smoker --> experimenter Non-smoker –-> Regular smoker Experimenter –> Regular smoker	3 years	• Mother smokers • Father smokers • Older Brother • Older sister • Best friend smoker • Best friend's friend • Steady girlfriend or boyfriend who smokes
White HR et	Longitudinal	n=1040	1)None smoker	Transition to a different stage	2 years	• Gender

al (2009) United states			2)Light smoker 3)Intermittent smoker 4)Heavy smoker			• College status • Age of initiation • Binge drinking
White ,et al. (2002) United states	Longitudinal	n=447	trajectory groups: Non/ experimental Occasional / maturing out Heavy/regular smokers	Increase in frequency and quantity for each trajectory group	18 year 3 yearly	• Gender • Socio –economy • Parent smoking • Sibling smoking • Mother smoke while pregnant • Perceived number of peer smoking • Negative belief of smoking • Self-esteem • Self-derogation • Depression • Disinhibition • Education attachment • Drug Use • Delinquency
White , et al.. (2004) United states	Longitudinal Pittsburgh Youth Study (PYS)	n=983	Non smoker Light smoker Heavy smoker	Trajectories based on number of cigarettes per day	6monthly upto 8 follow up than Yearly for total of 14 years	• Race

2.4 Predictors of smoking transition

Smoking is not solely determined by individual choice but also influenced by factors external to the individual. Many factors are involved in adverse transition or progression of smoking stages. Parental and peer smoking status, parenting style, genetics, family structure, school factors, and exposure to tobacco advertisements are among the many factors examined in progression of smoking stages studies. Some studies have divided these factors to individual variables, immediate social surroundings and environmental and cultural surroundings. Others have grouped them into demographic characteristics, psychosocial factors, psychological factors and predisposing factors. The factors can also be divided into three areas which include interpersonal factors, intrapersonal factors, and environmental factors. Interpersonal factors usually included familial and peer influences. Intrapersonal factors examine various individual characteristics, problem behaviours and socio-demographic traits. Among many other factors, environmental factors also examine tobacco advertisements and tobacco accessibility.

2.4.1 Interpersonal Influences

2.4.1.1 School

Schools are a key area that can provide protective factors against health risk behaviours. In general, many studies reported that poor psychosocial ties to schools are associated with being a smoker (Rasmussen, M., Damsgaard, M.T., Holstein, B.E., Poulsen, L.H., & Due, P., 2005). School connectedness is one type of psychosocial tie to school that is associated with adolescent smoking. No general definitions of school connectedness is available therefore, school connectedness is taken as the belief by students that teachers and lecturers care about their learning and about them as individuals (Blum, R.W., Libbey, H.P., Bishop, J.H., & Bishop, M., 2004).

A study on adolescent daily smoking found that there is an inverse association between adolescent smoking and school connectedness (Rasmussen, M. et al., 2005). Low school connectedness has a significant effect on increasing the possibility of smoking initiation and experimentation and a higher chance of progressing to become a regular smoker (Lloyd-Richardson, E.E. et al., 2002). A study done among school girls reported that those who enjoyed school have a decreased relative risk for tobacco use initiation (DiNapoli, P.P., 2009). Secondary school students who have positive relationship with their teacher have a lower risk of being a regular smoker and early school disengagement can have a negative influence on this teacher-student relationship (Perra, O., Fletcher, A., Bonell, C., Higgins, K., & McCrystal, P., 2012). This was also supported by a systematic review on school effects on young people drug use which found that many observational studies consistently reported disengagement and poor student-teacher relationship were associated with drug use and other risky health behaviour (Fletcher, A., Bonell, C., & Hargreaves, J., 2008).

2.4.1.2 Adolescent-Peer Relationship and smoking

Children's development not only involves creating emotional bonds with their parents but also with other individuals. Hazan and Shaver (1994) posit that peers become essential attachment figures as development progresses. However, parent-child relationship has a role to play in the forming of peer relationships. Peer group serves as a major influence on an adolescent's substance use. The peer group role is explained by selective association and socialization by peers (Kandel, D.B., 1980).

Friends' smoking has been shown to both directly and indirectly affect adolescent smoking initiation and also influence the transition from trial to experimental use (Flay, B.R., Hu, F.B., et al., 1998). Early adolescent period is often a time where individuals

have higher need for social and emotional connectedness to their friends. In other words the need for social image and social belonging (Guo, Q., Unger, J.B., Azen, S.P., MacKinnon, D.P., & Johnson, C.A., 2012). It is during this period where peers' smoking influence may be high (Bricker, J.B., Peterson Jr, A.V., Sarason, I.G., Andersen, M.R., & Rajan, K.B., 2007). Measures of peer influences include friend's smoking, friend's use of other substance, friend's expectations regarding smoking, friend's approval, social normative beliefs, and motivation to comply (Conrad, K.M., Flay, B.R., & Hill, D., 1992).

A systemic review on predictors of onset of smoking in children revealed that peer influences were investigated in 19 studies. Friend's smoking was found to be predictive in 15 studies and friend's approval of smoking was predictive in six studies (Conrad, K.M. et al., 1992). Number of friends, level of social life, participation in anti-social activities and having a boyfriend or girlfriend also plays a role in the onset of smoking (Conrad, K.M. et al., 1992). Close friends who smoke act as role models for experimentation with cigarettes (Bricker, Jonathan B et al., 2007).

There are also many qualitative studies on tobacco use and adolescents. A review of such studies reported that there is consistent evidence of an association between adolescent smoking onset and maintenance with peer smoking (Walsh, R.A. & Tzelepis, F., 2007). This review also states that adolescents select their peer groups knowing the possibility that it may impact their smoking habits. Findings from this review also put forward that in general, peer influence on smoking though subtle direct pressure is not totally absent (Walsh, R.A. & Tzelepis, F., 2007).

Transition to a higher stage was related to friends smoking, cigarette offered by friends, smoking intentions, grade and substance abuse (Flay, B.R., Hu, F.B., &

Richardson, J, 1993). Peer smoking is by far the strongest predictor of smoking progression. Students having at least two friends who smoke were found to be six times more likely to progress from experimental to intermittent smoking and ten times more likely to become a regular or established smoker (Lloyd-Richardson, E.E. et al., 2002). However, strong parental involvement appears to be a protective factor against progression of smoking (Simons-Morton, B.G. & Haynie, D.L., 2003).

2.4.1.3 Familial Influences

Family smoking behaviour is an important factor that influences use of tobacco and other substances in adolescents (Conrad, K.M. et al., 1992; Dornelas, E. et al., 2005; Tyas, S.L. & Pederson, L.L., 1998). Social Learning Theory emphasizes that people learn from one another and from environment through observation, imitation and modelling. Parents often are seen as role models for their children. Adolescents can pick up both good and bad habits from their parents. The association between adolescents smoking with parental and older siblings cigarette use is mostly explained by them modelling this immediate environment (Huang, H.W., Lu, C.C., Yang, Y.H., & Huang, C.L., 2014; Taylor, J.E., Conard, M.W., Koetting O'Byrne, K., Haddock, C.K., & Poston, W., 2004).

A large number of studies have been conducted to identify the impact of parental, family members and older siblings smoking on adolescents smoking behaviours, whether smoking initiation or transition to a higher stage. A review of literature on these groups of studies concluded that twice the number of the studies found significant higher risk of adolescent smoking compared to studies that did not find significance (Health Sponsorship Council., 2005).

Smoking onset is related to having either smoking parents (Alexander, W.M. et al., 1983) (Hoving, C. et al., 2007)or siblings who smoke (Alexander, W.M. et al., 1983; Mayhew, K.P. et al., 2000). An increase in smoking stages and higher level of use was also related to having parents or siblings who smoke (Bricker, Jonathan B et al., 2007; Niknami, S.H., Akbari, M., Ahmadi, F., Babaee-Rouchi, G., & Heidarnia, A., 2008). Adolescents of parents, who smoke, may perceive positive consequences of smoking and mistakenly view smoking to be a social norm (Chassin, L., Presson, C.C., Sherman, S.J., Montello, D., & McGrew, J., 1986; Flay, B.R. et al., 1994; Turner, R.A., IrwinJr, C.E., & Millstein, S.G., 2014; Wen, C.P. et al., 2005).

A local study done on family influences in Kelantan showed that among smokers 60.7% had fathers who smoked compared to 48.6% among non- smokers. From 282 students with siblings, 66.7% smokers had siblings who smoked compared to 48.6% siblings of non-smokers who did the same. This study found that students current smoking habits was significantly associated with father's and sibling's smoking (Shamsuddin K & Haris M Abdul, 2000). A more recent study done in the local district of Petaling Jaya reported significant association between smoking and having smokers in family and having brothers who smoke (Lim, K.H. et al., 2010).

Family Structure is one of the most consistent factors that can increase or decrease the likelihood of adolescent smoking in a family. A study done in Latin America found that boys born to single mothers were more likely to smoke than those born to two parent families. There is a lot of evidence that point out that two parent families are protective against smoking (Covey, L.S. & Tam, D., 1990; Otten, R., Engels, R.C., van de Ven, M.O., & Bricker, J.B., 2007; Turner, R.A. et al., 2014). In a study done in Europe, smoking among 15-year-olds was significantly related to family structure in all

its countries. Young people in intact families were less likely to be daily smokers than those in lone-parent families, who in turn were less likely to smoke than young people in stepfamilies. In most countries, daily smoking prevalence among adolescents in stepfamilies was double that of adolescents in intact families (Griesbach, D., Amos, A., & Currie, C., 2003)

Parenting and family environment

Local studies on family influences and tobacco mostly focused on family structure, parents education levels, parental smoking habits, older siblings smoking or number of family members smoking. Many international studies have shown that familial influences go beyond the factors mentioned above. Several researches have reported that straightforward disapproval from parents and also parental advice not to use tobacco could be useful in adolescence (Huver, R.M., Engels, R.C., & de Vries, H., 2007; Newman, I., Ward, JM.,, 1989).

Parental Expectations, Monitoring And Involvement effects adolescents' motivation to smoke, selection of peers and chances or opportunities to smoke (Dick, D.M. et al., 2007; Harakeh, Z., Scholte, R.H., Vermulst, A.A., de Vries, H., & Engels, R.C., 2004; Simons-Morton, B.G. & Haynie, D.L., 2003). Low levels of perceived parental monitoring in urban low income families were associated with adolescents involvement with smoking cigarettes and also other health risk behaviours (Li, X., Feigelman, S., & Stanton, B., 2000). Parental monitoring of their children's activities and selection of friends was found not only to have a protective effect against adolescent smoking (Choquet, M., Hassler, C., Morin, D., Fallisard, B., & Chau, N.,, 2008; Guo, H., Reeder, A., McGee, R., & Darling, H., 2011) but also higher parental monitoring was associated with lower odds of smoking initiation (Mahabee- Gittens,

E.M., Xiao, Y., Gordon, J.S., & Khoury, J.C., 2012). Parental indifference to their child's smoking increased the likelihood for current, experimental weekly or daily smoking (Tyas, S.L. & Pederson, L.L., 1998). Lack of knowledge about their children's friends and inadequate monitoring were associated with increased smoking in some studies and in other studies there was no significance association between parental supervision and children smoking (Tyas, S.L. & Pederson, L.L., 1998).

There have been many studies that support the association between parent child relationship **(**parent-teen relationship**)** and the risk behaviours of adolescents such as smoking (Fleming, C.B., Kim, H., Harachi, T.W., & Catalano, R.F., 2002; Resnick, M.D. et al., 1997; Wang, M.Q., Fitzhugh, E.C., Westerfield, R.C., & Eddy, J.M., 1995). Strong family ties and positive communications between adolescents and their parents were found to be protective in the sense that students were less likely to progress from experimentation to regular smoker (Distefan, J.M. et al., 1998)or to make any particular transition to a higher stage of smoking (Lloyd-Richardson, E.E. et al., 2002). A poor relationship between mother and child was associated with a higher prevalence of smoking for boys and girls where else a weak father child relationship showed significance only for smoking among girls (Oakley A, Brannen J, & Dodd K, 1992). Adolescents who perceive that both parents would react negatively and be disappointed if they smoke have a lesser likelihood to smoke (Sargent, J.D. & Dalton, M., 2001). A study that examined parent-child relationship factors and parent smoking to predict youth smoking, reported that youths from non-smoking parents and from parent who smoke are less likely to report ever smoking if they have high levels of connectedness to their parents (Tilson, E.C., McBride, C.M., Lipkus, I.M., & Catalano, R.F., 2004).

Another important area that is associated with adolescents smoking and family environment is the existence of household smoking rules or **home bans**. Banning smoking in the home, even when parents smoke gives out a message to teenagers about the unacceptability of smoking (Flay, B.R., Hu, F.B., & Richardson, J, 1993; Rainio, S.U. & Rimpela, A.H., 2007) and also reduce the influence of friends smoking (Szabo, E., White, V., & Hayman, J., 2006). When a complete ban on smoking exists in a household, there was a reduced risk for smoking experimenting and daily smoking (Rainio, S., 2009). Studies (Mathur, C., Stigler, M.H., Erickson, D.J., Perry, C.L., & Forster, J.L., 2014; Wakefield, M. & Chaloupka, F., 2000) on effects of restrictions on smoking added that transition of teenagers through stages of smoking was reduced by bans on anyone smoking at home and also by restrictions on home smoking. The study by Wakefield, 2000 also found that bans in public places and schools had less effect than home bans (Wakefield, M. & Chaloupka, F., 2000). Adolescents who live in a smoke-free house are less likely to be smokers compared to those living in homes with no restrictions (Farkas, A.J., Gilpin, E.A., White, M.M., & Pierce, J.P., 2000). Results from many studies strongly suggests that home bans on smoking are significantly associated with lower rates of adolescent smoking (Andersen, M.R., Leroux, B.G., Bricker, J.B., Rajan, K.B.,& Peterson A.V.,, 2004; Clark, P.I. et al., 2006; Farkas, A.J. et al., 2000; Rainio, S.U. & Rimpela, A.H., 2007) and a less effective parental smoking specific communication is significantly associated with growth in smoking (de Leeuw, R.N., Scholte, R.H., Sargent, J.D., Vermulst, A.A., & Engels, R.C., 2010).

2.4.2 Intrapersonal Influences

Based on previous research multiple individual factors were identified as possible risk and protective factors for smoking onset and progression. Personal characteristics that have been associated with adolescent smoking are levels of self-efficacy, self-

esteem, stress, life satisfaction, religiosity, sensation seeking behaviour and health knowledge.

2.4.2.1 Gender and Age

Gender is a non-modifiable intrapersonal variable that can influence adolescent tobacco use. Gender has been found to be a strong predictor of adverse transitions. The recent Surgeon General Report (2012) stated that there are differences in the smoking behaviour among boys and girls of developed countries and developing countries. In the developing countries, smoking tend to be more prevalent among the males compared to the females, however ,in developed countries, some show no differences and others show narrowing of the gender gap (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Some studies report that male adolescents are more likely to show progression of smoking stage (Blitstein, J.L. et al., 2003; Sun, W. et al., 2006) and more likely to be nicotine dependent (de Leeuw, R.N. et al., 2009). In contrast to this, there are also studies that reported girls were more likely to become smokers (Ariza-Cardenal, C. & Nebot-Adell, M., 2002; Hoving, C. et al., 2007; White, H.R., Pandina, R.J., & Chen, P.H., 2002) and cigarette use by this gender to increase more rapidly compared to their male counterpart (Gabrhelik, R. et al., 2012). Nevertheless,, there were studies that reported gender does not play a significant role in progression of smoking stage (Bernat, D.H. et al., 2008; Wang, M.Q. et al., 1999; White, H.R., Bray, B.C., Fleming, C.B., & Catalano, R.F., 2009).

Age of an individual is also viewed as a risk factor for smoking. **S**moking has been shown to decrease with age among adults (Yong Kang Cheah & Balkish Mahadir Naidu, 2012). In contrast, studies among adolescents have found probability of

becoming a smoker to increase with age (Mosavi-Jarrahi, A. et al., 2004; Ozawa, M., Washio, M., & Kiyohara, C., 2008).

2.4.2.2 Self-Efficacy

Self-efficacy as a derivate from social cognitive theory is said to be an important factor in modifying human behaviour. Bandura (1995) defined self-efficacy as the "belief in one's capabilities to organize and execute the course of action required to manage prospective situations." This factor can influence individual's self-confidence to resist risky behaviours such as smoking. It is important to measure self-efficacy in a way that is specific to the subject of interest. In this study that "subject" is smoking refusal skills or self-efficacy. This is one of the factors that differentiate self-efficacy from self-esteem where self-efficacy is used in the context of specific behavioural areas (Rush, M., 1993). Many studies have found self-efficacy to be predictive of adolescent smoking behaviour (Choi, W.S., Gilpin, E.A., Farkas, A.J., & Pierce, J.P., 2001; Flay, B.R. et al., 1994; Tucker, J.S., Ellickson, P.L., & Klein, D.J., 2003). Self-efficacy prompts the adoption, initiation and maintenance of health promoting behaviours (Schwarzer, R. & Luszczynska, A., 2005).Youth smokers who do not have self-efficacy to avoid smoking, believe smoking to be beneficial and have no intention to quit smoking (Sterling, K.L. et al., 2007). Current smoking status of adolescents, intention to smoke, attitudes towards smoking and social norms are all related to self-efficacy (Hanson, C., Downing, R.A., Coyle, K.K., & Pederson, L.L., 2004). Lawrance (1989) found adolescents who smoke and who do not smoke have significant different self-efficacy scores and that self-efficacy scores were a good predictor of future smoking behaviour (Lawrance, L., 1989). A study among adolescents in a peer tobacco use environment found self-efficacy to be a protective factor in relation to smoking and overall tobacco use (Rush, M., 1993). It may be possible that adolescent's smoking

refusal-self efficacy may be the reason why some adolescent under stress smoke where else others refrain from tobacco use (Rush, M., 1993).

2.4.2.3 Religiosity

In recent years, increasing attention has focused on the role of faith as a tool for influencing individual health risk behaviours. Religiosity can be defined as an organized set of beliefs and measurable practices within a community of people who accept an authoritative doctrine (Koenig, H.G., McCullogh, M.E., & Larson, D.B., 2001). Religiosity has been found to be protective against cigarette use among adolescents. Higher levels of religiosity have been associated with lower levels of cigarette use (Creel, D.B., 2007; Koenig, H.G. et al., 2001; Wallace, J.M. & Forman, T.A., 1998). There is also lower probability of progressing to established smoking from experimental smoking (Choi, W.S., Ahluwalia, J.S., Harris, K.J., & Okuyemi, K., 2002; Van Den Bree, M.B., Whitmer, M.D., & Pickworth, W.B., 2004) and higher chance cessation of smoking (Van Den Bree, M.B. et al., 2004) with higher levels of religiosity. There was also a linear and inverse association between frequency of smoking in the past 30 days and frequency of religious attendance and importance of religion (Wallace, J.M. & Forman, T.A., 1998). A large national study of smoking in the general population revealed that the likelihood of smoking decreased significantly as religious attendance increased. Frequent attenders of religious activities were approximately half as likely to smoke as infrequent attenders, and the association was present regardless of sex and race (Gillum, R.F., 2005). Religion was found to be the strongest reason among non-smokers for not smoking (Nyi, N.N. et al., 2004).

2.4.2.4 Self-esteem

Among other factors associated with higher risk of smoking among adolescents is self-esteem. **Self-esteem** is the personal sense of value or the extent of how much an individual appreciates oneself (Taylor, S.E., Peplau, L.A., & Sears, 2000). Numerous research has focused on the association of self-esteem and health related behaviours (Veselska, Z. et al., 2009). One study reported that Rosenberg's global measure of self-esteem to be significantly associated not only with adolescent smoking behaviour but also future intention to smoke (Murphy, N. & Price, C., 1983). This study separately analysed adolescents whose parents smoked and reported that a higher self-esteem can act as a buffer for influence from parents who smoke as the results showed adolescent non-smokers from this group had the highest self-esteem, followed by experimenters and lastly adolescent smokers had the lowest self-esteem scores (Murphy, N. & Price, C., 1983). Self-esteem has been shown to be associated with initiation and continuation of smoking (Alireza Ayatollahi, S., Mohammadpoorasl, A., & Rajaeifard, A., 2005; Engels, R.C., Hale III, W.W., Noom, M., & Vries, H., 2005; Glendinning, A. & Inglis, D., 1999). Both cross sectional and longitudinal studies have reported that decreased levels of self-esteem is related to higher levels of smoking (Byrne, D.G. & Mazanov, J., 2001; Carvajal, S.C., Wiatrek, D.E., Evans, R.I., Knee, C.R., & Nash, S.G., 2000). An Australian study revealed that all forms of self-concept decreased when smoking was initiated and increased upon smoking cessation. This study reported self-concept to be significantly associated with transition through stages of smoking to regular smoking (Thornton, W., Douglas, G.A., & Houghton, S.J., 1999).

2.4.2.5 Life Satisfaction

Life satisfaction has been defined as the degree to which an individual judges the overall quality of one's own life (Veehoven, R., 1991) or as a global evaluation by the

person of his or her own life (Pavot, W. & Diener, E., 1993). Adolescents with higher level of life satisfaction show less behavioural problems (Suldo, S.M. & Huebner, E.S., 2006). Higher life satisfaction used as measures of positive wellbeing was associated with being a non-smoker (Grant, N., Wardle, J., & Steptoe, A., 2009). Zullig et al, 2001 used four tobacco use behaviours which included first cigarette smoked before age 13, first cigarette smoked after age 13, cigarettes smoked during past 30 days and use of chewable tobacco during the past 30 days in his study on perceived life satisfaction. This study reported significant association between life dissatisfaction and all four tobacco use behaviours (Jeganathan, P.D., Hairi, N.N., Al Sadat, N., & Chinna, K., 2013).

2.4.2.6 Stress

A literature review of psychosocial factors associated with adolescent smoking reported **stress** to have a definite influence on smoking initiation and maintenance (Health Sponsorship Council., 2005). Stress is a transactional process between an individual and the external environment or stressor. Perceived stress is the experience or level of distress, perceived by the individual in relation to the stressor (Byrne, D.G. & Mazanov, J., 2001). Smoking is perceived as a way to increase concentration, overcome boredom, reduce stress and enhance positive mood (Wills, T.A. & Cleary, S.D., 1995). Smoking is found to be positively related to stress in cross sectional studies (Castro, F., Maddahian, E., Newcomb, MD.,& Bentler, PM.,, 1987) and prospective studies have reported stress measures to be predictive of smoking onset and progression (Sussman, S. & Dent, C.W., 2000).

2.4.2.7 Sensation Seeking

Adolescence is a risky period where physical, cognitive, emotional and social changes take place. It is a time where individuals become more independent and autonomous from parents (Byrnes, J., 2002). Adolescents are more likely to become involved in high risk behaviours than individuals in other stages of life (Arnett, J.J., 2000). Accordingly, teenage smokers have been reported to have a high sensation seeking behaviour and are more likely to be involved in risk taking behaviour (Hoyle, R.H., Stephenson, M.T., Palmgreen, P., Lorch, E.P., & Donohew, R.L., 2002; McGovern, J., Rodriquez, D., Tercyak, KP., Cuevas, J., Rodgers, K.,&Patterson, Freda.,, 2003).

Sensation seeking is a personality trait defined as seeking varied, novel, complex and intense sensations and experiences and the willingness to take the risks for achieving such experiences (Zuckerman, M., 1994). Studies have observed that non-smokers had lower sensation seeking level (Ristic, S., Uljarevic, M., & Nesic, M., 2008), and sensation seeking can be used to predict tobacco use (Burt, R.D. et al., 2000; Carton, S., Jouvent, R., & Widlocher, D., 1994; Murphy, N. & Price, C., 1983; Rush, M., 1993) and smoking transitions (Bricker, J.B. et al., 2009). Sensation seeking was positively associated with higher chance of having tried smoking, but not with, being current smoker or smoking susceptibility. This indicates that transition from non-smoker to trying smoking could be motivated by sensation seeking (Moran, M.B., 2009).

2.4.3 Environmental factors

2.4.3.1 Tobacco advertising

Tobacco advertising means any commercial communication whose main, secondary or incidental aim or effect is to promote a tobacco brand or to promote tobacco use. Indirect advertising includes the association of a tobacco product brand element with non-tobacco products, goods or services and the advertising or marketing of such good s or services. Indirect advertising is a deliberate strategy used by tobacco companies to circumvent bans on tobacco advertising. Numerous studies both cross sectional and prospective have shown that exposure to tobacco advertisement is positively associated with smoking initiation by adolescents (Difranza, J.R. et al., 2006; Goldberg, M.E., 2008). Tobacco companies spend more than thirteen billion (USD) each year on advertising and promotion materials, most of which are accessible to adolescents (U.S. Federal Trade Commision., 2007). Children and adolescents continue to be exposed to cigarette advertising in magazines (Lee, R.G., Taylor, V.A., & McGetrick, R., 2004) and in some developing country the exposure is without protection (Sebrie, E. & Glantz, S.A., 2006). Tobacco companies target youth by falsely linking tobacco use with qualities such as energy, glamour, beauty and youth and downplay the health concerns (Gilbert, J.B., Goldberg, C.J., Botvin, E.M., & Dusenbury, L., 1993; World Health Organization., 2008). Indirect advertising has grown rapidly in Malaysia since ban on tobacco advertising. There is little point in banning advertising that only relates to a tobacco product as the modern market revolves around brands (Hock, L.K. et al., 2013). A review of longitudinal studies supports that exposure to tobacco advertisement is associated with the likelihood of smoking initiations by adolescents (Lovato, C., Linn, G., Stead, L.F., & Best, A., 2008). The US Surgeon general identified seven ways in which tobacco advertising and promotion can increase consumption. Firstly, by

encouraging children or young adults to experiment with tobacco and thereby slip into regular use, by encouraging smokers to increase consumption, by reducing smokers motivation to quit, by encouraging former smokers to resume, by discouraging full and open discussion of the hazards of smoking as a result of media dependence on advertising revenues, by muting opposition to controls on tobacco as a result of the dependence of organizations receiving sponsorship from tobacco companies and finally by creating through the ambiguity of advertising, sponsorship, etc. an environment in which tobacco use is seen as familiar and acceptable and the warnings about health are undermined. A longitudinal study reported that receptivity to tobacco advertising and promotions is an important factor in progressing from experimentation to established smoking among adolescents. Adolescent perceived ability to quit made them more likely to progress (Choi, W.S. et al., 2002).

2.4.3.2 Tobacco in film industry

Apart from advertisements, films and movies can present positive images to youth on tobacco use. Exposure to smoking in movies creates the social context to shape normative beliefs about smoking, learned expectations and self-identification processes that has the ability to influence adolescents to smoke. It is important to take into consideration the impact of visual imagery of tobacco use that is glamorized, on adolescents. Adolescent smoking has been linked to on screen smoking status of their favourite movie stars. A majority of popular movie stars have been portrayed as using tobacco both on and off screen (Distefan, J.M., Gilpin, A., Sargent, J.D., & Pierce, J.P., 1999). A similar study found adolescents who choose movie stars who use tobacco on screen have a significant high chance of being in a more advanced smoking stage and have more favourable attitudes toward smoking compared to adolescents who choose non-smoking stars (Tickle, J.J., Sargent, J.D., Dalton, M.A., Beach, M.L., &

Heatherton, T.F., 2001). Another cross sectional study reported susceptibility to smoking increased with higher levels of exposure to tobacco use in movies. This study added that this type of exposure also significantly increased the number of positive expectations endorsed by adolescent and the perception that most adults smoke (Sargent, J.D. et al., 2002). An increased level of exposure to smoking in movies was associated with increased rates of smoking experimentation among school children aged nine to fifteen year old. The strength of association suggested that the influence from movies was as strong as the influences from having a parent or sibling who smoke (Sargent, J.D. et al., 2001). There are also internet sites that provide information on smoking in movies, sites that list out celebrities who smoke and sites with photos depicting various actresses smoking in real life (Ribisl, K., 2003).

2.4.3.3 Tobacco access

Adolescent tobacco accessibility is one of the important risk factor. Although there are laws prohibiting sales to adolescents, many are still able to acquire cigarettes through direct purchase due to lack of enforcement and low compliance from traders. Adolescents also have access to tobacco by means of stealing from parents or others who smoked and from their peers (Tyas, S.L. & Pederson, L.L., 1998). Studies done in the United States (Forster, J., Chen, V., Blaine, T., Perry, C., & Toomey, T., 2003) and in United Kingdom (Croghan, E., Aveyard, P., Griffin, C., & Cheng, K., 2003)found that most of the youths obtained a cigarette from another adolescent. Studies show that rates of adolescent smoking are low when communities' sales of cigarette to minors are lower (Dent, C. & Biglan, A., 2004). The Malaysian Global Youth Tobacco Survey (2009) revealed that around 53% of the current smokers buy cigarettes from the store and were not refused sales because of their age. A total of 5% of the adolescents in this survey have been offered free cigarettes from tobacco company representatives.

2.4.3.4 Tobacco Control Initiative

In order to tackle the tobacco epidemic, a wide range of measures is required. Evidence from nations that have witnessed a decline in smoking shows that a combination of the following is needed: mass media health education programmes; a ban on all forms of tobacco advertising and promotion; vivid health warnings on tobacco products; regular increases in tobacco taxation; restrictions on smoking in public places and the workplace and better consumer information and help for smokers who wish to quit. Tobacco Free Initiative (TFI) is conducted from headquarters in Geneva and the regional and national offices around the world. TFI is supported by a number of other international agencies such as United Nations Children's Fund (UNICEF), the World Bank, International Agency for Research on Cancer (IARC) and the United Nations (UN) Foundation (World Health Organization, 2002b).

The Malaysian government recognized the health hazards of smoking as early as the seventies and this concern was also shared by several non-governmental organizations. Prior to the Control of Tobacco Product Regulations (CTPR) 1993 made under the Food Act 1983 by the Health Ministry, there was no specific legislation for tobacco control (Clearinghouse for Tobacco Control., 2005). The initial efforts of tobacco control involved the gathering of basic evidence of smoking in the population through studies of specific populations in the early 1970's. "Smoking is dangerous to health" on cigarette packs and advertisement was made mandatory in 1977. Regulating of tobacco advertisements began in 1977 with prohibition of featuring people in the advertisements. Civil servants were prohibited from smoking at work in government offices and vehicles except in toilets and canteens and in the 1980s small increments in tobacco tax was implemented (Clearinghouse for Tobacco Control., 2005).

Circumvention of television ban by brand names on non-tobacco products such as clothes, travel and gold items were put in place in 1984.

Major advances were made during the 1990s. The Control of Tobacco Products Regulation 1993 (CTPR '93) was implemented in May 1994. CTPR '93 had more prohibitions of cigarette advertising (Clearinghouse for Tobacco Control., 2005). Subsequently, the CTPR '93 was amended in 1995 and again in 1997. As tobacco control measures improved, the provisions in CTPR '97 included a limited ban on tobacco advertisement, sponsorship, prohibition to distribute free sample of tobacco product, prohibition of sale to minors, prohibition on placement of vending machine, the designation of smoke-free areas and requirement for health warnings by the government (Foong, K. & Tan, Y.L., 2008).

A major success in Malaysian tobacco control was in 2003 when Malaysia signed the WHO FCTC (Clearinghouse for Tobacco Control., 2005). The CTPR 2004, which is quite comprehensive, was gazetted on 23 September, 2004. The legislation banned tobacco product advertisement from Formula 1 Grand Prix and other motor vehicle racing events held at Sepang International Circuit after 31 December, 2005 and football matches after 31 December, 2004. There were marked improvements in the CTPR 2004 which is part of the Food Act 1983. Among the notable improvements is the expansion of the list of places where smoking is banned in 1997. Smoking bans are extended to toilets, any area used for assembly (other than private places or residences,) petrol stations, any place used for religious purposes, and internet cafés (Foong, K. & Tan, Y.L., 2008).

The list of places where smoking is banned became quite comprehensive except the exclusion of pubs discotheques, night clubs or casinos "at any time when such places

are open to the public". In most restaurants that permit smoking, a rope barricade is used as the partition between the smoking and non-smoking sections. The proprietor of air-conditioned eating places is able to designate an area of not more than one-third of the total floor space for smoking and it has to have a partition and an "approved" mechanical ventilation system (Foong, K. & Tan, Y.L., 2008). CTPR 2004 was amended in 2008 and again in 2009. Currently, the Control of Tobacco Product Act, 2006 has been drafted after a series of consultation with various departments. It is currently at the final stages of confirmation before being implemented as a new Act.

Summary of chapter 2

This chapter provides evidence of the gaps found in previous literature especially local studies. To the best of our knowledge, this is the first study on adverse transition among adolescents in Malaysia. This chapter further provides information on smoking stages and factors that have been linked to smoking among adolescents.

CHAPTER 3: METHODOLOGY

Introduction of this chapter

This chapter outlines the research methods adopted in this study. The present study sought to identify factors associated with the different stages of smoking and factors associated with the adverse transition of smoking stages. This study explored the roles of socio-demographic characteristics, school, peer, parenting, individual characteristics and external environmental factors that may play a role in the progression of smoking stages among adolescents. This chapter is presented as two sections. In the first section, the development of the research instrument is detailed out. The second section outlines the actual research procedures, including study designs, location, data collection methods, data analysis and ethical considerations.

Section I: Development of Research Instrument

Smoking is a complex behavioural problem that consists of several progressive stages (Leventhal, H. & Cleary, P.D., 1980; Mayhew, K.P. et al., 2000). Our understanding of smoking stage transition among adolescents and the factors influencing the progression is limited (!!! INVALID CITATION !!!) as research related to tobacco has largely focused on identification of predictors of tobacco onset or smoking cessation. First, a systematic review was conducted to help identify factors influencing the transition of smoking stages. Subsequently a questionnaire was developed which was then used to collect data.

3.1 Research Instrument / Questionnaire

A questionnaire was developed to achieve two things: 1) to identify the different smoking stages among the participants; 2) to assist in identifying factors influencing the adverse transition of smoking stages. The questionnaire was developed using adopt and

adapt method based on literature review and other questionnaires. The questions were adapted from the Global Youth Tobacco Survey, Rosenberg Self-Esteem survey, Zuckerman Sensation Seeking Scale and various other tobacco related studies (Cohen, S. & Williamson, G., 1988; Hoyle, R.H. et al., 2002; Rosenberg, M., 1965; Sterling, K.L. et al., 2007).

3.2 Independent variables

In the questionnaire, the independent variables were grouped in six main domains (refer to Table 3.1): socio-demographic, peer, school, familial, individual and external influence. The demographic domain contained eleven questions. Six items gathered information on participants' name, which class, age, gender, race and religion. The remaining five items collected information regarding the participants' parents' occupation, education and marital status. The question on parents' occupation was an open-ended question and the answers were classified according to Malaysia Standard Classification of Occupations 2008, (MASCO-08).

The second domain was related to school factors, identified participants' school connectedness and how they adjust to the school work (school adjustment). Family and parenting factors were in the third domain. This domain consisted of subscale measuring family members smoking influences (parents smoking status, siblings smoking status and number of family members who smoke), parental monitoring, parents expectations, home ban on smoking, home discussions on smoking and frequency of parent-teen conflicts.

The fourth was the peer domain. This domain consisted of three subscales on best friend smoking, peer influence (number of friends smoking), and peer pressure. The fifth domain focused on the individual values and characteristics. This domain consisted

on measures on individual perception of smoking, knowledge of smoking hazards, smoking related self-efficacy, religiosity, life satisfaction, self-esteem, stress and sensation seeking. The sixth domain focused on external influence such as tobacco advertisement, exposure to anti-smoking campaigns and accessibility to cigarettes.

Table 3.1: Questionnaire's domains and subscales

Domains	Variables							
Socio-demographic	Locality	Ethnicity	Gender	Parents Marital Status	Father's education	Mother's education	Father's Occupation	Mother's occupation
School	Connectedness	Adjustment						
Peer	Best friends smoking	Peer influence	Peer pressure					
Familial	Parents smoking status	Siblings smoking status	Number of relatives who smoke	Parental monitoring	Frequency of parent-teen conflict	Parental expectations	Direct home ban on smoking	Home discussion on smoking hazards
Individual characteristics	Health knowledge	Smoking related Self-efficacy	Perception	Religiosity	Self-esteem	Life satisfaction	Stress	Sensation seeking
Environmental	Exposure to actor/actress smoking	Exposure to anti-smoking campaigns	Perceived accessibility to purchase cigarettes	Exposure to pictorial warnings				

3.3 Description of subscales and items in each subscale

Socio-demographic factors

The socio-demographic information gathered in this study includes participants' age, gender, ethnicity, religion, parents' occupation, education and marital status.

School factors and Peer Influences

The school (Bond, L. et al., 2007; Karcher, M.J. & Lee, Y., 2002; Rasmussen, M. et al., 2005; Weiner, I.B., Reynolds, W., & Miller, G., 2003) and peer factors (Simons-Morton, Chen, Abroms, & Haynie, 2004;(McLeod, K. et al., 2008; Simons-Morton, B., Chen, R.S., Abroms, L., & Haynie, D.L., 2004; Villanti, A., Boulay, M., & Juon, H.-S., 2011) were adapted from various resources and studies

3.3.1 School factors

This study looked into two school aspects, firstly the participants' connectedness to their respective school and how the participants were adjusting to school work. The connectedness scale comprised of six items. The items adapted from another study on school connectedness covered these aspects; being happy in school, sense of belonging in school, relationship with peers, relationship with teachers, participation in school activities and engagement in learning. Each item was measured on a four point Likert scale where a response of 1 indicated strong disagreement, while a response of 4 indicated strong agreement to the statement. In the final analysis, the total score was used and a higher total score reflected better connectedness.

Two items were used to measure the school adjustment. Participants' answered how they were handling their school work and if they found it difficult to finish their assignments on time compared to their peers. Response categories ranged from 1=more

difficult to complete task on time to 4= easier to complete task on time. In the final analysis, the total score was used and a higher score indicated better adjustment.

3.3.2 Peer Influence

Peer smoking status was ascertained by one item. Participants were asked regarding the number of their close friends who smoked cigarettes, the options were “none”, “less than half”, “more than half smoke” or “all”.

3.3.3 Best friends’ smoking status

For the purpose of identifying the influence of having a best friend who smoked cigarettes, one question asking the participants if their best friends smoked cigarette was included. Response to this question was a dichotomous answer “yes” or “no”.

3.3.4 Peer pressure

Peer pressure was identified based on response given by the respondents on two items. One question enquired if the participants ever felt pressure from any of their friends to smoke and response ranged from “1=no” to “4=always”. The second question asked if their friends encouraged them to smoke with a dichotomous answer “1=no” and ‘2=Yes”. A total score for both the items was calculated. Scores above the overall mean score was categorized as higher peer pressure.

Familial Influences

Items for family members smoking ("Global Youth Tobacco Survey (GYTS), 2009 - Malaysia," 2009), parental monitoring (Dick, D.M. et al., 2007; Pokhrel, P., Unger, J.B., Wagner, K.D., Ritt-Olson, A., & Sussman, S., 2008), parent teen conflicts (Fleming, C.B. et al., 2002; Pahl, K., Brook, D.W., Morojele, N.K., & Brook, J.S., 2010), parents expectations (Pokhrel, P. et al., 2008; Simons-Morton, B.G., 2004) and

home smoking rules (den Exter Blokland, E.A., Hale III, W.W., Meeus, W., & Engels, R.C., 2005; Fleming, C.B. et al., 2002; Harakeh, Z., Scholte, R.H., de Vries, H., & Engels, R.C., 2005; Szabo, E. et al., 2006) were either adapted or developed after reviewing various literatures.

3.3.5 Family members smoking

Three items were used to determine the participants' family members' smoking behaviour. Parents' smoking status was assessed by one item where the participants were asked if their parents smoked. The responses to this item were: none, both, father only, mother only, father quit smoking and mother quit smoking. Two other questions covered siblings' smoking status and number of family members who smoked cigarettes.

3.3.6 Parental monitoring

Parents' monitoring strategies were based on participants' response to three items. Two items asked regarding parents monitoring their activities and parents knowing their friends. The third item asked "My parents checks up to see whether I have done what they told me to do." Both this items had four responses: "4=yes", "3=sometimes only","2=not sure" and "1=no". In response to the third question, participants were asked to answer if parents "4=knew the identity of their friends", "3=knew only a few", "2=not sure" and "1=did not know their friends". A higher total score was indicative of better parental monitoring.

3.3.7 Frequency of parent-teen conflicts

The participants were asked how frequently they had problems with either one or both of their parents with the response ranging from "4= no problems", "3=sometimes", "2=often" and "1=always".

3.3.8 Parents expectation

Participants responded to their parents' expectation items focusing on how upset parents would be if they did poorly in a test, got into trouble at school and if they smoked cigarettes. The response ranged from "4=extremely disappointed "to "1=not disappointed" at all. A total score from the response was calculated for these items and higher scores were reflective of higher expectations.

3.3.9 Direct ban on smoking

House rules on smoking were measured using one item. Response to the statement "Your parents have told you that you are not allowed to smoke" was a "yes" or "no" response.

3.3.10 Home discussions about smoking

This was measured by one question asking if participants' parents had discussed with them the harmful health effects of smoking. The response to this question was dichotomous "yes" or "no".

Individual Characteristics

3.3.11 Health Beliefs

Participants' responded to three health belief related items such as "Do you think the smoke from other people's cigarettes is harmful to you?" Possible responses ranged from "definitely not (4)" to "definitely yes (1)". Higher score was indicative of better knowledge on smoking hazards.

3.3.12 Smoking refusal self-efficacy

Self-efficacy to avoid smoking was measured using four items that assessed the adolescents' ability to resist smoking tempting situations. Responses to statement such

as “If all my friends were smoking, I’d feel left out unless I smoked too” ranged from “1=strongly disagree” to “4=strongly agree”. Negatively worded items were reverse coded before analysis. High total scores reflected higher smoking refusal self-efficacy.

3.3.13 Perceived benefits of smoking

This subscale included five items which examined if the participants perceived that smoking makes it easier to mingle with friends, in general smokers have more friends, are more confident and either a smoker male or female friend looks more attractive or not. Scores above the mean score of these items were categorized as participants having higher perceived benefit of smoking.

3.3.14 Religiosity

Religiosity questions were adapted from Religiosity Personality Scale (RSC) that was developed in Malaysia and later validated for use across four different faiths: Muslims, Hindus, Buddhists and Christians (Krauss, S.E., Azimi Hamzah, & Fazila Idris, 2007). The five items adapted were from the ritual behaviour domain and the items were measured on a four point response ranging from strongly disagree to strongly agree. The higher is the total score, the higher is the level of religiosity.

3.3.15 Self-esteem

Self-esteem refers to individuals’ sense of value and how much one appreciates oneself (Taylor, S.E., Peplau, L.A., & Sears, 2000). Rosenberg’s self-esteem scale (RSES) has been validated in Bahasa Malaysia and used extensively in Malaysia (Shamshunnisah Abu Bakar & Hasanah Che Ismail, 2009). The RSES has 10 items with four point answers from strongly disagree, scored as 1 and strongly agree, scored as 4. Five items that were negatively worded were reversed scored. Again the higher is the total score the higher is the level of self-esteem.

3.3.16 Life Satisfaction

Students' Life satisfaction scale (SLSS) is a seven item self-report measure (Huebner, E.S., 1991). Positive and negative affect items were included in this scale. For the purpose of this study, questions from this scale was adapted and a response format comprising of a four point scale, with 1= strongly disagree, 2= disagree, 3= agree and 4= strongly agree was used. Negatively worded items were reversed scored. The higher is the total score,-the higher is the level of life satisfaction.

3.3.17 Stress

Questions to assess stress were adapted from the perceived stress scale (Cohen, S., Kessler, R., & Underwood Gordon, L., 1994). Five items were used to solicit how often the participants' felt stress related conditions in the last one month prior to the survey. The possible responses ranged from 1(never) to 4 (always). The higher is the total score, the higher is the level of stress.

3.3.18 Sensation seeking

Sensation seeking was assessed with Brief Sensation Seeking Scale (BSSS). The BSSS is an eight item version that was adapted from the Zuckerman Sensation Scale. Study done by Hoyle et al., 2002 reported that the BSSS can be used as an indicator for sensation seeking regardless of sex, age grade and ethnicity. BSSS has four domains with two items each. The domains covered were "experience seeking", "boredom susceptibility", "thrill and adventure seeking" and "disinhibition". In this study a 4 point response was used and labelled strongly disagree to strongly agree.

External Influences

3.3.19 Film smoking exposure

A single item was used to determine the level participants' exposure to smoking imagery in movies. Participants were given four options ranging from "never" to "always".

3.3.20 Exposure to anti-smoking campaigns

Exposure to anti-smoking campaigns, messages or advertisement via media such as television, radio, internet, newspaper or on school bus was assessed by one question. Participants' answer options were "never", "seldom", "sometimes" and "always".

3.3.21 Perceived accessibility

Perceived easy access to cigarettes was assessed with answers to one question: "Is it easy to get cigarettes?" Responses ranged from "very easy" to "very difficult"

3.3.22 Pictorial warnings

Participants were also asked if they have seen the pictorial warnings on the cigarette boxes. Answer to the question was dichotomous "yes" or "no".

3.4 Translation of questionnaire

The questionnaire was first developed in English and subsequently, a back-to-back translation to Bahasa Malaysia and Mandarin was carried out. The forward translation from English to Bahasa Malaysia was done by an editor and the back translation from Bahasa Malaysia to English was conducted by a secondary school language teacher. The forward and back translation for Mandarin was carried out by another two independent Mandarin language graduate teachers.

3.5 Validity and Reliability of the questionnaire

Validity is defined as the degree to which all accumulated evidence supports the intended interpretation of test scores for the proposed purpose. In this study, only content validity and face validity were tested. This was done by an expert panel and core elements for the instrument were identified. The panel included two individuals: a public health researcher with experience in tobacco research and a psychologist. The two panel members deliberated if the questionnaire was suitable to measure all that it was intended to measure and if it was appropriate for the participants involved in this study.

Reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produce the same results on repeated trials. Reliability indicates the accuracy or precision of the measuring instrument. A test retest was conducted among forty participants, with age ranging from twelve to fourteen years from a school that was not included in the primary sampling list. The retest was conducted three weeks after the first. Intra class correlation using reliability analysis procedures in SPSS was used. Kappa coefficients were used to measure agreement for all categorical measurements.

3.6 Outcome measures

The main focus of this study is adverse transition of smoking stages. By comparing smoking stages at baseline and after one year the adverse transition that had taken place within the one year was determined.

3.6.1 Smoking stages

A new variable, with five levels of responses was created based on previous studies on tobacco (Harrell, J.S., Bangdiwala, S.I., Deng, S., Webb, J.P., & Bradley, C., 1998;

Lloyd-Richardson, E.E. et al., 2002; Valente, T.W., Unger, J.B., Ritt-Olson, A., Cen, S.Y., & Johnson, C.A., 2006) to operationalize the smoking stages (Figure 3.1). Smoking status was assessed through participants' response to one item asking, "Have you ever smoked a cigarette, even one or two puffs?" Participants who responded "Yes" were classified as 'ever smokers' and those who answered "No" as 'non-smokers' ("The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008). Non-smokers were further divided into as either never smokers or susceptible never smokers (Kaufmann, N.J. et al., 2002; Michell, L. & West, P., 1996). The ever smokers were further classified as experimenters, current smokers or ex-smokers. As the participants of this study were only twelve to thirteen year olds, the number of cigarettes smoked was not used to define any of the stages. Similar system was used to group the students' smoking status-after one year (Time 2).

The data from Time 2 were merged with baseline data matched for name of student, participants' fathers' names, class and gender. The focus of this study was on adverse transition which is defined as transition from one smoking stage at Time 1 (the baseline) to a more adverse stage in Time 2 (12 months later) (Kim, H. & Clark, P.I., 2006). Further explanation on adverse transitions is given in section 3.4.2

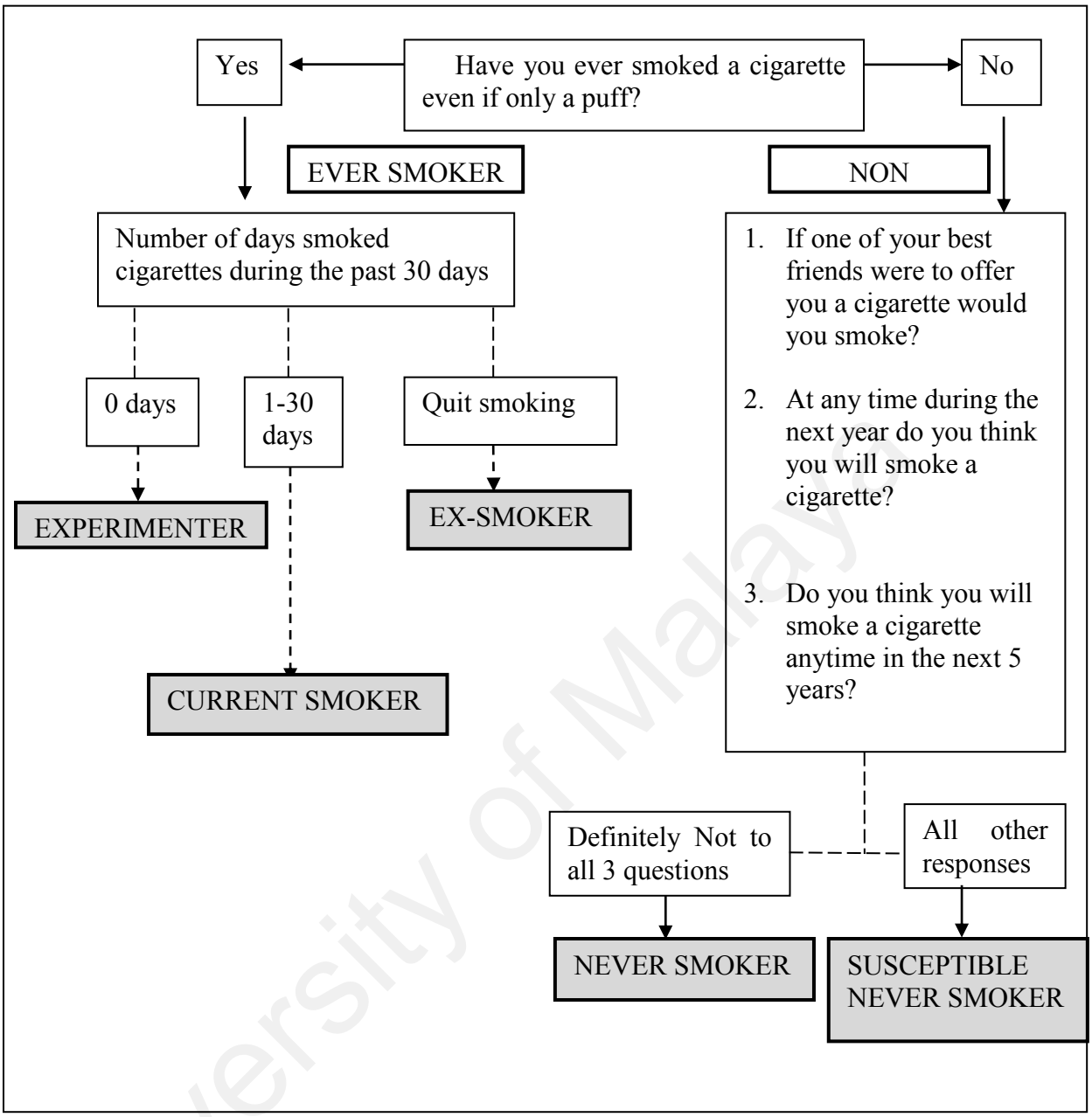

Figure 3.1: Classification of smoking stages

Illustration above is was constructed after reviewing previous studies on tobacco (Harrell, J.S. et al., 1998; Kaufmann, N.J. et al., 2002; Lloyd-Richardson, E.E. et al., 2002; Michell, L. & West, P., 1996; Valente, T.W. et al., 2006) ("Global Youth Tobacco Survey (GYTS), 2009 - Malaysia," 2009; "The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008)

3.6.2 Adverse transition

Different kinds of smoking transition might have occurred during the twelve-month period. The focus of this study is on adverse transition: a transition from one smoking stage at baseline to a more adverse stage at the end of one year in Time 2 (Kim, H. & Clark, P.I., 2006). The adverse transitions were grouped into four levels as shown in

Table 3.2. Adverse Transition I is said to have taken place when a never smoker progressed to become either a susceptible never smoker, experimenter, current smoker or ex-smoker. Adverse Transition II was the progression among the susceptible never smokers to become experimenters, current smokers or ex-smokers. Adverse Transition III was progression of experimenter to current smoker. Adverse Transition IV is said to have taken place when an ex-smoker went back to current smoking.

Table 3.2: Description of adverse transition

Smoking stages at Baseline	Smoking stages at Time2				
	Never smoker	**Susceptible never smoker**	**Experimenter**	**Current smoker**	**Ex- smoker**
Never smoker		←	←	ADVERSE TRANSITION I	→
Susceptible never smoker			←	ADVERSE TRANSITION II	→
Experimenters				← ADVERSE TRANSITION III	→
Ex-smoker				← ADVERSE TRANSITION IV	→

Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Section II: Actual Research

3.7 Study design

The main focus of this study is to describe the adverse transition of smoking stages and to explore the factors associated with the adverse transition. Additionally, this study also examined the prevalence of different stages of smoking and the factors associated with the different stages. This study was conducted using a prospective longitudinal study design. This design allowed the study to capture initial stages of smoking and the changes in the stages after twelve months.

3.8 Study area and study duration

3.8.1 Study Area

Malaysia is a country in Southeast Asia and it is divided into Peninsular Malaysia, Sabah and Sarawak. There are eleven states in Peninsular Malaysia of which Perak is the second largest state. The secondary schools in Malaysia are either national government funded schools or private schools. The government funded schools can be co-educational schools or single sex schools; vocational schools; boarding schools; religious-based schools or special education schools.

This study was conducted in Kinta, in the state of Perak. This state also known as Perak Darul Ridzuan, is the second largest state in Peninsular Malaysia, with an area of 21,000 square km. The population in Perak during the most recent census done in the year 2010 was 2,299,582. The ethnicity distribution in Perak was 52.73% Malays, 29.38% Chinese and 11.94% Indians. The remaining were 2.95% foreigners and 2.99% were of other races. Perak state education department grouped according to ten administrative districts: Batang Padang; Manjung; North Kinta; South Kinta (includes

Kampar); Kerian; Kuala Kangsar; Hilir Perak; Perak Tengah; Larut, Matang and Selama; and Hulu Perak.

Kinta, one of the ten districts in Perak, was famous for its tin during the 18th century. This district encompasses an area of 1,958 km² with a total population of 749,474. Eighteen percent of the population in Kinta is between the ages of ten to nineteen years old. Kinta has several types of secondary school namely national secondary schools, national type secondary schools, residential schools, technical / vocational schools, cluster schools, international schools, religious schools and lastly private schools.

Figure 3.2: Districts of Perak

3.8.2 Study duration

The data collection was done twice. The baseline data was collected from 1st till the 28th of February 2010 and the follow-up phase from 15th of January till 15th of February, 2011.

3.9 Reference Population

The reference populations in this study are adolescents aged twelve to thirteen years old.

3.10 Source Population

The source populations are adolescents aged twelve to thirteen years old in Kinta, Perak.

3.11 Sampling Frame

The sampling frame for this study was a list of all secondary schools located in Kinta, Perak.

3.12 Study participants

This study only included all Form One students, aged twelve to thirteen years old. Mean initiation age of experimental smoking was reported in NHMS III, 2006 as 12.9 years ("The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008). At the second stage of data collection, after one year, these students had moved to Form Two.

3.12.1 Inclusion criteria

For the purpose of this study only Form One student from government funded co-educational schools were included.

3.12.2 Exclusion criteria

Boarding schools, vocational schools and all religious-based schools were excluded.

3.13 Sample size determination

The sample size was calculated using PS software version 2.1.31. The sample size takes into account ∝ (type one error, rejecting a true null hypothesis), ß (type II error, not rejecting a false hypothesis) and the size effect. The confidence level (1-∝) will be set at 95%, this means that the significant level (probability of making type I error,∝) is set at 5%. The power (1-ß) of the study which is the probability of rejecting a false null hypothesis is set at 80%. A study on psychosocial predictors of progression in smoking stage found that out of 973 students, girls who were categorized as never smokers at Time 1, 2.5% became current smokers at Time 2 (6-7 months later) (Simons-Morton, B.G. & Haynie, D.L., 2003).

So for this study:

Po (proportion of transition from never smokers to current smoker among female students)	= 0.025
P1 (estimated proportion of transition from never smokers to current smokers among male)	= 0.05
(n)	= 906
Sample size needed will be (906 x 2)	= 1812
Final total sample needed after taking in account response rate of 80% [1812+ (1812x20%)]	= 2174
	≈ 2200

3.14 Sampling Procedure

A total of 46 schools met the inclusion and exclusion criteria. After applying the inclusion and exclusion criteria there were a total of 46 schools. Two stage sampling

method was used in the sampling. First, the schools were stratified as urban school and rural schools according to Ministry of Educations' criteria. In the second stage, schools were randomly selected within the urban and rural locations: eight urban schools and seven rural schools. All Form One students in the selected schools were invited to participate in this study.

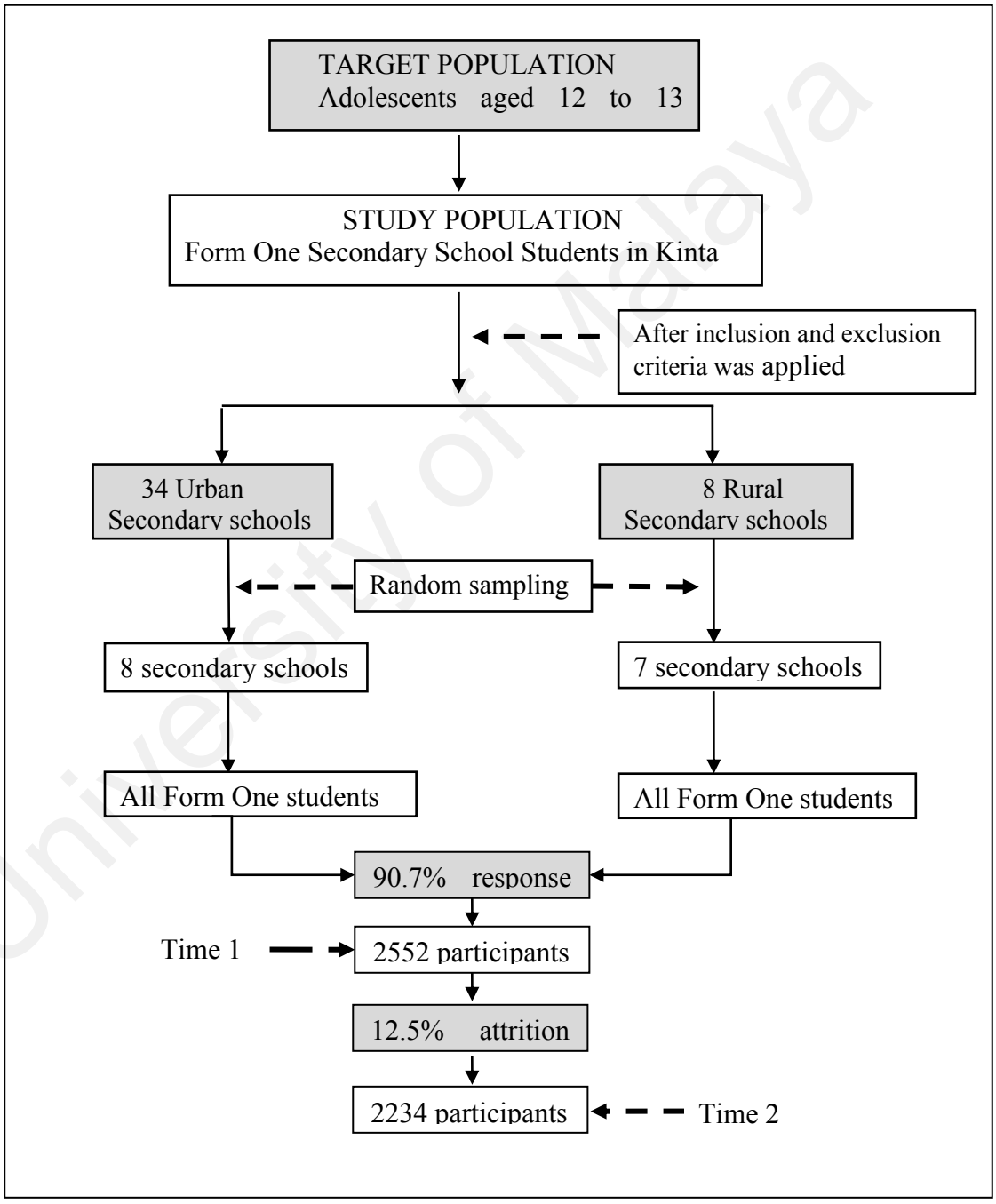

Figure 3.3: Flowchart showing the sampling process

3.15 Study Variables

3.15.1 Dependent variables

The dependent variable in this study was smoking transition that had four levels: Adverse Transition I, Adverse Transition II, Adverse Transition III, and Adverse Transition IV. The method of classification has been discussed in section 3.4.2

3.15.2 Independent variables

The objective of this study was to identify factors influencing the adverse transition of smoking stages. The independent variables were grouped into to six domains which encompassed socio-demographic details, school factors, peer factors, family and parenting factors, individual characteristics and external environmental factors. A total of 33 independent variables were studied. This list includes:

Socio-demographic variables:

1. Gender
2. Area of school
3. Ethnicity
4. Parents' marital status
5. Fathers' education level
6. Mothers' education level
7. Fathers' occupation
8. Mothers' occupation

School factors

9. School connectedness
10. School adjustment

Peer factors

11. Best friend smoking status
12. Number of close friends who smoke
13. Peer pressure

Family factors

14. Parents smoking status
15. Sibling smoking status
16. Number of relatives smoking
17. Parental monitoring
18. Parental expectations
19. Parent-teen conflicts
20. Direct ban on smoking
21. Home discussions on smoking hazards

Individual factors

22. Health knowledge of risk of smoking
23. Smoking related self-efficacy
24. Perceived benefits of smoking
25. Religiosity
26. Self-esteem
27. Life satisfaction
28. Stress
29. Sensation seeking

External Environmental factors

30. Exposure to smoking imagery
31. Exposure to anti-smoking campaigns
32. Perceived accessibility

33. Pictorial warnings

The details of each variable mentioned above can be found in Section I of this chapter.

3.16 Data collection

Prior to data collection heads of all the fifteen schools were met. The headmasters or headmistresses were given briefed regarding the research. An official letter requesting permission to conduct the research attached with a copy of permission letter obtained from the Malaysian Ministry of Education and Perak Educational Department was submitted to all the heads of schools. All school heads consented to this study. They also understood that data collection will out carried out twice. After explanation of the research, dates were set for data collection.

Self-administered questionnaires were given to participants to be filled within the school premises. Prior to distribution of questionnaire the participants were given an explanation regarding the research. Assurance was given that all responses will be treated confidentially and only used for the study. It was also stressed that there were no right or wrong answers but merely answers that applied to the participants. During the data collection, only the researcher and trained assistants were present. No discussions were allowed but participants could ask for help from the researcher and the assistants if they had any enquiries. Participants on the average took about 40 to 60 minutes to complete the questionnaire.

3.17 Data analyses

Statistical Package for Social Science (SPSS) software version 15.0 was used to enter and analyse the data. Data were cleaned prior to beginning of the analyses. The procedures in complex samples add-on module in SPSS were used in the analyses after

adding appropriate student and school weights that were adjusted for non-response. Descriptive and inferential analyses were carried out. For the inferential analysis the weighted means for all continuous variables and weighted percentages for all categorical variables were obtained together with the 95% confident intervals.

Multinomial logistic regression analyses were used because the outcome variables for the main objective were four groups of adverse transitions. Similar analyses were carried out when analysing for factors associated with the five different stages of smoking. Stable never smokers group was used as the reference group for the analyses on adverse transition. The association of each independent variable with the adverse transitions was tested first. All variables with *p* value less than 0.25 in univariate analyses were included in the building of multivariable model during multinomial analyses. Independent variables were removed manually starting with the variable with highest non-significant *p* value. Strength of association between the selected variable and the smoking stages was assessed using adjusted odds ratio and 95% confidence interval.

3.18 Ethical considerations

Ethical approval was first obtained from University Malaya Medical Centre Ethics Committee (Ref. No.:824.6). Approvals from Malaysian Ministry of Education and the state education department of Perak were obtained. Copies of consent letters from the university, education ministry and state educational department were submitted to the school heads and permission was granted to proceed with the study. Explanations regarding the aims of this study were clearly given to everyone who was involved. Informed consent (verbal) was obtained from all participants. The participants were told

that participating in the study was voluntary and they were allowed to withdraw at any time.

Summary of chapter 3

This chapter provides detail information regarding the development of the questionnaire used as a tool to collect data in Section I. The methodology used for this study is discussed in Section II of this chapter. Section II further describes how the collected data were managed and analysed. The results from data analyses are discussed in chapter 4.

CHAPTER 4: RESULTS

Introduction of this chapter

This chapter is divided into two sections. Section I describes the results of the questionnaire validation. Section II is divided to IIa and IIb. Section IIa describes the prevalence and initial smoking stages among the Form One students of Kinta, Perak. It presents the results on the factors influencing the baseline smoking stages of the participants. Section IIb describes the adverse transition of smoking stages that took place after twelve months and factors determining the adverse transition of each smoking stage.

Section I

4.1 Reliability

Table 4.1 displays the number of items and kappa correlation or internal consistency of each subscale in the questionnaire. The finalized questionnaire consisted of 19 subscales and a total of 87 items. Kappa correlation for the categorical items ranged from 0.50 to 0.93. Coefficient alpha reliabilities, calculated for this sample showed an acceptable ranged from 0.75 to 0.93. Self-efficacy and sensation seeking subscale had the highest reliability scores.

Table 4.1 Subscales with Kappa Correlation, Internal Consistency and Number of Items

NO	SUBSCALES	NO OF ITEMS	KAPPA CORRELATION	CRONBACH'S α
1.	School Connectedness	6		0.86
2.	School Adjustment	2		0.84
3.	Peer Influence	1	0.65	
4.	Best-friend smoking	1	0.80	
5.	Peer Pressure	2	0.70 - 0.80	
6.	Family Influence	3	0.68 - 0.92	
7.	Parental Monitoring	3		0.75
8.	Parent -teen Conflict	1	0.78	
9.	Parental Expectations	3		0.89
10.	Home Ban	1	0.93	
11.	Home Discussion	1	0.81	
12.	Health Knowledge	3	0.50 - 0.85	
13.	Self-efficacy	4		0.93
14.	Perception	5	0.60 - 0.82	
15.	Religiosity	5	0.54 - 0.77	
16.	Self Esteem	10		0.80
17.	Life Satisfaction	7		0.85
18.	Stress	5		0.82
19.	Sensation Seeking	8		0.93

Section IIa

4.2 Socio-demographic characteristics of participants

Table 4.2 displays the socio-demographic characteristics of the participant in this study. In the sample, 48.3% were Malays, 33.5% were Chinese and 15.6% were Indians. This sample proportion is comparable to the general adolescent population in Perak.

In the sample, majority of the students' parents were married with only 9% were from single parents. Majority of the parents had at least secondary level education with a small percentage (10.0% among the fathers and 9.3% among the mothers) had tertiary level education. Less than 20% of the students' fathers or mothers had primary no formal education.

A small percentage (11.1%) of the respondents did not know their mothers' occupational status while 17.5% did not know their fathers 'occupation. Less than 10% of the participants had parents who held managerial or other professional jobs. Close to 1.5% of the fathers were unemployed and 57.4% of the mothers were housewives.

Table 4.2: Socio-demographic characteristics of participants in the study

Demographic factors	n	(%)
Gender		
Female	1150	(45.1)
Male	1401	(54.9)
Area of School		
Urban	1297	(50.8)
Rural	1255	(49.2)
Race		
Malay	1233	(48.3)
Chinese	854	(33.5)
Indians	397	(15.5)
Others	68	(2.7)
Parents' Marital Status		
Married	2308	(90.4)
Single parents	230	(9.0)
Father's education level		
Primary & No formal education	487	(19.1)
Secondary level	1188	(46.6)
Tertiary level	254	(10.0)
Do not know	618	(24.2)
Mother's education level		
Primary & No formal education	473	(18.5)
Secondary level	1271	(49.8)
Tertiary level	238	(9.3)
Do not know	570	(22.3)
Father's occupation		
Manager & Professionals	230	(9.0)
Other Professions	1831	(71.7)
Unemployed	33	(1.3)
Do not know	447	(17.5)
Mother's occupation		
Manager & Professionals	196	(7.7)
Other Professions	606	(23.7)
Housewives	1466	(57.4)
Do not know	284	(11.1)

*missing values vary for each variable

4.3 Initial smoking stages

The baseline smoking stages of the participants are provided in table 4.3. Out of the 2552 participants, 409(16.1%) were ever smokers; 168(6.6%) were experimenters, 158(6.2%) were current smokers and 83(3.3%) wee ex-smokers A substantial percentage of the participants were susceptible never smokers (18.6%)

Table 4.3: Baseline smoking stages of participants from secondary schools of Kinta, Perak (2011)

Smoking Stages	n=2552	%
Non-smokers (n=2143)		
Never smokers	1669	65.4
Susceptible never smokers	474	18.6
Ever smokers (n=409)		
Experimenters	168	6.6
Current smokers	158	6.2
Ex-smokers	83	3.2

Table 4.4 displays the socio-demographic characteristics of the participants according to the smoking stages. Among the females 81.1% were never smokers while only 52.5% among the males were never smokers. Among the males, 23.1% were susceptible never smokers and 9.8% were current smokers. Among the females, 13.1% were susceptible never smokers and only 1.8% were current smokers. In the sample, 1.8% of the females and 9.8% of the males were smoking currently.

Among the Malays, 23.1% were ever smokers whereas only around 10% of the Indians and Chinese were ever smokers. In the sample, among the Malay, Chinese and Indian participants, 8.3%, 4.0% and 3.0%, respectively, were smoking currently.

Among those from single parent families, 9.1% were current smokers and 7.4% were experimenters and among those from married parent families, 5.8% were current smokers and 6.5% were experimenters.

Table 4.4: Socio-demographic characteristics at baseline by smoking stages.

Demographic factors	Smoking status				
	Never smoker n (%)	Susceptible Never smoker n (%)	Experimenter n (%)	Current Smoker n (%)	Ex-smoker n (%)
Gender					
Female	933 (81.1)	151 (13.1)	32 (2.8)	21(1.8)	13 (1.1)
Male	735 (52.5)	323 (23.1)	136 (9.7)	137(9.8)	70 (5.0)
Area of School					
Urban	861 (66.4)	261 (20.1)	73 (5.6)	65 (5.0)	37 (2.9)
Rural	808 (64.4)	213 (17.0)	95 (7.6)	93 (7.4)	46 (3.7)
Race					
Malay	720 (58.4)	229 (18.6)	122 (9.9)	102 (8.3)	60 (4.9)
Chinese	615 (72.0)	168 (19.7)	25 (2.9)	34 (4.0)	12 (1.4)
Indians	295 (80.4)	61 (8.4)	20 (5.4)	12 (3.3)	9 (2.5)
Others	39 (57.4)	16 (23.5)	1 (1.5)	10(14.7)	2 (2.9)
Parents' Marital Status					
Married	1518(65.8)	432 (18.7)	149 (6.5)	135(5.8)	74 (3.2)
Single parents	144 (62.6)	40 (17.4)	17 (7.4)	21(9.1)	8 (3.5)
Father's education level					
Primary & No formal education	317 (65.1)	109 (22.4)	23 (4.7)	25(5.1)	13 (2.7)
Secondary level	805 (67.8)	201 (16.9)	72 (6.1)	72 (6.1)	38 (3.2)
Tertiary level	170 (66.9)	38 (15.0)	17 (5.7)	14 (5.5)	15 (5.9)
Do not know	375 (60.7)	123 (19.9)	56 (9.1)	47 (7.6)	17 (2.8

Total n for each variable varies due to missing values
Row percentages are presented

Table for 4.4 continued

Demographic factors	Smoking status				
	Never smoker n (%)	Susceptible Never smoker n (%)	Experimenter n (%)	Current Smoker n (%)	Ex-smoker n (%)
Mother's education level					
Primary & No formal education	293 (61.9)	122 (25.8)	26 (5.5)	25 (5.3)	7 (1.5)
Secondary level	883 (69.5)	192 (15.1)	80 (6.3)	67 (5.3)	49 (3.9)
Tertiary level	158 (66.4)	39 (16.4)	14 (5.9)	17 (7.1)	10 (4.2)
Do not know	335 (58.8)	121 (21.2)	48 (8.4)	49 (8.6)	17 (3.0)
Father'soccupation					
Manager & Professionals	165 (71.7)	32 (13.9)	10 (4.3)	15 (6.5)	8 (3.5)
Other Professions	1224(66.8)	337 (18.4)	113 (6.2)	100 (5.5)	57 (3.1)
Unemployed	17 (51.5)	11 (33.3)	2 (6.1)	2 (6.1)	1 (3.0)
Do not know	258 (57.7)	90 (20.1)	42 (9.4)	41 (9.2)	16 (3.6)
Mother's occupation					
Manager & Professionals	144 (73.5)	30 (15.3)	11 (5.6)	8 (4.1)	3 (1.5)
Other Professions	374 (61.7)	130 (21.5)	35 (5.8)	47 (7.8)	20 (3.3)
Housewives	977 (66.6)	269 (18.3)	95 (6.5)	76 (5.2)	49 (3.3)
Do not know	174 (61.3)	45 (15.8)	27 (9.5)	27 (9.5)	11 (3.9)

Total n for each variable varies due to missing values
Row percentages are presented

The results from complex sample analyses are provided in tables 4.5, 4.6 and 4.7. Table 4.5 displays the comparison between peer and school factors with the smoking stages. Current smokers had the lowest school connectedness mean scores (17.45, 95% CI: 16.84, 18.05). Ex-smokers had the lowest school adjustment mean scores (4.99, 95% CI: 4.71, 5.28).

The majority of the participants in the ever smokers group had best friends who smoke; 67.5% among the current smokers, 63.8% among the ex-smokers and 56.2% among the experimenters. Only 10.2% of the never smokers had best friends who smoke. Notably, 31.7% of the susceptible never smokers had best friends who smoke.

When comparing the number of close friends who smoke, in the non-smoker group, 6.4% of the susceptible never smokers and 1.6% of the never smokers reported that more than half of their close friends smoke. In the ever smokers group, 9.2% of the experimenters, 12.9% of the ex-smokers and 24.6% of the current smokers agreed that more than half of their close friends smoke.

Peer pressure to smoke was high among the current smokers (66.8%). Among the susceptible never smokers 22% reported facing high peer pressure to smoke. Even some of the never smokers (7.1%) reported facing similar pressure.

Table 4.5: Peer and school factors by baseline smoking stages

Domains	Smoking stages				
	Non-smokers		Ever smokers		
	Never smokers	Susceptible Never smokers	Experimenters	Current Smokers	Ex-smokers
School connectedness	19.00 (18.84,19.16)[a]	17.93 (17.66, 18.21)[a]	17.76 (17.21, 18.31)[a]	17.45 (16.84, 18.05)[a]	18.75 (18.15, 19.36)[a]
School adjustment	5.71 (5.64, 5.78)[a]	5.20 (5.06, 5.33)[a]	5.21 (4.99, 5.44)[a]	5.21 (4.96, 5.47)[a]	4.99 (4.71, 5.28)[a]
Best friend smoking status					
No	89.8 (88.0, 91.3)[b]	68.3 (63.4, 72.9)[b]	43.8 (35.4, 52.6)[b]	32.5 (24.5, 41.7)[b]	36.2 (25.3, 48.7)[b]
Yes	10.2 (8.7, 12.0)[b]	31.7 (27.1, 36.6)[b]	56.2 (47.4, 64.6)[b]	67.5 (58.3, 75.5)[b]	63.8 (51.3, 74.7)[b]
Number of close friends who smoke					
None	83.9 (81.8, 85.8)[b]	58.7 (53.7, 63.6)[b]	31.2 (23.7, 39.8)[b b]	17.4 (11.5, 25.6)[b]	26.1 (16.7, 38.3)[b]
Less than half smoke	14.5 (12.7, 16.5)[b]	34.9 (30.3, 39.8)[b]	59.7 (50.9, 67.9)[b]	58.0 (48.9, 66.6)[b]	61.0 (48.7, 72.1)[b]
More than half or all smoke	1.6 (1.1, 2.4)[b]	6.4 (4.4, 9.3)[b]	9.2 (5.3, 15.3)[b]	24.6 (17.7, 33.1)[b]	12.9 (7.1, 22.1)[b]
Peer pressure					
Low Peer Pressure	92.9 (91.3, 94.1)[b]	78.0 (73.6, 81.8)[b]	50.7 (42.0, 59.3)[b]	33.2 (25.1, 42.5)[b]	56.8 (44.5, 68.2)[b]
High Peer Pressure	7.1 (5.9, 8.7)[b]	22.0 (18.2, 26.4)[b]	49.3 (40.7, 58.0)[b]	66.8 (57.5, 74.9)[b]	43.2 (31.8, 55.5)[b]

[a] weighted mean score (95% Confidence Interval)
[b] weighted percentage (95% Confidence Interval)

Table 4.6 displays the comparison between family factors with the different stages. More than 65% of the current smokers and more than 60% of the ex-smokers had at least one parent who smokes cigarettes. Among the ex-smokers, 6% reported having parents who were also ex-smokers.

Only 11% of the never smokers had siblings who smoke cigarettes. Among the experimenter, 32.1% had siblings who smoke cigarettes. Among the current smokers, 43.6% had siblings who also smoke cigarettes.

Compared to never smokers, all the stages excluding the ex-smokers had significantly lower parental monitoring mean scores. Current smokers' parental monitoring mean score was 8.85, which was the lowest among all the stages. Similarly, parental expectation mean scores for all stages excluding ex-smokers were also significantly lower when compared to never smokers.

Participants who reported that they have been told by their parents that there are not allowed to smoke was grouped as having a direct ban on smoking. Among the ex-smokers, 82.5% had a direct ban on smoking and 71.9% reported that they had discussions at home regarding the negative effects of cigarette smoking.

Table 4.6: Family factors by smoking stages at baseline

Domains	Smoking stages				
	Non-smokers	Ever smokers			
	Never smokers	Susceptible Never smokers	Experimenters	Current Smokers	Ex-smokers
Parents smoking status					
Neither parents smoke	47.9 (45.2, 50.7)[b]	41.6 (36.7, 46.7)[b]	38.4 (30.3, 47.1)[b]	26.2 (19.1, 34.8)[b]	32.8 (22.4, 45.2)[b]
At least one parent smoke	44.3 (41.6, 47.0)[b]	49.9 (44.9, 55.0)[b]	54.6 (45.9, 63.0)[b]	66.6 (57.7, 74.5)[b]	61.2 (48.7, 72.4)[b]
Ex-smoker	7.8 (6.4, 9.4)[b]	8.5 (6.0, 11.8)[b]	7.0 (3.7, 13.0)[b]	7.2 (3.6, 13.8)[b]	6.0 (2.2, 15.3)[b]
Siblings smoking status					
No, siblings/none of the siblings smoke	86.2 (84.2, 87.9)[b]	76.1 (71.5, 80.1)[b]	61.2 (52.5, 69.2)[b]	42.9 (34.2, 52.1)[b]	70.5 (58.3, 80.4)[b]
Yes, siblings smoke	11.0 (9.4, 12.8)[b]	16.4 (13.0, 20.4)[b]	32.1 (24.6, 40.7)[b]	43.6 (34.9, 52.7)[b]	24.4 (15.5, 36.2)[b]
Do not know	2.8 (2.1, 3.9)[b]	7.5 (5.2, 10.7)[b]	6.7 (3.6, 12.2)[b]	13.5 (8.4, 21.0)[b]	5.1 (1.7, 14.3)[b]
Relatives smoking					
None of the relatives smoke	25.7 (23.4, 28.2)[b]	18.1 (14.5, 22.3)[b]	15.2 (10.1, 22.4)[b]	18.6 (12.4, 27.0)[b]	15.8 (8.7, 27.0)[b]
Less than 8 relatives smoke	63.8 (61.1, 66.4)[b]	60.9 (55.8 65.7)[b]	55.8 (47.0, 64.1)[b]	53.7 (44.6, 62.5)[b]	58.5 (46.1, 70.0)[b]
8 or more than 8 relatives smoke	10.5 (8.9, 12.2)[b]	21.0 (17.2, 25.5)[b]	29.0 (21.7, 37.5)[b]	27.7 (20.4, 36.5)[b]	25.6 (16.4, 37.7)[b]

[a] weighted mean score (95% Confidence Interval)
[b]weighted percentage (95% Confidence Interval)

Table for 4.6 continued

Domains	Smoking stages				
	Non-smokers	Ever smokers			
	Never smokers	Susceptible Never smokers	Experimenters	Current Smokers	Ex-smokers
Parental monitoring	10.19 (10.10, 10.28)[a]	9.69 (9.52, 9.87)[a]	9.61 (9.26, 9.96)[a]	8.85 (8.41, 9.28)[a]	9.71 (9.26, 10.15)[a]
Frequency of Parent-teen conflict					
No conflicts	41.2 (38.6, 43.9)[b]	36.4 (31.7, 41.4)[b]	31.5 (24.1, 40.1)[b]	34.5 (26.4, 43.6)[b]	38.4 (27.2, 50.9)[b]
Sometimes	47.3 (44.6, 50.0)[b]	46.5 (41.5, 51.5)[b]	44.5 (36.0, 53.2)[b]	32.1 (24.2, 40.8)[b]	54.1 (41.8, 66.0)[b]
Often	4.6 (3.6, 5.9)[b]	8.7 (6.2, 12.0)[b]	12.0 (7.3, 19.0)[b]	10.4 (6.0, 17.3)[b]	2.3 (0.9, 6.2)[b]
Always	7.0 (5.7, 8.5)[b]	8.4 (6.0, 11.7)[b]	12.0 (7.3, 19.1)[b]	23.1 (16.2, 31.7)[b]	5.1 (1.7, 14.5)[b]
Parental expectation	10.05 (9.95, 10.15)[a]	9.60 (9.39, 9.81)[a]	9.81 (9.42, 10.19)[a]	9.67 (9.29, 10.06)[a]	9.87 (9.42, 10.31)[a]
Direct ban of smoking					
No	27.1 (24.7, 29.6)[b]	28.8 (24.4, 33.6)[b]	22.6 (16.2, 30.7)[b]	32.0 (23.9, 41.2)[b]	17.5 (9.9, 29.1)[b]
Yes	72.9 (70.4, 75.3)[b]	71.2 (66.4, 75.6)[b]	77.4 (69.3, 83.8)[b]	68.0 (58.8, 76.1)[b]	82.5 (70.9, 90.1)[b]
Home discussions					
No	35.1 (32.6, 37.8)[b]	43.5 (38.6, 48.6)[b]	33.8 (26.1, 42.5)[b]	39.5 (31.0, 48.7)[b]	28.1 (18.3, 40.6)[b]
Yes	64.9 (62.2, 67.4)[b]	56.5 (51.4, 61.4)[b]	66.2 (57.5, 73.9)[b]	60.5 (51.3, 69.0)[b]	71.9 (59.4, 81.7)[b]

[a] weighted mean score (95% Confidence Interval) [b] weighted percentage (95% Confidence Interval)

In this study, scores in personal factors of smoking related health knowledge, self-efficacy, religiosity, self-esteem, life satisfaction perception of smoking, stress and sensation seeking were compared between the five smoking stages. The results are presented in table 4.7. The never smokers had higher mean scores in health knowledge (10.42, 95% CI: 10.34, 10.50), Self-efficacy (10.91, 95% CI: 10.38, 11.45), Religiosity (14.31, 95% CI: 14.10, 14.51), Self-esteem (27.64, 95% CI: 27.43, 27.86) and Life satisfaction (17.06, 95% CI: 16.45, 17.66) compared to the other groups. This group also had lower mean scores in perception of smoking (6.81, 95% CI: 6.70, 6.92) stress (11.9, 95% CI: 11.84, 12.06) and sensation seeking (18.53, 95% CI: 18.29, 18.77) compared to the other groups.

Table 4.7: Personal factors and baseline smoking stages

Domains	Smoking stages a Mean scores (95% Confidence Interval)				
	Non-smokers			Ever smokers	
	Never smokers	Susceptible Never smokers	Experimenters	Current Smokers	Ex-smokers
Health knowledge	10.42 (10.34, 10.50)	9.98 (9.82, 10.15)	9.67 (9.42, 9.92)	8.90 (8.52, 9.29)	9.67 (9.23, 10.12)
Self-efficacy	14.77 (14.66, 14.87)	13.30 13.06, 13.54)	13.09 (12.68, 13.51)	10.91 (10.38, 11.45)	12.73 (12.10, 13.36)
Perception of smoking	6.81 (6.70, 6.92)	7.63 (7.40, 7.85)	7.53 (7.16, 7.91)	8.82 (8.37, 9.26)	8.13 (7.79, 8.58)
Religiosity	14.31 (14.10, 14.51)	13.10 (12.71, 13.49)	13.62 (12.98, 14.26)	13.18 (12.56, 13.79)	13.33 (12.43, 14.22)
Self-esteem	27.64 (27.43, 27.86)	26.29 (25.92, 26.66)	26.35 (25.81, 26.29)	25.72 (25.15, 26.29)	26.63 (25.87, 27.39)
Life satisfaction	18.02 (17.85, 18.20)	17.27 (16.96, 17.59)	17.22 (16.62, 17.82)	17.06 (16.45, 17.66)	17.53 (16.87, 18.18)
Stress	11.95 (11.84, 12.06)	12.56 (12.36, 12.76)	12.37 (12.05, 12.70)	12.49 (12.13, 12.85)	12.91 (12.23, 13.59)
Sensation seeking	18.53 (18.29, 18.77)	20.14 (19.70, 20.58)	21.34 (20.55, 22.12)	21.21 (20.50, 21.93)	21.44 (20.14, 22.73)

[a] weighted mean score (95% Confidence Interval)

4.4 Univariate analyses

Results from analyses on the associations between socio-demographic, school, peer, family and personal factors and the baseline smoking stages are presented in tables 4.8, 4.9, 4.10 and 4.11. In all analyses, the reference stage was never smokers. All independent variables with a level of significance of less than or equal to 0.25 were then included in the multivariate analysis.

4.4.1 Susceptible never smokers compared to never smokers

Based on table 4.8, socio-demographic factors such as gender, race and fathers' occupational status were associated with being a susceptible never smoker. All three peer factors and both school factors were also significantly associated with susceptible never smokers (Table 4.9). All the family factors, except direct ban on smoking (Table 4.10), and all personal factors (Table 4.11) were significantly associated with susceptible smoking.

4.4.2 Experimenters compared to never smokers

Socio-demographic factors such as gender, Malay ethnicity, area of school and not knowing fathers' occupation were significantly associated with being an experimenter. Similar to the susceptible never smokers, all peer and school factors (Table 4.9) and personal factors (Table 4.11) were significantly associated with experimenters. Parental expectations, direct ban on smoking and having home discussion on smoking hazards (Table 4.10) were not associated with experimenters when compared to never smokers.

4.4.3 Current smokers compared to never smokers

Current smoking was associated with gender, ethnicity, area of school, parents' marital status, not knowing parents education level, not knowing fathers occupation and mothers' occupation (Table 4.8). Current smoking was also associated with peer, school

(Table 4.9) and personal factors (Table 4.11). Among the family factors, direct ban on smoking and home discussion on smoking hazards were not significantly associated with current smoking (Table 4.10).

4.4.4 Ex-smokers compared to never smokers

Gender, ethnicity, not knowing mothers' occupation and school adjustment scores were significantly associated with ex-smokers. All three peer factors, having a parent who smokes, having siblings who smoke, having more than eight relatives who smoke and parental monitoring were also associated with being an ex-smoker. All personal factors excluding life satisfaction was also found to be significantly associated with ex-smokers when compared to never smokers.

Table 4.8: Results from univariate analyses on the association between socio-demographic factors and smoking stages at baseline

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Gender								
Female	1		1		1		1	
Male	**2.83**	2.22, 3.62	**6.38**	4.01, 10.14	**8.57**	4.97, 14.79	**6.19**	3.15, 12.19
Area of School								
Urban	1		1		1		1	
Rural	0.87	0.71, 1.07	**1.41**	1.02, 1.94	**1.54**	1.11, 2.15	1.33	0.85, 2.08
Race								
Indians	1		1		1		1	
Malay	**1.67**	1.18, 2.08	**2.13**	1.25, 3.65	**2.55**	1.32, 4.94	**2.56**	1.14, 5.73
Chinese	**1.45**	1.01, 2.08	0.33	0.18, 0.68	1.12	0.54, 2.33	0.72	0.27, 1.91
Others	1.62	0.77, 3.42	0.52	0.07, 4.03	**4.72**	1.72, 12.95	2.62	0.52, 13.18
Parents' Marital Status								
Married	1		1		1		1	
Single parents	0.98	0.65, 1.46	1.59	0.90, 2.81	1.51	0.86, 2.64	1.40	0.63, 3.15

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval

Table for 4.8 continued…

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Father's education level								
Tertiary education	1		1		1		1	
Primary & No formal education	1.37	0.87, 2.18	0.63	0.29, 1.35	1.44	0.66, 3.14	0.89	0.37, 2.10
Secondary level	0.94	0.62, 1.45	0.84	0.45, 1.59	1.34	0.67, 2.66	0.77	0.37, 1.57
Do not know	1.47	0.94, 2.31	1.71	0.89, 3.29	**2.86**	1.41, 5.82	0.96	0.43, 2.16
Mother's education level								
Tertiary education	1		1		1		1	
Primary & No formal education	1.33	0.84, 2.09	0.68	0.31, 1.47	0.95	0.45, 2.00	0.49	0.16, 1.47
Secondary level	0.70	0.46, 1.07	0.79	0.41, 1.54	0.61	0.32, 1.17	0.80	0.35, 1.78
Do not know	1.36	0.86, 2.13	1.54	0.76, 3.09	**1.99**	1.02, 3.88	0.97	0.39, 2.41
Father's occupation								
Manager & Professionals	1		1		1		1	
Other Professions	1.26	0.81, 1.95	1.68	0.78, 3.64	0.91	0.47, 1.76	0.86	0.36, 2.03
Unemployed	**3.88**	1.57, 9.58	2.26	0.37, 13.67	2.22	0.44, 11.09	0.53	0.06, 4.74
Do not know	**1.87**	1.14, 3.07	**4.13**	1.81, 9.04	**2.37**	1.15, 4.88	1.43	0.54, 3.07
Mother's occupation								
Manager & Professionals	1		1		1		1	
Other Professions	1.47	0.91, 2.39	1.09	0.50, 2.38	**2.60**	1.07, 6.32	3.23	0.77, 13.52
Housewives	1.12	0.71, 1.76	0.99	0.49, 2.02	1.29	0.54, 3.05	2.54	0.64, 10.13
Do not know	1.09	0.61, 1.93	1.99	0.88, 4.52	**4.31**	1.69, 10.98	**4.66**	1.03, 21.06

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval

Table 4.9: Results from univariate analyses on the association between peer and school factors and smoking stages at baseline

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
School connectedness [c]	**1.13**	1.09, 1.17	**1.15**	1.08, 1.21	**1.18**	1.11, 1.25	1.03	0.96, 1.11
School adjustment [c]	**1.36**	1.24, 1.49	**1.35**	1.17, 1.55	**1.35**	1.16, 1.57	**1.52**	1.29, 1.80
Best friend's smoking status								
No	1		1		1		1	
Yes	**4.08**	3.07, 5.40	**11.28**	7.61, 16.74	**18.24**	11.83, 28.14	**15.51**	8.98, 26.77
Number of close friends who smoke								
None	1		1		1		1	
Less than half smoke	**3.44**	2.65, 4.49	**11.09**	7.31, 16.84	**19.31**	11.38, 32.77	**13.57**	7.40, 24.86
More than half or all smoke	**5.64**	3.13, 10.17	**15.21**	7.10, 32.60	**72.99**	35.91,148.3	**25.49**	10.61, 61.23
Peer pressure								
Low peer pressure	1		1		1		1	
High peer pressure	**3.67**	2.67, 5.04	**12.65**	8.41,19.02	**26.15**	16.72, 40.89	**9.91**	5.80, 16.93

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit

Table 4.10: Results from univariate analyses on the association between family factors and smoking stages at baseline

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Parents smoking status								
Neither parents smoke	1		1		1		1	
At least one parent smoke	**1.30**	1.02, 1.67	**1.54**	1.05, 2.26	**2.76**	1.80, 4.22	**2.02**	1.17, 3.49
Ex-smoker	1.26	0.81, 1.95	1.13	0.54, 2.37	1.68	0.74, 3.80	1.12	0.36, 3.43
Siblings smoking status								
No siblings/none of the siblings smoke	1		1		1		1	
Yes, siblings smoke	**1.69**	1.23, 2.33	**4.13**	2.73, 6.26	**7.98**	5.21, 12.32	**2.72**	1.50, 4.94
Do not know	**3.00**	1.80, 4.98	**3.31**	1.57, 6.99	**9.53**	4.95, 18.37	2.19	0.67, 7.19
Relatives smoking								
None of the relatives smoke	1		1		1		1	
Less than 8 relatives smoke	**1.36**	1.00, 1.83	1.48	0.89, 2.46	1.16	0.69, 1.95	1.49	0.73, 3.05
8 or more than 8 relatives smoke	**2.85**	1.95, 4.18	**4.68**	2.63, 8.34	**3.66**	2.03, 6.59	**3.99**	1.77, 8.98
Parental monitoring [c]	**1.17**	1.10, 1.25	**1.20**	1.09, 1.32	**1.42**	1.29, 1.55	**1.17**	1.03, 1.33

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit

Table for 4.10 continued

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	
Frequency of Parent-teen conflict								
No conflicts	1		1		1		1	
Sometimes	1.11	0.86, 1.43	1.23	0.81, 1.87	0.81	0.52, 1.27	1.23	0.72, 2.12
Often	**2.15**	1.34, 3.43	**3.43**	1.79, 6.60	**2.71**	1.35, 5.44	0.55	0.18, 1.64
Always	1.37	0.87, 2.15	**2.26**	1.19, 4.27	**3.96**	2.29, 6.84	0.79	0.24, 2.64
Parental expectations [c]	**1.12**	1.06, 1.19	1.07	0.97, 1.18	**1.10**	1.00, 1.21	1.05	0.93, 1.19
Direct ban of smoking								
Yes	1		1		1		1	
No	1.09	0.84, 1.41	0.79	0.51, 1.21	1.26	0.83, 1.92	0.57	0.29, 1.12
Home discussions								
Yes	1		1		1		1	
No	**1.43**	1.13, 1.80	0.94	0.64, 1.39	1.21	0.82, 1.79	0.72	0.41, 1.28

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit

Table 4.11: Results from univariate analyses on the association between personal factors and smoking stages at baseline

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Health knowledge [c]	**1.21**	1.12, 1.30	**1.35**	1.23, 1.48	**1.64**	1.47, 1.84	**1.34**	1.16, 1.56
Self-efficacy [c]	**1.35**	1.28, 1.42	**1.39**	1.29, 1.49	**1.78**	1.64, 1.92	**1.45**	1.33, 1.59
Perception of smoking [d]	**1.20**	1.14, 1.27	**1.18**	1.08, 1.28	**1.50**	1.37, 1.64	**1.32**	1.21, 1.45
Religiosity [c]	**1.09**	1.05, 1.12	**1.05**	1.00, 1.10	**1.08**	1.03, 1.13	**1.07**	1.01, 1.14
Self-esteem [c]	**1.11**	1.07, 1.14	**1.10**	1.05, 1.15	**1.15**	1.10, 1.20	**1.08**	1.02, 1.14
Life satisfaction [c]	**1.08**	1.04, 1.12	**1.08**	1.02, 1.15	**1.10**	1.04, 1.16	1.05	0.98, 1.12
Stress [d]	**1.16**	1.09, 1.22	**1.11**	1.02, 1.20	**1.14**	1.04, 1.24	**1.25**	1.08, 1.45
Sensation seeking [d]	**1.09**	1.06, 1.12	**1.16**	1.11, 1.21	**1.15**	1.11, 1.20	**1.16**	1.09, 1.25

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
[d] Increase in score by 1 unit

4.5 Multivariate analyses

In the multivariate analysis, variables that were significant at 0.25 and below in the univariate analyses were included. Factors that were significantly associated with the different smoking stages are presented in table 4.12. The reference group in all comparisons is never smokers.

4.5.1 Factors influencing susceptible never smokers

Gender and race were significantly associated with susceptible never smokers. The odds of a male adolescent being susceptible never smokers is nearly three times (adjusted OR: 2.84, 95% CI: 2.13, 3.79) more compared to a female adolescent. The odds of a Malay being susceptible never smokers is two times more (adjusted OR: 1.99, 95% CI: 1.29, 3.09) compared to an Indian. School connectedness and school adjustment both had an influence on susceptible never smokers. The odds of susceptible never smoker increases with the frequency of relatives who smoke. The odds of an adolescent with less than 8 relatives who smoke being a susceptible never smoker is about 2 times (adjusted OR: 1.78, 95% CI: 1.23, 2.56) more compared to one without any relatives who smoke. The odds of an adolescent with 8 or more relatives who smoke being a susceptible never smoker is more than 3 times (adjusted OR: 3.25, 95% CI: 2.02, 5.23) more compared to one without any relatives who smoke.

4.5.2 Factors influencing experimenters

Gender was also associated with being in the experimenter stage. The odds of a male adolescent being experimenter is 5 times (adjusted OR: 5.01, 95% CI: 2.936, 8.59) more compared to a female adolescent. Having a best friend who smokes increases the odds of being an experimenter significantly (adjusted OR: 2.30, 95% CI: 1.26, 4.18). Similarly, having less than half of the close friends being smokers increases the odds of

being an experimenter (adjusted OR: 2.14, 95% CI: 1.14, 4.03). High peer pressure also increases the odds of being an experimenter (adjusted OR = 2.54, 95% CI: 1.47, 4.38).

A decrease in school connectedness increases the odds of being an experimenter significantly (adjusted OR: 1.19, 95% CI: 1.09, 1.31). Similarly, a decrease in smoking related self-efficacy also increases the odds of being an experimenter significantly (adjusted OR: 1.24, 95% CI: 1.12, 1.36). An increase in sensation seeking score increases the odds of being an experimenter, moderately (adjusted OR: 1.09, 95%CI: 1.03, 1.15).

4.5.3 Factors influencing current smokers

The odds of a male adolescent being current smoker is close to 6 times more (adjusted OR: 5.81, 95% CI: 2.79, 12.11) compared to a female adolescent. The odds of a Malay being current smoker is close to 5 times more (adjusted OR: 4.71, 95% CI: 1.76, 12.59) compared to an Indian. Having a best friend who smokes increases the odds of being a current smoker significantly (adjusted OR: 2.05, 95% CI: 1.10, 3.85). Having more than half of the close friends being smokers increases the odds of being current smoker by close to 5 folds (adjusted OR: 4.46, 95% CI: 1.41, 14.10). High peer pressure increases the odds of being a current smoker by more than 4 folds (adjusted OR = 4.22, 95% CI: 2.30, 7.73). Having siblings who smoke cigarettes increases the odds of being a current smoker by 3 folds (adjusted OR: 3.01, 95% CI: 1.70, 5.33). When 8 or more relatives smoke, the odds of an adolescent being a current smoker is higher (adjusted OR: 2.47, 95% CI: 1.05, 5.78). In the absence of home discussions on smoking hazards, the odds of an adolescent being current smoker is 2 time more (adjusted OR: 2.07, 95% CI: 1.18, 3.62). A decrease in school connectedness increases the odds of being a current smoker significantly (adjusted OR: 1.54, 95% CI: 1.38,

1.71). Similarly, a decrease in smoking related self-efficacy also increases the odds of being a current smoker significantly (adjusted OR: 1.39, 95% CI: 1.23, 1.57). An increase in sensation seeking score increases the odds of being a current smoker, moderately (adjusted OR: 1.05, 95%CI: 1.00, 1.11).

4.5.4 Factors influencing ex-smokers

When comparing ex-smokers to never smokers, statistically, the significant factors were gender, race, school adjustment, best friend's smoking status, number of close friends who smoke and the number of relatives who smoke.

Table 4.12: Results of multivariate multinomial logistic regression analysiss to identify factors influencing baseline smoking stages

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Gender								
Female	1		1		1		1	
Male	2.84	2.13, 3.79	5.01	2.93, 8.59	5.81	2.79, 12.11	2.99	1.41, 6.36
Race								
Indians	1				1		1	
Malay	1.99	1.29, 3.09			4.71	1.76, 12.59	3.02	1.34, 6.79
Chinese								
Others	2.50	1.08, 5.77			6.38	1.27,32.14		
School connectedness c	1.06	1.01, 1.12	1.19	1.09, 1.31				
School adjustment c	1.13	1.01, 1.26					1.45	1.18, 1.88
Best friend smoking status								
No	1		1		1		1	
Yes	1.67	1.09, 2.55	2.30	1.26, 4.18	2.05	1.10, 3.85	3.04	1.42, 6.52
Number of close friends who smoke								
None			1		1		1	
Less than half smoke			2.14	1.14, 4.03	2.76	1.17, 6.54	2.71	1.21, 6.08
More than half or all smoke					4.46	1.41, 14.10		

Reference category: Never smokers
[b] Confidence interval
[a] Odds ratio
[c] Decrease in score by 1 unit
Not Significant

Table for 4.12 continued

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Peer pressure								
Low peer pressure			1		1			
High peer pressure			2.54	1.47, 4.38	4.22	2.30, 7.73		
Siblings smoking status								
No siblings/none of the siblings smoke	1		1		1			
Yes, siblings smoke			2.14	1.29, 3.53	3.01	1.70, 5.33		
Do not know	2.78	1.50, 5.13			8.00	2.76, 23.16		
Relatives smoking								
None of the relatives smoke	1		1		1		1	
Less than 8 relatives smoke	1.78	1.23, 2.56						
8 or more than 8 relatives smoke	3.25	2.02, 5.23	2.76	1.29, 5.93	2.47	1.05, 5.78	2.62	1.02, 6.76
Home discussions on smoking hazards								
Yes	1				1			
No	1.63	1.22, 2.17			2.07	1.18, 3.62		

Reference category: Never smokers
a Odds ratio
b Confidence interval
Not Significant

Table for 4.12 continued

Factors	Susceptible never smokers		Experimenters		Current smokers		Ex-smokers	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Smoking related self-efficacy [c]	1.27	1.19, 1.36	1.24	1.12, 1.36	1.54	1.38, 1.71	1.33	1.20, 1.47
Perception of smoking [d]	1.10	1.03, 1.17			1.39	1.23, 1.57	1.26	1.12, 1.42
Sensation seeking [d]	1.04	1.01, 1.07	1.09	1.03, 1.15	1.05	1.00, 1.11	1.06	1.01, 1.16

Reference category: Never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
[d] Increase in score by 1 unit
Not Significant

Section IIb

The objective of this study was to identify the factors influencing the transition of smoking stages. The second phase data collection was carried out twelve months later. Data were collected from the same fifteen schools where the participants were now in form two. During the second phase of data collection, 318 (22%) participants were loss to follow-up.

4.6 Comparison of respondent and those loss to follow-up

The distribution of participants at baseline and those loss to follow-up is provided in table 4.13. Among those loss to follow up, 53.4% were never smokers, 24.2% were susceptible never smokers, 7.5% were experimenters, 11% smokers and ex-smokers were 3.7%. Table 4.14 shows comparison of socio-demographic characteristics of the participants at baseline and those who loss to follow-up. There were no systematic differences in the socio demographic characteristics.

Table 4.13: Comparison of smoking status of participants and that loss to follow-up during second phase data collection

Smoking stages	Participants	Loss to follow-up
	n= 2552	n=318
Never smokers	65.3	53.5
Susceptible never smokers	18.6	24.2
Experimenters	6.6	7.5
Current smokers	6.2	11.0
Ex-smokers	3.3	3.8

*unweighted percentages

Table 4.14: Comparison of socio-demographic characteristics of respondents and those loss to follow-up during second phase data collection

	Participants	Loss to follow-up
	n= 2552	n=318
Gender		
Female	1150 (45.1)	126 (40.0)
Male	1401 (54.9)	189 (60.0)
Area of School		
Urban	1297 (50.8)	149 (47.3)
Rural	1255 (49.2)	166 (52.7)
Race		
Malay	1233 (48.3)	115 (36.5)
Chinese	854 (33.5)	135 (42.9)
Indians	397 (15.6)	60 (19.0)
Others	68 (2.7)	5 (1.6)
Marital Status		
Married	2308 (90.4)	273 (86.7)
Single parents	230 (9.0)	39 (12.0)
Father's education level		
Primary & No formal education	487 (19.1)	77 (24.4)
Secondary level	1188 (46.6)	154 (48.9)
Tertiary level	254 (10.0)	26 (8.3)
Do not know/ Missing	618 (24.2)	57 (18.1)
Mother's education level		
Primary & No formal education	473 (18.5)	83 (26.3)
Secondary level	1271 (49.8)	156 (49.5)
Tertiary level	238 (9.3)	27 (8.6)
Do not know	570 (22.3)	49 (15.6)
Father's occupation		
Manager & Professionals	230 (9.0)	27 (8.6)
Other Professions	1831 (71.7)	220 (69.8)
Unemployed	33 (1.3)	5 (1.6)
Do not know	447 (17.5)	62 (19.7)
Mother's occupation		
Manager & Professionals	196 (7.7)	24 (7.6)
Other Professions	606 (2.7)	75 (23.8)
Housewives	1466 (51.4)	177 (56.2)
Do not know	284 (11.1)	39 (12.4)

*missing values varies for each variable

4.7 Adverse transition of smoking stages

During the twelve months period different pathways of smoking stage transitions may have occurred. The focus of this study is on adverse transition: a transition from one smoking stage at baseline to a more adverse stage in phase two.

Table 4.15 shows details regarding the smoking stages at baseline and twelve months later. There were 1669 never smokers at baseline, out of which, 1156(77.2%) remained as never smokers (stable never smokers) and Adverse Transition I was 143(22.8%) within the 12 months. Among the never smokers, 14.3% progressed to become susceptible never smokers, 4.3% had become experimenters, 3.6% became current smokers and 0.6% became ex-smokers. There were 474 susceptible never smokers at baseline and among them; 33(8.5%) became experimenters, 62(15.5%) became current smokers and 10(3.8%) became ex-smokers. There were 168 experimenters at baseline, out of which, 64(43.5%) had adverse transition to current smoking status. Out of the 83 ex-smokers at baseline, 25(36.0%) have become current smokers again within the 12 months.

Table 4.15: Adverse transitions of smoking stages after 12 months of follow-up

Smoking stages at baseline	Smoking stages at Time 2				
	Never smoker	Susceptible never smoker	Experimenter	Current smoker	Ex-smoker
	[a] n (%)	[a] n (%)	[a] n (%)	[a] n (%)	a n (%)
Never smoker (n=1669)	1156 (77.2)	218 (14.3)	62 (4.3)	56 (3.6)	7 (0.6)
		← ADVERSE TRANSITION I →			
Susceptible never smoker (n=474)			33 (8.5)	62 (15.5)	10 (3.8)
			← ADVERSE TRANSITION II →		
Experimenters (n=168)				64 (43.5) ADVERSE TRANSITION III	
				← →	
Ex-smoker (n=83)				25 (36.0) ADVERSE TRANSITION IV	
				← →	

[a] weighted row percentages are reported

Adverse transitions

Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

4.8 Factors influencing adverse transition of smoking stages

4.8.1 Univariate analyses

In this section the results for the univariate analyses determining the factors influencing adverse transition of smoking stages are presented. The associations between socio-demographic, school, peer, family and personal factors with adverse transition of the smoking stage are presented in tables 4.16, 4.17, 4.18, 4.19 and 4.20, respectively. The reference was stable never smokers. All independent variables with a *p* value less than or equal to 0.25 were then included in the multivariate analysis.

4.8.1.1 Adverse Transition I

Other than gender and race having a significant correlation with Adverse Transition I, never smokers who come from a single parent family are also more likely to move up to a higher stage of smoking (OR: 1.93, 95% CI : 1.24, 3.00). All the peer factors have a strong effect on adverse transition of the never smokers where those who have a best friend who smokes (OR: 2.84, 95% CI : 1.92, 4.21) , less than have their close friends smoke (OR: 2.75, 95% CI : 1.93, 3.92) or more than half their close friends smoke (OR: 4.05, 95% CI : 1.70, 9.61) and never smokers with high peer pressure to smoke (OR: 3.09, 95% CI : 1.95, 4.92) had higher odds of being in a more advance stage of smoking post twelve months of secondary school. Often having conflicts with their parents and having a sibling who smokes is also a risk factor for adverse transition among the never smokers. Sensation seeking was not a risk factor for adverse transition among the never smokers. Never smokers who were never exposed to anti-smoking campaigns were twice (OR: 2.23, 95% CI: 1.23, 4.07) more likely to move onto a more advance stage of smoking.

4.8.1.2 Adverse Transition II

When compared to female participants, male participants who were susceptible never smokers were nearly seven times more likely to move to a more advance stage of smoking after twelve months. Susceptible never smokers who are of the Malay ethnicity have higher odds of adverse transition compared to susceptible never smokers who come from Indian ethnicity. Unemployment among susceptible never smokers' fathers had a very strong effect on the adverse transition of this group of participants (OR: 5.15, 95% CI: 1.25, 21.18). Although all three peer factors were correlated with the adverse transition of susceptible never smokers, the analysis showed that having more than 50% of close friends smoking had the strongest effect on the adverse transition of these susceptible participants (OR: 22.33, 95% CI: 8.99, 55.45). Often having conflicts with parents (OR: 4.15, 95% CI: 1.86, 9.28) was also significantly related with Adverse Transition II. Susceptible never smokers were four times more likely to undergo adverse transition when there were never exposed to anti-smoking campaigns.

4.8.1.3 Adverse Transition III

Gender had the strongest effect on Adverse Transition III with male participants having high odds (OR: 9.40, 95% CI: 3.99, 22.13) of becoming a current smoker. Experimenters who at baseline claimed that they did not know of their parents' education level and those who did not know their fathers' occupation were more likely to move onto a higher smoking stage. Experimenters with either best friends or more than half their close friends who smoke cigarettes were nearly twenty times more likely to become current smokers in twelve months duration. Participants from this smoking stage with high peer pressure to smoke were twenty five times more likely to be in a higher smoking stage. Family influences such as parents' and siblings smoking status, having more than eight relatives who smoke and parent-teen conflicts all influenced the

Adverse Transition III. A lower smoke related health knowledge, lower self-esteem or having more stress had the stronger effect on Adverse Transition III compare to the adverse transition of the other stages. Accessibility to buying cigarettes was a very important risk factor. Experimenters who thought it was very easy (OR: 16.68, 95% CI: 4.62, 60.26) or easy (OR: 17.83, 95% CI: 5.23, 60.80) had a very high odds of becoming a current smokers.

4.8.1.4 Adverse Transition IV

Best friends' smoking status had the strongest effect on the Adverse Transition IV. High peer pressure to smoke also pushed the ex-smokers to begin smoking again (OR: 32.62, 95% CI: 12.42, 85.71). Ex-smokers with at least one parent who smokes (OR: 5.85, 95% CI: 2.04, 16.79) and those who have siblings who smoke (OR: 4.70, 95% CI: 1.68, 13.13) were more likely to start the habit again. A reduction in self-efficacy and an increase in perception of smoking had a stronger influence on the Adverse Transition IV.

Table 4.16: Univariate analyses showing socio-demographic factors association with adverse transition of smoking stages

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Gender								
Female	1		1		1		1	
Male	**2.48**	1.87, 3.29	**6.60**	3.77, 11.55	**9.40**	3.99, 22.13	-	-
Area of School								
Urban	1		1		1		1	
Rural	1.15	0.88, 1.49	0.75	0.48, 1.17	1.42	0.82, 2.47	0.80	0.37, 1.76
Race								
Indians	1		1		1		1	
Malay	**1.54**	1.05, 2.26	**2.71**	1.34, 5.45	7.92	0.92, 68.01	7.18	0.95, 54.50
Chinese	0.94	0.62, 1.42	1.12	0.50, 2.48	0.95	0.13, 6.89	0.57	0.04, 9.18
Others	0.73	0.24, 2.21	2.10	0.65, 6.81	-	-	7.29	0.44,120.55
Parents' Marital Status								
Married	1		1		1		1	
Single parents	**1.93**	1.24, 3.00	1.53	0.73, 3.21	**2.40**	1.01, 5.70	0.79	0.10,6.01

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval

Table for 4.16 continued

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Father's education level								
Tertiary education	1		1		1		1	
Primary & No formal education	1.16	0.69, 1.95	1.49	0.60, 3.52	0.70	0.17, 2.84	0.80	0.17, 3.69
Secondary level	0.96	0.61, 1.52	0.75	0.33, 1.68	1.34	0.43, 4.19	0.70	0.21, 2.36
Do not know	1.11	0.67, 1.82	1.61	0.71, 3.66	**4.03**	1.33, 12.26	0.99	0.26, 3.85
Mother's education level								
Tertiary education	1		1		1		1	
Primary & No formal education	0.99	0.59, 1.69	1.18	0.48, 2.92	0.73	0.20, 2.65	-	-
Secondary level	0.74	0.46, 1.17	0.74	0.33, 1.68	1.23	0.40, 3.73	0.55	0.17, 1.77
Do not know	1.06	0.64, 1.76	1.46	0.62, 3.45	**3.48**	1.14, 10.59	0.83	0.22, 3.17

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Table for 4.16 continued

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Father's occupation								
Manager & Professionals	1		1		1		1	
Other Professions	1.08	0.66, 1.74	0.78	0.35, 1.74	1.62	0.45, 5.82	0.63	0.63, 0.63
Unemployed	2.38	0.68, 8.30	**5.15**	1.25, 21.18	1.62	0.15, 18.08	-	-
Do not know	**1.76**	1.00, 3.08	1.94	0.80, 4.71	**3.97**	1.01, 15.64	**1.13**	1.13, 1.13
Mother's occupation								
Manager & Professionals	1		1		1		1	
Other Professions	1.42	0.79, 2.55	1.20	0.55, 2.62	0.53	0.18, 1.59	-	-
Housewives	1.45	0.84, 2.49	0.69	0.33, 1.46	0.68	0.27, 1.69	-	-
Do not know	1.72	0.87, 3.37	0.72	0.25, 2.03	0.89	0.27, 2.95	-	-

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Table 4.17: Univariate analyses showing peer and school factors association with adverse transition of smoking stages

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
School connectedness [c]	**1.06**	1.01, 1.11	**1.11**	1.04, 1.18	**1.14**	1.06, 1.22	1.05	0.91, 1.21
School adjustment [c]	**1.23**	1.11, 1.36	**1.41**	1.22,1.62	**1.43**	1.19, 1.73	**1.55**	1.18, 2.03
Best friend smoking status								
No	1		1		1		1	
Yes	**2.84**	1.92, 4.21	**9.45**	5.71, 15.62	**19.54**	10.30, 37.07	**99.29**	22.50, 438.38
Number of close friends who smoke								
None	1		1		1			
Less than half smoke	**2.75**	1.93, 3.92	**7.79**	4.70, 12.89	**15.04**	7.70, 29.36	-	-
More than half or all smoke	**4.05**	1.70, 9.61	**22.33**	8.99, 55.45	**19.39**	4.91, 76.65	-	-
Peer pressure								
Low Peer Pressure	1		1		1		1	
High Peer Pressure	**3.09**	1.95, 4.92	**9.36**	5.46, 16.06	**25.38**	13.26, 48.58	**32.62**	12.42, 85.71

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Table 4.18: Univariate analyses showing family factors association with adverse transition of smoking stages

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Parents smoking status								
Neither parents smoke	1		1		1		1	
At least one parent smoke	1.27	0.95, 1.69	1.29	0.80, 2.08	**2.17**	1.15, 4.09	**5.85**	2.04, 16.79
Ex-smoker	1.31	0.75, 2.26	1.84	0.83, 4.11	1.23	0.39, 3.88	3.90	0.64, 16.79
Siblings smoking status								
No siblings/none of the siblings smoke	1		1		1		1	
Yes siblings smoke	**2.16**	1.46, 3.18	3.36	1.92, 5.87	**7.54**	3.93, 14.46	**4.70**	1.68, 13.13
Do not know	0.86	0.35, 2.09	2.10	0.77, 5.70	**4.62**	1.59, 13.41	**4.58**	1.06, 19.85
Relatives smoking								
None of the relatives smoke	1		1		1		1	
Less than 8 relatives smoke	0.97	0.70, 1.35	1.65	0.86, 3.18	**4.46**	1.24, 16.05	3.58	0.70, 18.41
8 or more than 8 relatives smoke	1.35	0.84, 2.18	**6.29**	3.02, 13.13	**10.74**	2.73, 42.21	6.17	0.99, 38.36

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Table for 4.18 continued

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Parental monitoring [c]	0.87	0.81, 0.94	0.86	0.76, 0.97	0.82	0.71, 0.95	0.84	0.67, 1.04
Parent-teen conflict								
No conflicts	1		1		1		1	
Sometimes	**1.47**	1.09, 1.98	1.10	0.66, 1.84	**1.99**	1.01, 3.95	2.26	0.87, 5.90
Often	**3.19**	1.74, 5.84	**4.15**	1.86, 9.28	3.53	0.96, 12.93	0.77	0.09, 6.55
Always	**1.91**	1.11, 3.27	2.14	0.99, 4.66	**4.76**	1.77, 12.80	0.44	0.05, 3.67
Decrease in parental expectations [c]	**1.13**	1.05, 1.21	**1.13**	1.01, 1.24	1.11	0.96, 1.27	1.04	0.82, 1.22
Direct ban of smoking								
Yes	1		1		1		1	
No	0.99	0.72, 1.37	0.64	0.36, 1.13	0.58	0.27, 1.26	0.16	0.02, 1.21
Home discussions								
Yes	1		1		1		1	
No	1.32	0.99, 1.76	1.08	0.68, 1.72	1.02	0.55, 1.90	0.38	0.13, 1.16

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Table 4.19: Univariate analyses showing personal factors association with adverse transition of smoking stages

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Health knowledge [c]	**1.19**	1.08, 1.30	**1.27**	1.12, 1.44	**1.33**	1.13, 1.56	**1.16**	0.85, 1.58
Self-efficacy [c]	**1.22**	1.14, 1.31	**1.47**	1.35, 1.60	**1.43**	1.30, 1.58	**1.58**	1.42, 1.77
Perception of smoking	**1.15**	1.08, 1.24	**1.27**	1.14, 1.41	**1.19**	1.04, 1.36	**1.43**	1.21, 1.69
Religiosity [c]	**1.06**	1.02, 1.10	**1.06**	1.00, 1.13	**1.09**	1.03, 1.16	**1.11**	1.03, 1.23
Self-esteem [c]	**1.07**	1.03, 1.11	**1.09**	1.04, 1.14	**1.11**	1.05, 1.16	**1.11**	1.04, 1.18
Life satisfaction [c]	**1.04**	1.00, 1.08	**1.07**	1.01, 1.13	**1.10**	1.02, 1.19	**1.12**	1.05, 1.20
Stress [d]	**1.09**	1.01, 1.18	**1.19**	1.08, 1.32	**1.20**	1.07, 1.34	0.98	0.69, 1.40
Sensation seeking [d]	**1.03**	0.99, 1.07	**1.19**	1.13, 1.25	**1.17**	1.10, 1.27	**1.07**	0.91, 1.26

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
[d] Increase in score by 1 unit

Table 4.20: Univariate analyses of external environmental factors and adverse transitions

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Exposure to smoking scenes in movies								
Never	1		1		1		1	
Sometimes	0.49	0.31, 0.77	0.97	0.45, 2.12	1.65	0.41, 6.62	0.86	0.86, 0.86
Often	0.65	0.37, 1.12	1.44	0.58, 3.54	3.48	0.79, 15.41	**1.79**	1.79, 1.79
Always	1.13	0.61, 2.07	1.70	0.58, 5.00	3.59	0.72, 17.98	-	-
Exposure to anti-smoking campaigns								
Always	1		1		1		1	
Never	**2.23**	1.23, 4.07	**4.08**	1.68, 9.93	2.90	0.73, 11.58	0.42	0.08, 2.13
Sometimes	0.99	0.67, 1.45	1.27	0.67, 2.42	1.41	0.51, 3.92	0.49	0.18, 1.36
Often	0.62	0.40, 0.95	0.79	0.38, 1.67	1.98	0.70, 5.59	0.20	0.05, 0.87

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker

Table for 4.20 continued

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Accessibility								
Very difficult	1		1		1		1	
Very easy	**1.67**	1.09, 2.57	**3.63**	1.64, 8.00	**16.68**	4.62, 60.26	**5.82**	0.99, 34.29
Easy	**2.24**	1.52, 3.30	**4.12**	1.96, 8.70	**17.83**	5.23, 60.80	**4.06**	0.69, 23.79
Difficult	**1.87**	1.21, 2.87	**3.16**	1.39, 7.18	**15.19**	4.17, 55.32	**6.61**	1.12, 38.87
Pictorial warnings								
Yes	1		1		1		1	
No	1.27	0.82, 1.99	1.85	0.95, 3.60	0.67	0.19, 2.43	-	-

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit

4.8.2 Multivariate analyses

All independent variables that were seen to be associated with the four adverse transitions at a level of significance of 0.25 and below in the univariate analyses were selected for the multivariate analysis. Influential effects of factors on the four adverse transitions were examined using multinomial logistic regression analyses. Stable never smokers were used as the reference group. A total of eleven variables were tested in the multivariate model. The results are shown in table 4.21

4.8.2.1 Adverse Transition I

Gender and race had statistically significant association with the adverse transition among baseline never smokers. When compared to a female, the odd of a male participant moving to a more advance stage of smoking is three times more. The odds of a Malay being among Adverse Transition I is two times more compared to an Indian. Never smokers who had best friends' who smoke (adjusted OR: 1.92, 95% CI: 1.26, 2.94), siblings who smoke (adjusted OR: 1.81, 95% CI: 1.17, 2.79) and often had conflicts with parents (adjusted OR: 2.88, 95% CI: 1.42, 5.85) had higher chance of being in a more advance stage of smoking at twelve months follow up. External environment factors such as exposure to anti-smoking campaigns and accessibility to buy cigarettes also influenced to adverse transition of never smokers.

4.8.2.2 Adverse Transition II

Again, gender and race showed significant association with Adverse Transition II. The odds of a susceptible never smoker whose best friends' smoke cigarettes being in the adverse transition group was four times more compared to one who does not have a best friends' who smoke cigarettes. Family influences like having a sibling who smokes or having parent-teen conflicts was also found to be significantly associated with

Adverse Transition II. Susceptible never smokers with higher sensation seeking scores were also more likely to move to a more advance stage of smoking during the twelve months follow up. Not being exposed to antismoking campaigns significantly increased the odds of Adverse Transition II (adjusted OR: 3.97, 95% CI: 1.28, 12.26). The susceptible participants who thought it was easy or very easy to purchases cigarettes were more likely to experiment or start smoking cigarettes.

4.8.2.3 Adverse Transition III

Gender had the strongest effect on Adverse Transition III. Among the experimenters, the odds of a male becoming a current smoker during the twelve months follow-up was fourteen times more compared to a female, in the same group. Experimenters whose best friends' smoke or siblings smoke or always having conflicts with their parents had very high odds of moving to a higher stage of smoking. A reduction in the religiosity score (adjusted OR of 1.23) and an increase in sensation seeking scores (adjusted OR of 1.14) significantly increased the odds of Adverse Transition III. Exposure to anti-smoking campaigns did not influence the Adverse Transition III but those who thought it was very easy to purchase cigarettes were nearly fourteen times more likely to become a current smoker.

4.8.2.4 Adverse Transition IV

Only five factors were associated with Adverse Transition IV. Ex-smokers who had a best friend who smokes had high odds (adjusted OR of 37.42) of becoming a current smoker again. Ex-smokers who felt that it is very easy to purchase cigarettes are also more likely to begin smoking again (adjusted OR of 10.92). A decrease in school adjustment score (adjusted OR of 1.94) or a decrease in self-efficacy (adjusted OR of 1.78) scores were also correlated with Adverse Transition IV. School adjustment and

self-efficacy had the strongest effect on Adverse Transition IV compared to the transition of the other stages.

Table 4.21: Factors influencing the adverse transition by smoking stages, multivariate multinomial analysis

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Gender								
Female	1		1		1			
Male	3.19	2.32, 4.40	7.89	4.17, 14.91	14.28	4.32, 47.26		
Race								
Indians	1		1		1		1	
Malays	2.06	1.28, 3.32	5.89	2.17, 15.97	11.71	11.71, 11.71	27.14	2.62, 280.81
Chinese								
Others			6.86	1.60, 29.43				
School adjustment [c]	1.15	1.03, 1.29	1.39	1.13, 1.70	1.42	1.04, 1.93	1.94	1.24, 3.04
Best friends' smoking status								
No	1		1		1		1	
Yes	1.92	1.26, 2.94	4.15	2.18, 7.93	7.35	3.30, 16.38	37.42	6.10, 229.37

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
[d] Increase in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker
Not Significant

Table for 4.21 continued

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Siblings smoking status								
No	1		1		1			
Yes	1.81	1.17, 2.79	2.93	1.45, 5.90	6.35	2.80, 14.37		
Do not know					5.74	1.20, 27.39		
Frequency of Parent-teen conflicts								
No problems	1		1		1			
Sometimes	1.52	1.07, 2.17						
Often	2.88	1.42, 5.85	3.02	1.05, 8.71				
Always	2.31	1.29, 4.15	2.92	1.10, 7.75	8.40	2.35, 29.97		
Self-efficacy [c]	1.18	1.10, 1.28	1.42	1.26, 1.60	1.35	1.14, 1.60	1.78	1.47, 2.17
Religiosity [c]	1.09	1.04, 1.14	1.10	1.02, 1.20	1.23	1.10, 1.37		

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
[d] Increase in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker
Not Significant

Table for 4.21 continued

Factors	Adverse Transition I		Adverse Transition II		Adverse Transition III		Adverse Transition IV	
	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]	OR[a]	95% CI[b]
Sensation seeking [d]			1.14	1.08, 1.21	1.14	1.03, 1.25		
Exposure to antismoking campaigns								
Always	1		1					
Never	2.27	1.16, 4.43	3.97	1.28, 12.26				
Accessibility								
Very Difficult	1		1		1		1	
Very Easy	1.73	1.06, 2.84	4.12	1.29, 13.16	13.87	2.54, 75.80	10.92	2.13, 55.89
Easy	2.08	1.34, 3.24	4.30	1.52, 12.17	11.66	2.29, 59.41		
Difficult	1.91	1.19, 3.06	3.36	1.11, 10.24	10.76	2.12, 54.57		

Reference category: Stable never smokers
[a] Odds ratio
[b] Confidence interval
[c] Decrease in score by 1 unit
[d] Increase in score by 1 unit
Adverse transition I: transition from never smoker to susceptible never smoker, experimenter, current smoker or ex-smoker
Adverse transition II: transition from susceptible never smoker to experimenter, current smoker or ex-smoker
Adverse transition III: transition from experimenter to current smoker
Adverse transition IV: transition from ex-smoker to current smoker
Not Significant

Summary of chapter 4

Adolescents in this study were found to be in various smoking stages and during the follow-up conducted a year later, some adolescents had progressed to a higher smoking stage. This study clearly demonstrates that adverse transitions of smoking stages were associated with various socio-demographic, school, peer, parental and personal factors. Ethnicity, school adjustment, having a best friend who smokes, self-efficacy and perceived ease of accessibility to purchase cigarettes were associated with all four adverse transitions groups.

CHAPTER 5: DISCUSSIONS

Introduction

This chapter on dissussions begins with a brief overview of the research aims and their findings. The chapter is divided into two sections: (1) Section I will discuss the findings for the first and second objective of this study, (2) Section II will discuss the findings for the third and fourth objectives. This chapter concludes with describing the study's strengths and limitations. This chapter presents the findings according to the four main objectives in this study, as mentioned below.

1) To describe the prevalence and initial stages of smoking among Form One students in Kinta, Perak.
2) To determine the factors influencing the stages of smoking at the beginning of secondary school.
3) To identify adverse transitions of smoking stages after 12 months.
4) To study the factors influencing the adverse transition of smoking stages.

5.1 Brief overview of research

The current study was conducted to describe adolescents' cigarette use by using smoking stages, to expand the stage concept further by identifying the adverse transition of these stages and to determine factors associated with adverse transitions. In order to address these research objectives, we conducted a longitudinal prospective research on a cohort of adolescents. This study cohort was carried out in Kinta Educational institutions (secondary schools) and two point data collection was used. Multistage sampling method was applied to select the respondents for this study. The selected students completed a self-administered structured questionnaire during school hours.

Prior to the data collection, we developed a questionnaire based on previous literature on tobacco use among adolescents. The questionnaire was used to gather information on key domains (socio-demographic, school, peer, family, individual characteristics and external environment factors) in an adolescents' life.

Content and face validity was tested by an expert panel and core elements for the instrument were identified. The finalized questionnaire consisted of 19 subscales. Kappa correlation for the categorical items ranged from 0.54 to 0.93. Coefficient alpha reliabilities, calculated for this sample showed an acceptable ranged from 0.75 to 0.93. Self-efficacy and sensation seeking subscale had the highest reliability scores. The results from both test retest and internal consistency shows stability of this instrument over time and the consistency of the test items in measuring the same domains. The developed instrument can be used to identify factors influencing the transition of smoking stages.

At baseline, the adolescents were categorized into different smoking stages based on information provided by the students on their smoking status in the questionnaire. At the end of twelve months the adolescents were assessed using the same questionnaire. Hence, we were able to explore the changes in the adolescents smoking behaviour. In the twelve-month period there were some changes in the smoking behaviour among the students in the cohort. The analyses indicated various predictors of smoking influence, different smoking stages as well as at the adverse transition of the smoking stages.

Section I

5.2 Prevalence of smoking

5.2.1 Prevalence of different stages of smoking

In this study the prevalence of ever smokers among 12 year-old adolescents was 16% which is higher than the 7% prevalence reported in the 2006, National Health Morbidity Survey III (NHMS III). However, the 2009 Global Youth Tobacco Survey (GYTS) in Malaysia reported 30% of their participants to be ever smokers. Consistent with our national surveys, current smoking was measured by asking participants whether they had smoked at any time during the past 30 days prior to the survey. The prevalence of current smokers in our study was 6.2% which is again higher than 3.0% reported in NHMS III However, the figure was lower than the reported prevalence of 18.2% in GYTS 2009. The prevalence of smoking varies across the different surveys. This may be due to the difference in the participating adolescents' age groups. Local studies that reported a higher percentage was conducted among adolescents of an older age group. Similar studies conducted among similar age groups in United States, Australia (Victoria, W. & Geoff, S., 2008) and Thailand (Rudatsikira, Muula, Siziya, & Mataya, 2008) reported prevalence of current smoking as 4.3%, 4.2% and 9.6 %, respectively.

Susceptibility among non-smokers is another major problem unveiled by our study. In our study, we found that one out of every five adolescent non-smokers has a risk of becoming a smoker. Susceptibility is a precursor of tobacco use among adolescents (Choi, W.S., Farkas, A.J., Pierce, J.P., Berry, C.C., & Gilpin, E.A., 1997) as susceptible adolescents lack commitment not to smoke in the future (Jackson, C., 1998). The study by Jackson found susceptibility to be a strong predictor of smoking onset compared to exposure to family smoking and peer influences. Another study (Veeranki, S.P., Mamudu, H.M., Anderson, J.L., & Zheng, S., 2014), among adolescents aged 13-15years old from 168 countries found 12.5% of never smokers to be susceptible to

smoking. Since susceptibility carries risk of adverse transition to experimentation and regular smoking (Choi, W.S. et al., 2001; Pierce, J., White, M., & Gilpin, E., 2005) identifying susceptible adolescents is critical in optimizing any primary prevention anti-smoking campaigns.

Based on this study, 28.5% (6.6% experimenters, 18.6% susceptible never smokers and 3.3% ex-smokers) of our adolescents are at risk for regular smoking. Unger, et . (2002) reported that susceptible adolescents are two to three times more likely to start experimenting with cigarettes. There is evidence that experimentation with smoking by adolescents may result in them becoming regular smokers (Moore, M.A. et al., 2010; Park, S., Bae, J., Nam, B.H., & Yoo, K.Y., 2008). Therefore, it is also a priority to identify adolescents who are more at risk of becoming regular smokers instead of just focusing on those who are already regular smokers.

5.2.2 Gender difference in the prevalence of smoking

Based on this study, prevalence of smoking among male adolescents is higher compared to the female counterparts. Furthermore, prevalence of susceptible never smokers, experimenters and ex-smokers are also higher among the male adolescents. Malaysian National Health Morbidity and Mortality survey ("The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008) and Global Youth Tobacco survey ("Global Youth Tobacco Survey (GYTS), 2009 - Malaysia," 2009) have also reported similar pattern of more male smokers than female. Other smaller local studies also consistently report similar findings (Lee, L., Paul, C., Kam, C., & Jagmohni, K., 2005; Lim, K.H., Amal, N.M., et al., 2006). Malaysia is a patriarchal country (Lim, K.H. et al., 2010) with a social cultural environment that accepts male smoking as social norm but frowns upon female smoking.

The Surgeon General Report, 2012 stated that gender differences in smoking cigarettes vary across countries where prevalence tends to be higher among the males in Africa, Eastern Mediterranean, Southeast Asia, and Western Pacific. In contrast, the European countries and America do not show any significant gender difference in the smoking prevalence (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Nevertheless, female adolescents who are susceptible to smoking, experimenting or current smokers should not be neglected as this gender has been shown to have a lower likelihood of maintaining cessation efforts (Burt, R.D. & Peterson Jr, A.V., 1998). Social norms in our country do not support smoking among females but accepts smoking among males (Thambypillai, V., 1985). Thus, we should focus on strengthening efforts to build a society that disapproves of smoking behaviour regardless of their gender.

5.3 Factor associated with the different stages of smoking

5.3.1 Socio-demographic, peer, school and smoking stages

Through this study, we have identified some factors that are associated with the different smoking stages. Being a male, having best friends' who smoke, having eight or more relatives who smoke, smoking related self-efficacy and sensation seeking were all found to be associated with all four of the smoking stages. Studies have reported that males progress in the adverse smoking stages faster than the females (Mayhew, K.P. et al., 2000). Gender is a non-modifiable factor and thus our smoking prevention activities should focus on reducing acceptance of male smoking.

Studies conducted in other countries (Maxwell, A.E., Bernaards, C.A., & McCarthy, W.J., 2005; Townsend, L., Flisher, A.J., Gilreath, T., & King, G., 2006) as well as in Malaysia (Lee, L. et al., 2005; Lim, K.H., Amal, N.M., et al., 2006; "The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008) have shown adolescents' ethnic

background to be associated with tobacco use. Based on our study, Malays seem to have higher odds of being susceptible never smokers, current smokers or even ex-smokers despite the fact that many Muslim scholars in Malaysia have declared smoking to be sinful and forbidden in Islam (Shahrin, T.C., Azarisman, S.M., Melor, P.A., Jamalludin, A.R., & How, S.H., 2007). However, a comparison study conducted in Malaysia and Thailand reported that most Malaysian Muslim adults do not view smoking to be *haram* (Yong, H.-H., Hamann, S.L., Borland, R., Fong, G.T., & Omar, M., 2009). Therefore, there is a possibility that the Malay adolescents in Malaysia hold a similar view or they are not aware of religious rules against smoking. Efforts to reduce smoking among adolescents should take into account ethnic subgroups in any prevention activities.

We studied two school related aspects in relation to smoking status. The first factor is school connectedness, defined as the belief by students that teachers cared about their learning, about them as individuals and the students had sense of attachment to their school (Blum, R.W. et al., 2004; Rasmussen, M. et al., 2005). The second factor is school adjustment, referring adolescents' perceived ability to cope with their school work compared to their peers. Ours study results showed that high school connectedness and school adjustment are associated with desirable smoking status. The current study shows some associations between both the school factors and smoking stages. These findings corroborate with other studies (Dornbusch, S.M., Erickson, K.G., Laird, J., & Wong, C.A., 2001; Rasmussen, M. et al., 2005). Feeling connected to ones' own school reduces risky behaviour (McNeely, C.A., Nonnemaker, J.M., & Blum, R.W., 2002; Resnick, M.D. et al., 1997) and is also associated with less disruptive behaviours (Blum, R.W. et al., 2004). Schools provide an important venue for health intervention activities. These opportunities can be used to discourage tobacco use among adolescents.

Peer pressure, number of close friends who smoke and having a best friend who smokes are the three factors included under the peer domain in this study. Having a best friend who smokes is associated with all four stages whereas higher peer pressure was correlated only with experimenters and current smoking. In this study, it was found that peer influence, peer selection and also direct peer pressure to be strongly associated with current smokers. Current smokers may have selected friends with similar smoking behaviour and being in a group dominated by smokers may also exert direct and indirect pressure to continue smoking. In this study, we also found that ex-smokers reported high peer pressure to smoke. We do not know if ex-smokers will be able to maintain cessation when still befriending smokers. Many theories are used to explain the dynamics of peer influence over adolescents smoking behaviour (Kobus, K., 2003). Regardless of the pathways suggested by the theories, adolescents smoking refusal, experimentation, maintenance or cessation is influenced by their peers own smoking behaviour (Kobus, K., 2003).

5.3.2 Family influences and smoking stages

Among the family and parental factors tested in this study, having relatives who smoke cigarettes influences all four smoking stages. This association can mostly be explained by Social Learning Theory (Bandura, A., 1977) which emphasizes that adolescent learn and model behaviour by observing those in their immediate environment and whom they have more contact with (Kobus, K., 2003; Taylor, J.E. et al., 2004).

Many studies have reported the association between parents smoking habits and their children's smoking behaviour (Bricker, J.B., Andersen, M.R., Rajan, K.B., Sarason, I.G., & Peterson Jr, A.V., 2007; Hoving, C. et al., 2007). The findings of this study are congruent with the findings in other studies. We also found that sibling's smoking status

to be associated with experimenters and current smokers. Based on our findings in this study, smoking prevention efforts should focus more on siblings and peers. Also parental smoking behaviour encourages the adolescents to internalize smoking as norm.

Anti-smoking socialization practices such as direct ban on smoking by parents and home discussion as well as other family factors such as parents' expectations, parental monitoring and parental teen conflicts were tested as part of the factors under the familial domain on smoking stages. The results showed only parent-teen conflicts and home discussion to be associated with smoking stages. Parent-teen conflicts are associated with susceptible never smokers and experimenters and home discussions are associated with susceptible never smokers and current smokers. In other studies, constrained parent child relationship has been shown to be a risk factor for smoking (Fleming, C.B. et al., 2002; Kristjansson, A.L., Sigfusdottir, I.D., Allegrante, J.P., & Helgason, A.R., 2009; Pahl, K. et al., 2010). Studies on family context have reported on the protective role of parental monitoring and parental expectations on smoking (Engels, R.C. & Willemsen, M., 2004; Grenard, J.L. et al., 2006; Pokhrel, P. et al., 2008; Simons-Morton, B.G., 2004).

5.3.3 Personal factors and different smoking stages.

We found smoking-refusal self-efficacy and sensation seeking to be correlated with all four smoking stages. Self-efficacy is a key construct of Social Cognitive Theory (Bandura, A., 1986) and is also emphasized in other health behaviour models such as Theory of Planned Behaviour (Ajzen, I., 1991). Self-efficacy among the ever smokers was lower when compared to never smokers and susceptible never smokers. Current smokers had the lowest smoking refusal self-efficacy score and the strength of association was strongest between lower self-efficacy scores and current smokers. Youth smokers who lack self-efficacy to avoid smoking, believe smoking to be

beneficial (Sterling, K.L. et al., 2007) and current smoking status of adolescents, intention to smoke, attitudes towards smoking and social norms are all related to self-efficacy (Hanson, C. et al., 2004). Although parental guidance influences behaviour of their children, it is not easy for parents to continuously monitor their children and prevent them from initiating or experimenting with smoking. Other strategies are needed to help prevent smoking among adolescents. Prevention strategies should focus on promoting smoking refusal self-efficacy skills to curb smoking initiation and help smokers quit smoking.

The findings of this study shows, sensation seeking to be associated with all four smoking stages. Sensation seeking stimulates adolescents to engage themselves in various risky behaviours, including cigarette smoking. Tobacco use among adolescents involves "risk taking", thus, attracts those who are sensation seekers. Studies have shown sensation seeking to predispose adolescents towards cigarettes smoking, substance abuse and also other problem behaviours (Bisol, L.W., Soldado, F., Albuquerque, C., Lorenzi, T.M., & Lara, D.R., 2010; Robinson, M.L., Berlin, I., & Moolchan, E.T., 2004). Thus, sensation seeking should not be ignored in smoking prevention initiatives. To address the issue of sensation seeking and smoking, studies have suggested the use of leave and avoid strategy; projecting smoking as a unexciting and not thrilling behaviour and using physical activity as an alternative to smoking (Greene, K. & Banerjee, S.C., 2008; Greene, K., Krcmar, M., Walters, L.H., Rubin, D.L., & Hale, L., 2000; Plumridge, E.W., Fitzgerald, L.J., & Abel, G.M., 2002).

Section II

5.4 Overview of section II

This section discusses on the last two objectives of the study and concludes with discussions on the strengths and limitations of this study. The third objective of this

study was to determine the adverse transition of smoking stages after twelve months. Cohort studies enable us to compare changes over time. In this study, the purpose is to understand the subsequent smoking stages compared to the baseline smoking stages. Adverse transition is defined as transition from one smoking stage at Time 1 to a more adverse stage in Time 2. Adverse stage was taken as a stage that was more detrimental (Kim, H. & Clark, P.I., 2006). We defined four groups of adverse transition in this study, as shown in Table 1. Adverse Transition I is one when a never smoker progresses to become either a susceptible never smoker, experimenter, current smokers or ex-smoker. Adverse Transition II is said to have occurred when a susceptible never smoker progresses to become an experimenter, current smoker or ex-smoker. Adverse Transition III is progression of experimenter to current smoker. Adverse Transition IV is where an ex-smoker returns to current smoking.

5.5 Incidence of adverse transitions after 12 months.

5.5.1 Age and adverse transition

Consistent with other studies (Kaplan, C.P., Nguyen, T.T., & Weinberg, V., 2008; Nazarzadeh, M. et al., 2013) we found the proportion of current smokers increased when adolescents advanced in their academic education level, in this study, from Form 1 to Form 2. This study supports the possibility of identifying a larger proportion of smokers if the duration of observation is increased to more than a year as suggested by other studies (Park, S. et al., 2010). In line with this, smoking prevention activities aimed at reducing smoking prevalence among adolescents should target primary school children and focus largely on how to prevent uptake or initiation of smoking.

5.5.2 Different smoking stages and adverse transition

Overall, adverse transition among adolescents in this study was 24%. Adverse transitions were highest among never smokers, followed by susceptible never smokers

and experimenters. It was the lowest among ex-smokers. A higher proportion of both male and female experimenters become current smokers compared to susceptible never smokers. This finding is in line with previous studies that have established that experimental smokers have high risk of becoming regular smokers (Park, S. et al., 2009).

At the end of one year, a higher percentage of susceptible never smokers became current smokers when compared to never smokers. This finding is consistent with previous studies that also reported a higher risk of adverse transition among susceptible never smokers (Spelman, A.R., 2007). Among those susceptible never smokers at baseline, the chances of a female adolescent becoming an experimenter is similar to that of a male adolescent. Susceptible never smokers are open to the possibility of smoking compared to never smokers who are committed to not smoking (Pierce, J.P. et al., 1996).

Studies have reported progression from never smoking to become susceptible never smokers as the first step to regular smoking (Leventhal, H. & Cleary, P.D., 1980; Pierce, J.P. et al., 1996) and susceptibility among adolescents increases the risk for initiation up to 3.3 times (Huang, M., Hollis, J., Polen, M., Lapidus, J., & Austin, D., 2005). One research demonstrated that even being friends with susceptible never smokers affect future smoking behaviour (Hall, J.A. & Valente, T.W., 2007). As regular smoking is a major contributor of adverse health outcomes, morbidity and mortality (Centers for Disease Control and Prevention, 2000) as well as premature deaths , identifying susceptibility and preventing adverse transition among this group of adolescents group should be top priority in any anti-smoking initiatives.

The findings in this study indicate that the risk of becoming a smoker increases with the progression of smoking stages. Thus, early interventions designed to reduce

susceptibility and initiation can help to reduce future risk for regular smoking during late adolescence.

5.5.3 Gender differences on adverse transition

In the twelve-month period, the incidence of adverse transition was higher among the male adolescents, 16.8%. This is consistent with other studies (Mohammadpoorasl, A., Nedjat, S., Fakhari, A., Yazdani, K., & Fotouhi, A., 2014; Qian Guo., 2008; Spelman, A.R., 2007) that found adverse transitions to be higher among male adolescents. However, there are also studies that found a greater risk of adverse transitions among females (Lloyd-Richardson, E.E. et al., 2002; Richmond, R., 1999) and studies that showed no significant differences between gender (Kaufmann, N.J. et al., 2002). Malaysia is similar to other Asian countries where parents are more protective and tend to pay more attention to their daughters' social behaviours (Lim, K.H., Amal, N.M., et al., 2006; Thambypillai, V., 1985)et al. 2006) Smoking is also found to be more acceptable among males than females in the Asian communities (Thambypillai, V., 1985). Hence, we should not ignore the role of gender differences in our tobacco policy. It is important to change the mind-set of those who accept smoking among males. Studies have shown that gender itself is a single major risk factor for tobacco use (Morrow, M. & Barraclough, S., 2003).

5.6 Factors associated with adverse transition of smoking stages

This study provides new insights with regards to adverse transition of smoking stages among adolescents in Malaysia and factors associated with this process. To our knowledge, this is first local study to explore adverse transition of four different smoking stages. We examined the role of multiple factors in association with the adverse transition among adolescents. There were some similarities as well as differences in the factors associated with the different group of adverse transitions.

However, despite the similarities, the strength of association was different as some factors were more relevant to one group of adverse transition than the others. Our findings showed that ethnicity, school adjustment, having a best friend who smokes, self-efficacy and perceived ease of accessibility to purchase cigarettes are associated with all four adverse transitions groups. Siblings' smoking status, always having conflicts with parents, religiosity and sensation seeking do not influence adverse transition among ex-smokers. Exposure to anti-smoking campaigns was only associated with adverse transition of both non-smoking stages.

5.6.1 Socio-demographic factors

Gender and adverse transition

Gender was significantly associated with three of the adverse transitions, except Adverse Transition IV. Among never smokers, susceptible never smokers and experimenters, the males are more likely to progress to adverse transition. This finding is consistent with other studies (Karp, I., O'loughlin, J., Paradis, G., Hanley, J., & Difranza, J., 2005; Mohammadpoorasl, A. et al., 2014). Based on the findings in this study, males are associated with undesirable smoking stages and they are also more prone to progress to more advanced transition stages. It is interesting to note that studies conducted among Asian populations often reported that smoking is perceived as a sign of manhood and not suitable for females (Morrow, M., Ngoc, D.H., Hoang, T.T., & Trinh, T.H., 2002; Ng, N., Weinehall, L., & Öhman, A., 2007). Among the countries that participated in the GYTS 2000 - 2007 study, 59 reported higher prevalence of smoking among males, five reported higher prevalence of smoking among females and 87 reported that there was no difference in prevalence of smoking between males and females (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Studies on progression to adverse transitions did not show consistent gender differences; some showing higher escalation among male

adolescents (Spelman, A.R., 2007), some reporting higher escalation among female adolescents (Lloyd-Richardson, E.E. et al., 2002) and some reporting no difference (Kaufmann, N.J. et al., 2002). Once again, it is important to note that, in Malaysia, being a male itself is a risk factor for adverse smoking.

Gender is a prominent non-modifiable risk factor for current smoking stage as well as the subsequent adverse transition of the smoking stage among adolescents. Prevention efforts should emphasize that smoking is hazardous to both male and female adolescents. People should be encouraged to frown upon all those who smoke, regardless of the smoker's gender. This study did not explore the reasons for smoking among male and female but previous studies have that shown that motives for cigarette smoking tend to vary by gender (Turner, L., Mermelstein, R., Flay, B., Dahl, R.E., & Spear, L.P., 2004). The higher tendency of current smoking and escalation to a more adverse smoking stage among male adolescents in our study is most probably due to these adolescents viewing smoking as signs of maturity and manhood as noted in other studies (Morrow, M. et al., 2002; Ng, N. et al., 2007). In addition, Asian social cultural environment accepts smoking among men as normal behaviour (Lim, K.H., Amai, N.M., Norhamimah, A.B., Stimami, M.G., & Wan Roziia, W.M., 2006). These are among the major hurdles to overcome in order to prevent adverse transitions of smoking stages and reduce smoking prevalence, especially among the male adolescents.

Ethnicity and adverse transition

Adolescent smoking behaviour has been shown to vary across racial and ethnic groups as the acculturation process, ethnic identity and cultural norms are diverse (Tjora, T., Hetland, J., Aarø, L.E., & Øverland, S., 2011). Malaysia being a multi-ethnic country with three main ethnic groups of Malays, Chinese and Indians (Yoo, K.Y., 2010) also has similar ethnic variations. Previous cross sectional studies conducted in

Malaysia have often reported a higher prevalence of smoking among the Malay population (Lee, L. et al., 2005; "The Third National Health Morbidity Survey, 2006 (NHMS III)," 2008).

In general, the Malay adolescents in our study showed a high risk of progressing to more adverse level of smoking. In this study, we found a very high risk of relapse among the Malay adolescents whom at Time 1 reported to have quit smoking but at Time 2 were current smokers. We also found no significant difference in adverse transition between the Chinese and Indian adolescents. This postulates that cultural differences may play a role in smoking transitions. A local study by Lee et al, 2005, suggested the higher smoking prevalence among Malay adolescents may be associated with the higher prevalence of smoking among Malay fathers. In our study a higher percentage of Malay adolescents reported having at least one parent who smokes. It would be interesting for future studies to explore if adolescents from different races had different motives, perceptions and expectations of cigarette smoking. The advocates of public health should aggressively promote a new cultural norm (Malaysian culture) which is against smoking among adolescents and adults so that we can reduce prevalence of smoking and incidence of adverse transition among all races.

5.6.2 Peer factors

The link between peer factors and adolescent smoking is robust (Bricker, Jonathan B et al., 2007; Laukkanen, E., Korhonen, V., Peiponen, S., Nuutinen, M., & Viinamäki, H., 2001). The current study included best friends' smoking behaviour, number of close friends who smoke and the presence of direct peer pressure to smoke. Previous studies have reported that friendship groups influenced the early stages of smoking whereas best friends' behaviour to be a good predictor of adolescent smoking and continued use of tobacco products (Morgan, M. & Grube, J.W., 1991). This study found that best

friends' smoking status to be one of the strongest predictors of adverse transition. The strongest effect of best friend smoking status was on adverse transition among ex-smokers and experimenters. It is possible that adolescents regard smoking as a way to mingle and fit in with certain peer groups (Herrick, L.K., 2009). A higher percentage of experimenters, current smokers and ex-smokers in this study reported having best friends who smoke cigarettes compared to never smokers. This could be the reason why best friends' smoking status showed a weaker association to adverse transition among never smokers.

In agreement with social modelling mentioned in Social Cognitive Theory (Bandura, A., 1986) adolescents who were non-smokers could have started smoking because they were trying to model people they admire, for example close friends. Another possible explanation is in the Socialization Theory which explains that friends who smoke can persuade other adolescents to smoke as well (Park, S. et al., 2009). In our study susceptibility to smoking was measured using intention to smoke in the future. The existence of intention to smoke among susceptible never smokers could have led these adolescents to seek friendship with those who were already smoking.

The results from our study revealed that the risk of adverse transition among ex-smokers who have best friends' who smoke was very high. This postulates that still befriending peer who smokes could be a barrier to the success of any smoking cessation activities among adolescents. Unlike adults who normally buy their own cigarettes, adolescents more often get their cigarettes from friends (Robinson, L.A., Dalton III, W.T., & Nicholson, L.M., 2006). We did not find direct peer pressure to smoke to be associated with the adverse transition of smoking stages and very few studies have reported peer pressure to influence adolescent smoking (Hoving, C. et al., 2007). Adolescents seldom complain of friends pressuring them to smoke (Mermelstein, R.,

1999) and some studies have reported that decision to smoke was not due to peer pressure (Michell, L. & West, P., 1996; Nichter, M., Vuckovic, N., Quintero, G., & Ritenbaugh, C., 1997). There are also studies that have reported direct pressure to play a role in peers discouraging others from smoking (Stanton, W.R., Lowe, J.B., & Gillespie, A.M., 1996). However, being with friends who smoke may be a cause of indirect pressure to smoke because of adolescents' need for acceptance and belonging (Guo, Q., Unger, J.B., Palmer, P.H., Chou, C.-P., & Johnson, C.A., 2013; Mermelstein, R., 1999).

It is true that, in this study, the adolescents may already had best friends who smoke prior to the progression to a higher stage but this still does not reflect the peer selection process. More in depth studies on peer selection process and stability of the peer relationship influence on smoking would be useful. Such studies would enable us to accurately determine if the role of best friend smoking has been overestimated and the role of selection underestimated.

5.6.3 Familial factors

In this study we considered several aspects of familial influence. Understanding familial influences on adolescent smoking progression is important in formulating prevention activities. First we examined role modelling of parents smoking, sibling smoking and relatives smoking. The second source of influence included parental monitoring, parental expectations and frequency of parent-teen conflicts. We also examined the presence of antismoking socialization practices such as setting a no smoking rule and having discussions on smoking hazards with their children.

We found siblings smoking status to influence adverse transition among never smokers, susceptible never smokers and experimenters. However, we did not find any association with parents' smoking behaviour. Siblings smoking status was strongly associated with adverse transition of experimenter. Some studies have shown parental

smoking behaviour to influence adverse transition (Brook, J.S., Pahl, K., Ning, Y.,, 2006; Kristjánsson, Á.L., 2010) among adolescents but there are also studies that showed no associations (Distefan, J.M. et al., 1998; Walsh, S.D., Harel-Fisch, Y., & Fogel-Grinvald, H., 2010). Although there are not many studies that have examined the association between siblings smoking and adverse transition, literature shows that older siblings' smoking status to be an influential factor in initiation and smoking progression of adolescents, more intense than parents' smoking status (Bricker, J.B. et al., 2006; Hill, K.G., Hawkins, J.D., Catalano, R.F., Abbott, R.D., & Guo, J., 2005). In our study siblings smoking status and best friends smoking had almost similar strength of association with adverse transition among experimenters (Adverse Transition III). This is consistent with a previous study that reported effects of siblings' smoking to be as strong as effects of peer smoking (Bricker, J.B. et al., 2006).

Constrained parent-teen relationship is another important familial factor that is associated with adolescents smoking status (Fleming, C.B. et al., 2002; Sanchez, Z.M., Opaleye, E.S., Martins, S.S., Ahluwalia, J.S., & Noto, A.R., 2010). In our study, frequency of conflicts with parents was found to be associated with adverse transition but the associations vary across the four different adverse transition groups. Adverse transition among experimenters (Adverse Transition III) was only associated with always having conflicts with parents. Adverse transition among ex-smokers (Adverse Transition IV) had no association with parent-teen conflicts and among the never smokers (Adverse Transition I) even having conflicts sometimes was found to be associated with their progression to a higher stage. One possible explanation for this difference is that, at baseline, a higher percentage of the experimenters in our study reported as always having conflicts with their parents. However, further studies are needed to identify why frequency of parent-teen conflicts affect the adverse transition groups differently.

5.6.4 **Personal characteristics**

Previous studies on adolescent smoking were short of exploring intrapersonal and interpersonal variables' influence on different smoking stages. To our knowledge, this is the first study that explored the effect of intrapersonal and interpersonal factors on adverse smoking transitions. In our study self-efficacy, religiosity and sensation seeking were seen to influence some or all adverse smoking transitions. Although these three intrapersonal factors strength of association was weak it should not be overlooked.

Self-efficacy

Smoking related self-efficacy has been shown to influence smoking initiation (de Vries, H., Dijkstra, M., & Kuhlman, P., 1988; Holm, K., Kremers, S.P., & de Vries, H., 2003) smoking intentions (Markham, W. et al., 2009; Vitória, P.D., Salgueiro, M.F., Silva, S.A., & Vries, H., 2009) and future smoking behaviour (Hiemstra, M., Otten, R., de Leeuw, R.N., van Schayck, O.C., & Engels, R.C., 2011; Lawrance, L., 1989). Self-efficacy to avoid smoking in our study was derived from questions that tested the adolescents' ability to resist smoke-tempting situations. In our study, lower score of self-efficacy was correlated with adverse transition. Other studies (Engels, R.C. et al., 2005; Van Zundert, R.M., Engels, R.C., & Van Den Eijnden, R.J., 2006) have also found lower self-efficacy to be correlated with higher risk of transition across time.

In agreement with another research finding, a possible explanation for the influence of self-efficacy in progression is that, once smoking has been initiated or adolescents have already experimented with smoking, they probably feel that it will be difficult to resist smoking offers or temptation to smoke. Under these conditions, these adolescent are more likely to progress to a higher stage (Van Zundert, R.M. et al., 2006). In cessation studies, one also looks also at the ability to refrain from smoking after quitting (Dijkstra, A. & De Vries, H., 2000). In this study a decrease in smoking related self-

efficacy score increases the chance of relapse among ex-smokers by 78%. We found an increase risk to relapse back to current smoking among ex-smokers when there is a decrease of smoking related self-efficacy. Adolescents' who were ex-smokers at Time I probably lack in conviction to resist smoking and this could be the possible explanation for our finding.

Smoking prevention activities should include promoting and building adolescents self-efficacy to refuse smoking cigarettes. More recent studies have reported that self-efficacy is subjected to change and this suggests that it is not enough to include self-efficacy in prevention activities, but it will be also beneficial to periodically repeat and reinforce adolescents smoking related self-efficacy skills to help maintain abstinence and also avoid progression to a higher stage (Hiemstra, M. et al., 2011).

Religiosity

Religion can be defined broadly as a concept with three main characteristics: beliefs, religious practices and religious sentiments that are shared by people of the same faith (Borras, L. et al., 2007). Islam, Christianity, Buddhism and Hinduism are the most commonly practised religions in Malaysian. Most religious scriptures are very old and do not specifically forbid tobacco use (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Over the years some Islamic and Buddhist scholars have declared prohibition on smoking (World Health Organization, 2002a; Yong, H.-H. et al., 2009).

During the past few years smoking has become a religious issue for the Muslims in Malaysia. Following the increasing evidence of smoking hazards, many Muslim scholars have issued Fatwa' against smoking and according to Syariah, smoking is considered sinful and forbidden (Shahrin, T.C. et al., 2007; World Health Organization Regional Office for Eastern Mediterranean., 1996; Yong, H.-H. et al., 2009).

Our study is the first study to look at the relationship between religiosity and adverse transition of smoking stages. In this study we found adolescents' lower religious affiliation contributes to higher risk of adverse transition among never smokers, susceptible never smokers and experimenters. The inverse association was strongest for adverse transition among experimenters. Previous studies also supports our evidence of the religions' protective role against smoking (Sanchez, Z.M. et al., 2010; Yong, H.-H. et al., 2009) and progression of smoking stages (Choi, W.S. et al., 2002; Metger, A., Dawes, N., Mermelstein, R., & Wakschlag, L., 2011).

The possible explanation for the negative association between religiosity and escalation of smoking stages is that religious activities tend to decrease adolescents association with non-religious peers who may encourage them to smoke (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Religion could be used to create positive attitude among adolescents in order for them to stay away from smoking.

Sensation seeking

Sensation seeking and risk taking behaviour is similar because both are associated with thrill seeking behaviour (Burt, R.D. et al., 2000). Individuals with sensation seeking tendencies have increased susceptibility to substance use as they normally get attracted to stimuli that are intense, novel and arousing (Donohew, L. et al., 2000; Urbán, R., 2010). Sensation seeking has been used to predict the different adolescent smoking behaviours such as initiation of smoking (O'Loughlin, J., Karp, I., Koulis, T., Paradis, G., & DiFranza, J., 2009; Spillane, N.S. et al., 2012), and progression from one smoking stage to a higher stage (Bricker, J.B. et al., 2009). In our study, the four domains of sensation seeking: experience seeking, boredom susceptibility, thrill and adventure seeking, and disinhibition were tested. The results from this study show that

sensation seeking, to some extent, is able to differentiate adverse transition among susceptible never smokers and experimenter from the remaining two adverse transition groups. Studies have found sensation seeking to be a predictor of transition from experimental smoking to regular smoking (Skara, S. & Dent, C.W., 2001) and of smoking initiation. Susceptible never smokers in our study had a higher sensation seeking score compared to never smokers. Experimenters had a higher score than current smokers. As sensation seeking traits increase, the risk for escalation to a higher stage smoking also increases. However, though ex-smokers in our study had the highest sensation seeking scores, this did not influence the adolescents of this stage to relapse back to current smoking. This is not in agreement with other studies that reported the higher is the trait-impulsivity the harder it is to maintain abstinence (Doran, N., Spring, B., McChargue, D., Pergadia, M., & Richmond, M., 2004; Kahler, C.W., Spillane, N.S., Metrik, J., Leventhal, A.M., & Monti, P.M., 2009).

5.6.5 Environmental Factors

Perceived accessibility to cigarettes

In this study, the association between adverse transition and perceived access to cigarettes among adolescents was examined. The results indicated that adolescents' perception of accessibility to cigarettes influences adverse transition of smoking stages. In this study, we found that adolescents who perceive accessibility to cigarettes as easy or very easy had higher risk of progressing to a more detrimental smoking stage. Studies among adolescents have reported that perceived ease of access to cigarettes is associated with susceptibility to smoking, initiation of smoking and being a regular smoker (Ertas, N., 2007; Robinson, L.A., Klesges, R.C., Zbikowski, S.M., & Glaser, R., 1997).

Despite the presence of enforcement laws against sale of tobacco to underage adolescents, increasing cost of cigarettes and taxation that makes it difficult to access

cigarettes, uptake of smoking among many youths still occurs daily (Doubeni, C.A., Li, W., Fouayzi, H., & Difranza, J.R., 2008). In Malaysia, Control of Tobacco Products Regulation, 1993 prohibits smoking in public places and selling cigarettes to adolescents less than eighteen years old. However, accessibility to getting cigarettes is not limited to the ability to purchase cigarettes at retail shops but includes the possibility of getting their supplies from peers and at home. Parents who smoke cigarettes could unknowingly be supplying their adolescent children with cigarettes. Our results suggest that adolescents' perception of very easy accessibility to cigarettes strongly affected the adverse transition of experimenters. While recognizing this, we must keep in mind that those who were classified as experimenters and ex-smokers at Time I would have already had access to cigarettes before progressing or relapsing back to current smoking.

Exposure to antismoking campaigns

The predictive role of exposure to anti-smoking campaigns on adverse transition was also examined in this study. It was surprising to find some adolescents (7.4%) reported of never being exposed to any anti-smoking campaigns. It is true that during the major nationwide 'Tak Nak' anti-smoking campaign in 2004, the adolescents in this study were merely between five to six years old. Nonetheless, it is surprising that these adolescents were not exposed to any anti-smoking campaigns in their respective schools. It was evident that never being exposed to anti-smoking campaigns was significantly associated with Adverse Transition I and II. Adolescents from this group were never smokers and susceptible never smokers at Time 1. Adverse transition among never smokers showed only a weak association with exposure to anti-smoking campaigns as committed never smokers are more likely to pay attention to anti-smoking advertisements. Our findings postulate that anti-smoking messages have strong roles to play among those who have not initiated smoking. Persistent positive findings on the

effect of anti-smoking campaigns on smoking have been shown in many studies (Caixeta, R.B., 2013; Farrelly, M.C., Davis, K.C., Duke, J., & Messeri, P., 2009; Wakefield, M. & Chaloupka, F., 2000). However, some studies emphasize that effectiveness of campaigns depends on the type of media, type of messages, gender and various other factors (Siegel, M. & Biener, L., 2000; Yasin, S.M. et al., 2013). Thus, before embarking on any anti-smoking campaign all associated factors such as, what is the target cessation or prevention and who are we targeting must be decided for the campaigns to be effective.

5.7 Strengths and limitations of research

5.7.1 Strengths

This study has several strengths. The current study is the first study in Malaysia to examine adverse transition of smoking stages among adolescents. Previous smoking studies focused mainly on prevalence of smoking, factors related to smoking and smoking cessation. This longitudinal study allowed us to follow a cohort of adolescents over time. Thus, this study was able to explore the changes in adolescents' smoking behaviour. By identifying the different stages of smoking and adverse transition of the stages, this study provides provisions for comprehensive prevention programmes.

This study is superior to most previous studies in that it takes into account several factors such as peer, school, familial and personal factors involvement with different stages and adverse transition. This allowed us to identify the factors that play important roles and the strengths of associations at each stage of smoking.

Cohort studies are vulnerable to selection bias. However, this threat was minimized as this study not only has a large sample size; it also has a high response rate (90.7% at baseline) and a low attrition rate (12.5% after T2). In addition to the longitudinal study design, which was used to study transitions, the familial, peer, school and personal

factors as examined at baseline were helpful in identifying the temporal relationship between the independent factors and outcome.

Finally, the sampling design used in this study enables making generalization to the population of adolescents in government schools. The complex sampling procedures used in the analyses were most appropriate for the sampling design.

5.7.2 Limitations

This study has limitations that need to be considered when interpreting the results. Given, that the participants of this study were drawn from government secondary schools, we cannot generalize the findings of this study to non-schooling adolescents and adolescents from private schools. Limited to adolescents aged twelve to thirteen years old, the findings of this study can neither be generalized to older adolescents.

This study did not explore the possibility of change over time on the exposure factors. Therefore, further studies are needed to explore the association between these time varying factors and adverse transition.

The statistical modelling approach using multinomial logistic regression after adding student and school weights that were adjusted for non-response is generally appropriate but is limited when considering within school clustering effect.

Similar to other studies (Alireza Ayatollahi, S. et al., 2005; Kaufmann, N.J. et al., 2002) data for the current study was collected through self-reports by adolescents. Even so, there are studies that have shown self-reports to be generally reliable (Dolcini, M.M., Adler, N.E., Lee, P., & Bauman, K.E., 2003; Mokdad, A.H., Marks, J.S., Stroup, D.F., & Gerberding, J.L., 2004). No biochemical verification was used to confirm smoking status of these adolescents. Since this study did not validate self-reports of smoking behaviour, misclassification error could have occurred. However, all the

smoking stages have the similar probability of being misclassified. Although the research team made efforts to reassure the confidentiality of the data, still some adolescents may have given false information on their smoking behaviour due to fear of disciplinary actions. As mentioned previously the Asian community does not approve of smoking among women. Consequently, the adolescent females in this study may have been hesitant to admit to smoking or experimenting. This leads to the possibility that this study underestimated smoking among the adolescents.

Summary of chapter 5

The findings of this study suggest that various factors influenced the adverse transition of smoking stages. Among the various factors; ethnicity, school adjustment, having a best friend who smokes, self-efficacy and perceived ease of accessibility to purchase cigarettes were associated with all four adverse transitions groups.Some factors for example parents' smoking status and parent-teen conflicts that were found to be associated with transitions or smoking stages in other studies were not significant in this study. This could be related to cultural, definitional and other methodological differences in this study.

CHAPTER 6: PUBLIC HEALTH IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS

Introduction of this chapter

It is common knowledge that smoking is hazardous (Van Zundert, R.M. et al., 2006). Tobacco use leads to high mortality and morbidity. Tobacco related diseases have been reported as the single most important cause of preventable deaths (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Tobacco use is one of the most modifiable causes of not only cancer but also other diseases in Malaysia (Conrad, K.M. et al., 1992). Annually, in Malaysia, nearly 10000 deaths are said to be related to smoking and the government spends about USD One billion to treat smokers for various smoking related diseases (Thornton, W. et al., 1999). Hence, Malaysia has taken several steps to reduce the prevalence of smoking among our population. This chapter starts with an overview of Malaysian tobacco control initiative, postulates the likely public health implications and presents conclusions and finally future research recommendations.

6.1 Tobacco control initiative

The Malaysia government has taken several steps to address the tobacco problem in our country. The approaches taken can be divided to: 1) regulations and policy driven; 2) large mass media campaigns; 3) approaching small environments.

Since the ratification of the Framework Convention of Tobacco Control (FCTC), Ministry of Health Malaysia acts as the National FCTC secretariat and ensure that Malaysia complys to provisions of the FCTC. In Malaysia, the Control of Tobacco Product Regulations (CTPR) 1993 and subsequent amendments is regulated under Food Act of 1983. The CTPR placed bans on tobacco advertisements, promotions and sponsorships; it regulated tobacco packaging, labelling, taxes and cigarette prices;

prohibited individuals below 18 years old to be in possession of tobacco and sales to these group was also banned.

The next step was to have nationwide mass media campaigns. In 2004, a nationwide anti-smoking campaign (*TAKNAK*) was launched to educate the adolescents regarding smoking health hazards. The Malaysian government further took efforts to promote and create public awareness on the negative impacts of smoking through several media such as television and radio (Wee, L.H., West, R., Bulgiba, A., & Shahab, L., 2011; Yasin, S.M., Retneswari, M., Moy, F.M., Koh, D., & Isahak, M., 2011). The third step was to address small social environments such as schools and clinic and hospital settings. Ministry of Education Malaysia help organise school-based programmes mainly consisting of peer counselling, health talks, exhibitions aimed to prevent smoking initiation and encourage cessation among those who are smoking. Whereas the Ministry of Health regulates the setting up of cessation programmes in government primary and tertiary health care centres.

It is worrying that with all the efforts taken, our findings still show an increase in current smoking among adolescents aged thirteen years old compared to previous national studies and one in sixteen adolescents are experimenting with tobacco. This study also showed that among this young group there are also those who admit being ex-smokers and therefore, at risk of becoming a smoker again. Studies have shown that smoking from an early age increases risk for cancer (Golbasi, Z., Kaya, D., Cetindag, A., Capik, E., & Aydogan, S., 2011) and is also associated with risk of substance abuse (Chen, X. et al., 2002; National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Therefore, there is a need to intensify our efforts to combat tobacco use among adolescents. This study was undertaken to further explore adolescent tobacco use and to refine our understanding of

the etiological factors that contribute to adverse transition of smoking stages. I believe that the findings reported in this study contributed to a more detailed understanding of the factors that influence progression of smoking stages.

6.2 Public health implications and recommendations

This study's findings add two major contributions to knowledge in the field of adolescents smoking in our local setting. It is important to identify adolescents smoking stages. The current study also demonstrated that the adverse transition of any smoking stage is associated with many peer, school, familial, personal factors and environmental related factors.

The current study has found adolescents in lower secondary are in different stages of smoking behaviour and have different risks to progress to a higher stage of smoking. There is a higher tendency for susceptible never smokers and experimenters to progress to current smoking compared to never smokers. Considering this fact, it may be critical to categorize adolescents into different stages when carrying out interventions to help reduce the prevalence of smoking among adolescents. Tobacco prevention activities that do not consider the heterogeneity or the different smoking stages of the smokers may overlook adolescents who are at higher risk for adverse transition.

This study was conducted among a cohort of Form One students who were between twelve to thirteen years old. We found that even among this group of young adolescents, there were those who were experimenting, some who were current smokers and even ex-smokers. In this study, current smoking prevalence also increased at follow-up. These findings suggest the importance for early public health smoking prevention activities. Aggressive and consistent primary preventions against smoking cigarettes should be part of primary school policies. This can help decrease smoking uptake and experimentation among adolescents as they grow older. In agreement with a

meta-analysis that found tobacco prevention programmes that continue for a longer period of time to be more effective (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012) our smoking prevention efforts need to be continuous to be able to show a decline in smoking prevalence in every cohort of adolescent.

Intensive primary prevention efforts should target susceptible adolescents and experimenters who have higher risk for adverse transitions. Health care professional, teachers and parents should take efforts to identify non-smoking adolescents' who may be susceptible. Studies have shown adolescents to prefer receiving information on tobacco from medical physicians (Marcell, A.V. & Halpern-Felsher, B.L., 2007). Thus, health care professionals have an important role to play in our prevention activities. Prevention efforts targeting non-smokers should support and reinforce the benefits of their non-smoking behaviour and pay special attention to those who are categorized as susceptible never smokers. Exposure to anti-smoking campaign was not associated with adverse transition of experimenters. Therefore, there is a need to carry out specific activities targeting experimenters. Prevention activities for experimenters can include strategies to increase smoking refusal self-efficacy, counselling if parent-teen conflicts and school adjustment problems are present and portraying smoking as something that is not exciting.

This study clearly demonstrates that adverse transition of smoking stages was associated with various socio-demographic, school, peer, parental and personal factors. The magnitude of the effects varied across the different levels. An intervention strategy that focuses on a single dimension for example familial factors only may not be effective. Development of interventions for smoking prevention should be multi-facet and consideration should be given to using different strategies to target adolescents at

different smoking stages. Prevention efforts that did not consider the heterogeneity of smoking stages among the adolescents may fail to successfully reduce smoking prevalence. Hence, for better outcomes we should develop smoking prevention activities according to specific smoking stages of the targeted adolescents. Smoking stage specific intervention approach should be used instead of treating all adolescents as a homogenous group. For example to prevent non-smokers from becoming ever smokers, we should ensure they are constantly exposed to anti-smoking activities and campaigns. Smoking cessation efforts among ex-smokers should first address the issue of peer influence. Strategies to empower ex-smokers with smoking refusal self-efficacy skills are important to prevent them from smoking again.

The Surgeon General report suggests that the effectiveness of some prevention programmes implemented among a culturally diverse or multi ethnic population may vary according to the individuals' cultural or ethnic background (National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health, 2012). Given that Malaysia is a multi-racial country and this study also found an association between ethnicity and adverse transitions, public health policy makers should look at developing culturally sensitive intervention programmes. Gender also strongly influences adverse transitions. Therefore, it is important to explore and understand ethnic specific and also gender based risk factors for susceptibility, experimentation and adverse transition. This can help enhance efforts to reduce smoking prevalence in our population.

Even with the many regulations and restrictions, tobacco industries continue to spend billions on advertising and promotional strategies to normalize smoking behaviour. Hence, to contend against tobacco industry's efforts we need to use many different strategies and angles. Religion does seem to play a role in adverse transitions among

adolescents. Religious-based-centre service activities should be encouraged to advocate anti-smoking policies and discourage tobacco use.

The impact of self-efficacy was interesting as it was one of the two factors that showed association across the different smoking stages as well as influenced all four adverse transition groups. Although parental guidance influences behaviour of their children, parents cannot continuously monitor their children to prevent them from initiating or experimenting with smoking. Smoking refusal self-efficacy skills can play an important role in solving this problem. Prevention efforts should organize strategies to continuously empower, build, strengthen and help maintain adolescents smoking refusal self-efficacy skills to curb smoking initiation, to prevent experimenters from progressing to become regular smokers, help smokers to quit smoking and also to stay smoke free.

In summary, any interventions that aims to successfully reduce cigarette smoking and adverse transitions: need to be stage specific; able to address best friends' smoking behaviours and their influence on smoking uptake among adolescents; tailored to assist susceptible never smokers make a firm commitment not to smoke; work towards enhancing smoking refusal self-efficacy; designed to address gender and ethnic influence on smoking behaviour.

6.3 Conclusions

The specific aims of this study were to investigate different smoking stages and the factors associated with the stages. The current study also aimed to identify adverse transition of smoking stages and the association that exists between these transitions and various school, peer, familial and personal factors. This study is among the first attempt to examine longitudinal development of adverse transitions among our local adolescents as well as analysing the influence of socio-demographic, school, peer, familial and

personal factors on smoking stages and on the progression of the stages at follow up. The present study has contributed to our current understanding of escalation of smoking stages among Malaysian adolescents.

The first section of the current study examined the different smoking stages and factors that associated with the different stages. Our findings support stage conceptualization of adolescents' smoking behaviour and most factors seem to strongly differentiate higher smoking stages. In this study, one can observe that by using smoking stages to classify adolescents smoking behaviour, we can identify the many risk and protective factors of different smoking stages.

The longitudinal design of the current study allowed us to identify the changes in the smoking stages and provided us with information on adverse transition. The incidence of current smoking increased with age. We found susceptible never smokers and experimenters have higher risk have becoming regular smoker after a year. This shows that in addition to the age factor, the risk of adverse transition also varies according to smoking stages.

To further understand the relationship between various factors from different domains and adverse transitions, this study included many factors from five domains; socio-demographic factors, peer, school, familial and personal factors. It is clear that smoking stages and adverse transition is a multifactorial process and complex. No single variable has been found to adequately explain any one smoking stage. Given the fact that various factors from different domains determine adverse transition, smoking prevention interventions should be comprehensive and integrate the many factors mentioned above. Smoking stage specific intervention approach may provide greater opportunities for reducing smoking prevalence among adolescents. Certainly reductions in smoking prevalence can ameliorate public health.

6.4 Future research directions

There is a considerable amount of research done among adolescents and tobacco use. Even so adolescents smoking behaviour have yet to be fully understood. Malaysia lacks in cohort studies that explore adolescents smoking stages and dynamics of progression of these stages. This study is only the first step towards an improved understanding of smoking behaviour among adolescents. The current study shows that categorizing adolescents into different smoking stages are a simplistic way to guide prevention efforts. The use of stage model is also helpful when identifying risk for detrimental changes of smoking behaviour. Future research should examine further the current smoking by subcategorizing this stage to regular or daily smoking, intermittent smoking and nicotine dependence. Susceptible never smokers can also be further subtyped into those who plan to begin smoking within the next six months, within next one year and within the next five years. Information on subgroups can help enhance the effectiveness of smoking cessation strategies among current smokers and smoking prevention activities among non-smokers. Future research should also consider using validated measures for smoking such as Fagerstorm test for nicotine dependency.

Further studies in our population looking specifically at different culture and faith association with transition of smoking stages would be of great use as religious-based activities can buffer smoking escalation, uptake and relapse. Researchers interested in this area could examine the physiological impacts of smoking on people from different ethnic background. Our findings also postulate that it is necessary to explore the gender differences in adverse transitions.

We found adolescents' perception of accessibility to cigarettes to be associated with adverse transitions. It is important to encourage more rigorous research regarding the retail availability of tobacco, perceived accessibility, actual source of cigarette supplies

and adverse transition among adolescents to help strengthen our existing laws against tobacco sales to minors. The findings of this study show that adverse transition of smoking stages is influenced by multiple factors that are complicated and difficult to fit into a single theory. Future research should consider examining various independent factors based on multiple theories. Continued efforts to understand the process of smoking stages adverse transition is essential and key to developing effective smoking prevention programmes.

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List Of Publications And Conferences

The following papers have been published or submitted from this thesis:

Journal:

1. Smoking stages relation to peer, school and parental factors among secondary school students in Kinta, Perak. Published in Asia Pacific Journal of Cancer Prevention, Volume 14:6

2. Incidence of adverse transition among adolescents of Kinta, Perak. Published in Asia Pacific Journal of Cancer Prevention, Volume 14:11

3. Adverse transition of smoking stages among adolescents in Kinta, Perak of Malaysia: a prospective cohort study. Submitted to Asia Pacific Journal of Cancer Prevention

4. Self-efficacy and smoking stages among adolescents of Perak, Malaysia. Submitted to Nicotine and Tobacco Research.

Conference:

1. UM-QUB Public Health Research Collaboration Symposium, Kuala Lumpur, July 2011 (Poster presentation)

2. First International Public Health Conference &18th National Public Health Colloquium, Kuala Lumpur, September 2011 (Oral presentation)

3. International Health Conference IIUM 2011, Kuantan, December 2011 (Poster presentation).

4. 1st Asia Pacific Clinical Epidemiology Evidence-Based Medicine Conference, Kuala Lumpur, July 2012 (Oral presentation and Poster presentation)

5. The 45th APACPH Conference in Wuhan, China, October 2013 (Poster presentation)

Appendix A: Research Questionnaire

First Phase Questionnaires - English

CONFIDENTIAL

DEPARTMENT OF SOCIAL AND PREVENTIVE MEDICINE
FACULTY OF MEDICINE
UNIVERSITY MALAYA

PLEASE READ THESE INSTRUCTIONS BEFORE YOU ANSWER THE QUESTIONS

- There are 14 pages in this booklet including this page.
- There are 87 questions in this booklet.
- The information that you provide in this questionnaire is very important in helping us understand the health concerns of the adolescents
- We will treat all information in this booklet as CONFIDENTIAL.

QUESTIONNAIRE 2011

Dear Students,

Firstly I would like to thank you for your cooperation on answering these questions

For your kind information, these research questions are a part of evaluating the different stages of smoking among teenagers.

All the information given will be treated confidentially and be made anonymous. All information will be used for research purposes and for planning new programmes.

Your cooperation in answering the questions honestly and truthfully is appreciated and I would like to thank you in advance.

Wish you all the best for your future undertakings

Dr.Premila Devi, MD (Ind.), MPH (USM)
(019-2757421)

INSTRUCTIONS

- Please read each question carefully before answering it.
- Choose the answer that best describes what you believe and feel to be correct.
- Choose only **ONE** answer for each question.
- Circle your answer with the pencil that has been provided to you.
- If you have to change your answer, don't worry; just erase it completely, without leaving marks.
- Remember, each question only has one answer.

Example

27. Are you sure, that trees are living things?

(a) Yes

b. Maybe yes

c. Maybe no

d. No

DEMOGRAPHY QUESTIONS

1. How old are you?
   a. 12 year old
   b. 13 years old
   c. 14 years old
   d. 15 years and above

2. What is your sex?
   a. Male
   b. Female

3. What race are you?
   a. Malay
   b. Chinese
   c. Indian
   d. Others state :_____

4. What is your religion?
   a. Islam
   b. Buddhist
   c. Hindu
   d. Christian
   e. Others state :_____

5. My father works as a ----------

6. My father's education level:
   a. No formal education
   b. Primary
   c. PMR/SRP
   d. SPM/MCE
   e. STPM
   f. Diploma
   g. Degree
   h. Higher degree

7. My mother works as a ----------

8. My mother's education level :
   a. No formal education
   b. Primary
   c. PMR/SRP
   d. SPM/MCE
   e. STPM
   f. Diploma
   g. Degree
   h. Higher degree

9. Parents' marital status:
   a. Married

   b. Divorced

   c. Separated

10. Name and IC Number: ……(IC……)

11. Class: …….

*This is **NOT** a test. There is NO right or wrong answers.*

No.	Questions	Strongly disagree (a)	Disagree (b)	Agree (c)	Strongly agree (d)
12.	I am happy in this school	a	b	c	d
13.	I feel like I am a part of this school	a	b	c	d
14.	The teachers at this school treat students fairly	a	b	c	d
15.	I like to participate in school activities e.g clubs, sports, drama	a	b	c	d
16.	I always pay attention to lessons taught in the classroom	a	b	c	d
17.	I get along well with the others students in my school.	a	b	c	d

No.	Questions	Much harder (a)	Harder (b)	Easier (c)	Much easier (d)
18.	In your opinion, compared with other students in the same form, how difficult is it to keep up with school work.	a	b	c	d
19.	In your opinion, compared with other students how difficult is it for you to finish your homework on time.	a	b	c	d

*This is **NOT** a test. There is NO right or wrong answers*

20. Have you ever smoked cigarettes?
    a. Yes - If your answer is a (yes) please answer question 10

    b. No - If your answer is b (no) please move on and answer question 11, 12 &13

21. During the past 30 days (one month), on how many days did you smoke cigarettes?
    a. 0 day

    b. 1 to 10 days

    c. 11 to 19 days

    d. 20 to 29 days

    e. 30 days

    f. I quit smoking less than a year ago

    g. I quit smoking more than one year ago

22. If one of your best friends offered you a cigarette, would you smoke it?
    a. Definitely not b. Maybe not

    c. Probably yes d. Definitely yes

23. At any time during the next 12 months do you think you will smoke a cigarette?
    a. Definitely not b. Maybe not

    c. Probably yes d. Definitely yes

24. Do you think you will be smoking cigarettes 5 years from now?
    a. Definitely not b. Maybe not

    c. Probably yes d. Definitely yes

25. Does any of your closest friends smoke cigarettes?
    a. None of them

    b. Less than half of them

    c. More than half of them

    d. All of them

*This is **NOT** a test. There is NO right or wrong answers*

26. Does your best friend smoke?
    a. Yes

    b. No

27. Has any of your friends ever asked you to join him/her for a smoke?
    a. Yes

    b. No

28. Have you ever felt pressured from any of your friends to smoke?
    a. Never

    b. Sometimes

    c. Often

    d. Always

29. Do your parents smoke?
    a. None
    b. Both
    c. Father only
    d. Mother only
    e. Father quit smoking
    f. Mother quit smoking

30. Does any of your brothers or sisters smoke cigarettes?
    a. None
    b. Brother / Brothers
    c. Sister / Sisters
    e. I don't know
    f. I don't have any brothers or sisters

31. How many of your family members (grandparents, uncles, aunties, cousins and other relatives) smoke cigarettes?
    a. None
    b. 1 to 3 people
    c. 4 to 7 people
    d. 8 to 10 people
    e. More than 10 people

*This is **NOT** a test. There is NO right or wrong answers*

32. Do you think/feel your parents always monitor your activities?
    a. Yes b. No
    c. Sometimes only d. Not sure

33. Do you think/feel your parents know your friends?
    a. Yes b. No
    c. Know only a few d. Not sure

34. My parent / parents checks up to see whether I have done what they told me to do.
    a. Yes b. No
    c. Sometimes only d. Not sure

35. Do you feel that you always have problems with either one of your parents or both your parent?
    a. Yes I have problems b. Have problems frequently
    c. Sometimes only d. No do not have problems

36. How upset would your parents be if you did poorly on a test?
    a. Extremely disappointed b. Disappointed
    c. A little disappointed d. Not disappointed at all

37. How upset would your parents be if you got in trouble at school?
    a. Extremely disappointed b. Disappointed
    c. A little disappointed d. Not disappointed at all

38. How upset would your parents be if they found out you smoked cigarettes?
    a. Extremely disappointed b. Disappointed
    c. A little disappointed d. Not disappointed at all

39. Your parents have told you that you are not allowed to smoke.
    a. Yes b. No

40. Have you parents discussed the harmful health effects of smoking with you?
    a. Yes b. Never

*This is **NOT** a test. There is NO right or wrong answers*

41. Do you think cigarette smoking is harmful to your health?
    a. Definitely not
    b. Probably not
    c. Probably yes
    d. Definitely yes

42. Do you think the smoke from other people's cigarettes is harmful to you?
    a. Definitely not
    b. Probably not
    c. Probably yes
    d. Definitely yes

43. Do you think it is safe to smoke for only a year or two as long as you quit after that?
    a. Definitely not
    b. Probably not
    c. Probably yes
    d. Definitely yes

No.	**Questions**	**Strongly disagree (a)**	**Disagree (b)**	**Agree (c)**	**Strongly agree (d)**
44.	When my friends want me to smoke I am sure I can say no.	a	b	c	d
45.	If all my friends were smoking, I'd feel left out of it unless I smoked, too	a	b	c	d
46.	When my best friend is smoking and offers me a cigarette, I would join him / her.	a	b	c	d
47.	If I am bored, I will probably smoke cigarettes.	a	b	c	d

*This is **NOT** a test. There is NO right or wrong answers*

48. Do you think smoking cigarettes helps you feel more comfortable with your friends?
    a. None of my friends smoke

    b. More comfortable

    c Less comfortable

    d. There is no association with smoking and my friends

49. Do you think those who smoke cigarettes have more or less friends?
    a. More friends

    b. Less friends

    c. No difference from non-smokers

50. Do you think smoking cigarettes makes a person more or less confident?
    a. More confident

    b. Less confident

    c. No difference from non-smokers

51. Do you think smoking cigarettes makes boys look more or less attractive?
    a. More attractive

    b. Less attractive

    c. No difference from non-smokers

52. Do you think smoking cigarettes makes girls look more or less attractive?
    a. More attractive

    b. Less attractive

    c. No difference from non-smokers

*This is **NOT** a test. There is NO right or wrong answers*

No.	Questions	Never (a)	Sometimes (b)	Often (c)	Always (d)
53.	I practice **solat / religious prayers** as taught in my religion	a	b	c	d
54.	I will seek for God's help first then to others when faced with difficulty	a	b	c	d
55.	I make effort to obey rules/advice of my religion (God) in my daily life	a	b	c	d
56.	I am involved in religious work	a	b	c	d
57.	I try to understand the teachings of my religion.	a	b	c	d

No.	Questions	Strongly disagree (a)	Disagree (b)	Agree (c)	Strongly agree (d)
58.	On the whole, I am satisfied with myself.	a	b	c	d
59.	I certainly feel useless at times	a	b	c	d
60.	I take a positive attitude toward myself.	a	b	c	d
61.	All in all, I am inclined to feel that I am a failure.	a	b	c	d
62.	I feel that I have a number of good qualities	a	b	c	d
63.	I feel that I'm a person of worth, at least on an equal plane with others.	a	b	c	d
64.	I wish I could have more respect for myself.	a	b	c	d
65.	At times, I think I am no good at all.	a	b	c	d
66.	I am able to do things as well as most other people.	a	b	c	d
67.	I feel I do not have much to be proud of.	a	b	c	d

*This is **NOT** a test. There is NO right or wrong answers*

No.	Questions	Strongly disagree (a)	Disagree (b)	Agree (c)	Strongly agree (d)
68.	My life is going well.	a	b	c	d
69.	My life is just right	a	b	c	d
70.	I would like to change many things in my life.	a	b	c	d
71.	I wish I had a different kind of life.	a	b	c	d
72.	I have a good life.	a	b	c	d
73.	I have what I want in life.	a	b	c	d
74.	My life is better than most kids.	a	b	c	d

No.	Questions	Never (a)	Sometimes (b)	Often (c)	Always (d)
75.	How often have you felt "stressed" during the last one month?	a	b	c	d
76.	How often have you been able to control irritations in your life during the last one month?	a	b	c	d
77.	How often have you felt that you were unable to control the important things in your life during the last one month?	a	b	c	d
78.	How often have you felt that things were going your way during the last one month?	a	b	c	d
79.	How often have you found that you could not cope with all the things that you had to do during the last month?	a	b	c	d

*This is **NOT** a test. There is NO right or wrong answers*

No.	Questions	Strongly disagree (a)	Disagree (b)	Agree (c)	Strongly agree (d)
80.	I would like to explore strange places	a	b	c	d
81.	I would like to take off on a trip with no pre-planned routes or timetables	a	b	c	d
82.	I get restless when I spend too much time at home.	a	b	c	d
83.	I prefer friends who are excitingly unpredictable.	a	b	c	d
84.	I like to do frightening things.	a	b	c	d
85.	I like doing things just for the thrill of it.	a	b	c	d
86.	I like wild parties.	a	b	c	d
87.	I would love to have new and exciting experiences, even if they are illegal.	a	b	c	d

THANK YOU

SULIT **KOD**

JABATAN PERUBATAN KEMASYARAKATAN DAN PENCEGAHAN PENYAKIT
FAKULTI PERUBATAN
UNIVERSITI MALAYA

SILA BACA ARAHAN BERIKUT SEBELUM ANDA MENJAWAB BORANG KAJIAN INI

- Terdapat 14 muka surat di dalam borang kajian ini termasuk mukasurat ini.
- Terdapat 87 soalan dalam borang ini.
- Maklumat yang anda berikan di dalam kajian ini adalah amat penting bagi tujuan kajian ini dan untuk memahami dan menangani masalah kesihatan remaja.
- Pihak penganjur akan menyimpan maklumat yang terkandung di dalam borang ini sebagai SULIT.

BORANG SOAL SELIDIK 2011

Saudara / Saudari yang dihormati,

Terlebih dahulu saya ingin mengucapkan ribuan terima kasih atas kerjasama yang diberikan oleh saudara-saudari dalam menjawab soal selidik ini.

Untuk makluman saudara / saudari, soalan-soalan di dalam borang soal selidik ini adalah sebahagian daripada penilaian terhadap isu-isu berkaitan dengan pelbagai tahap merokok dan tidak merokok di kalangan remaja.

Segala maklumat yang diberikan adalah **SULIT** dan akan **DIRAHSIAKAN**. Maklumat ini adalah hanya untuk tujuan penyelidikan dan perancangan program untuk masa hadapan.

Kerjasama saudara/saudari dalam menjawab soalan-soalan ini secara jujur dan tulus adalah amat dihargai dan didahului dengan ucapan ribuan terima kasih.

Selamat maju, jaya

Dr.Premila Devi, MD (Ind.), MPH (USM)
(019-2757421)

INSTRUCTIONS

- Sila jawab semua soalan yang terkandung di dalam borang ini.
- Sila baca setiap soalan dengan teliti sebelum menjawab.
- Pilih jawapan yang paling tepat bagi anda.
- Hanya **SATU** jawapan untuk setiap soalan.
- Sila bulatkan jawapan dengan menggunakan pensil yang disediakan.
- Sekiranya anda ingin menukar pilihan jawapan, sila padam sehingga bersih.
- INGAT, hanya satu jawapan bagi setiap soalan.

Contoh

Soalan:

27. Pada fikiran anda, adakah pokok sesuatu benda yang hidup?

    a. Ya

    b. Mungkin ya

    c. Mungkin tidak

    d. Tidak

SOALAN DEMOGRAFI

1. Berapakah umur anda?

   a. 12 tahun b. 13 tahun

   c. 14 tahun d. 15 tahun ke ats

2. Apakah jantina anda?

   a. Lelaki b. Perempuan

3. Apakah bangsa anda ?

   a. Melayu b. Cina

   c. India d. Lain-lain nyatakan:_____

4. Apakah agama anda?

   a. Islam b. Budha

   c. Hindu d. Kristian

   e. Lain-lain nyatakan:_____

5. Bapa saya bekerja sebagai ----------

6. Bapa saya berpendidikan sehingga

   a. Tidak menerima pendidikan formal b. Sekolah rendah

   c. PMR/SRP d. SPM/MCE

   e. STPM f. Diploma

   g. Ijazah h. Ijazah tinggi

7. Ibu saya bekerja sebagai ----------

8. Ibu saya berpendidikan sehingga

a.	Tidak menerima pendidikan formal	b.	Sekolah rendah
c.	PMR/SRP	d.	SPM/MCE
e.	STPM	f.	Diploma
g.	Ijazah	h.	Ijazah tinggi

9. Status perkahwinan ibubapa:

   a. Kahwin

   b. Cerai

   c. Terpisah

10. Nama dan No.IC: …….(IC…….)

11. Kelas : …….

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

No.	Soalan	Sangat tidak setuju (a)	Tidak Setuju (b)	Setuju (c)	Sangat Setuju (d)
12.	Saya berasa gembira dan selesa di sekolah ini	a	b	c	d
13.	Saya adalah sebahagian daripada sekolah ini	a	b	c	d
14.	Guru – guru di sekolah ini melayan semua pelajar dengan adil	a	b	c	d
15.	Saya suka menyertai aktiviti-aktiviti sekolah, misalnya kelab, sukan, drama	a	b	c	d
16.	Saya selalu menumpukan perhatian kepada pelajaran yang diajar di kelas	a	b	c	d
17.	Saya mudah bergaul dengan pelajar-pelajar lain di sekolah saya	a	b	c	d

No.	Soalan	Lebih susah (a)	Susah (b)	Senang (c)	Lebih senang (d)
18.	Pada fikiran anda, berbanding dengan para pelajar di tingkatan yang sama, adakah anda berasa lebih mudah atau sukar untuk menumpukan pada pelajaran semasa di sekolah	a	b	c	d
19.	Pada fikiran anda, berbanding dengan para pelajar di tingkatan yang sama, adakah anda berasa lebih mudah atau susah rasa lebih susah untuk menghabiskan kerja rumah anda dalam masa yang ditetapkan	a	b	c	d

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

20. Pernahkah anda merokok atau mencuba waluapun sekali dalam hidup anda?

    a. Ya - Jika jawapan a (ya) sila jawab soalan-soalan 21

    b. Tidak - Jika jawapan b (tidak) sila jawab soalan-soalan 22,23 & 24

21. Dalam tempoh 30 hari (satu bulan) yang lepas, berapa harikah anda telah merokok?

    a. 0 hari

    b. 1 hingga 10 hari

    c. 11 hingga 19 hari

    d. 20 hingga 29 hari

    e. 30 hari

    f. Telah berhenti merokok selama kurang dari setahun.

    g. Telah berhenti merokok untuk lebih setahun yang lalu

22. Jika salah seorang daripada kawan karib anda menawarkan anda sebatang rokok, adakah anda akan merokok?

    a. Pasti tidak b. Mungkin tidak

    c. Mungkin ya d. Pasti ya

23. Dalam masa 12 bulan yang akan datang adakah anda berfikir untuk menghisap rokok?

    a. Pasti tidak b. Mungkin tidak

    c. Mungkin ya d. Pasti ya

24. Pada fikiran anda adakah anda akan merokok dalam masa 5 tahun yang akan datang?

    a. Pasti tidak b. Mungkin tidak

    c. Mungkin ya d. Pasti ya

25. Adakah di antara kawan - kawan rapat anda yang merokok?

    a. Tiada di kalangan mereka b. Kurang daripada separuh kawan-kawan

    b. Lebih daripada separuh kawan-kawan d. Kesemuanya merokok

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

26. Adakah kawan karib anda merokok
    a. Ya b. Tidak

27. Adakah di antara kawan –kawan anda yang mengajak anda merokok?
    a. Ya b. Tidak

28. Pernahkah anda berasa dipaksa oleh kawan kawan anda untuk merokok?
    a. Tidak pernah b. Kadangkala
    c. Sering d. Senantiasa

29. Adakah ibu bapa anda merokok?
    a. Tidak b. Kedua-duanya
    c. Bapa sahaja d. Ibu sahaja
    e. Bapa telah berhenti merokok f. Ibu telah berhenti merokok

30. Adakah abang atau kakak anda yang merokok?
    a. Tidak ada b. Abang
    c. Kakak d. Tidak tahu
    e. Saya tidak ada abang atau kakak.

31. Berapa anggota keluarga (datuk, nenek, pakcik, makcik, sepupu dan saudara lain) anda yang merokok?
    a. Tiada seorang pun yang merokok b. 1 hingga 3 orang
    c. 4 hingga 7 orang d. 8 hingga 10 orang
    a. Lebih daripada 10 orang

32. Pada fikiran anda, adakah ibu bapa anda sentiasa memerhatikan setiap tingkah laku dan kegiatan anda?
    a. Ya b. Tidak
    c. Kadangkala sahaja d. Tidak pasti

33. Pada fikiran anda, adakah ibu bapa anda mengenali kawan – kawan anda?
    a. Ya b. Tidak
    c. Kenal beberapa kawan sahaja d. Tidak pasti

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

34. Ibu bapa saya selalu memastikan sama ada saya telah melakukan apa yang mereka suruh saya lakukan.
    a. Ya
    b. Tidak
    c. Kadangkala sahaja
    d. Tidak pasti

35. Adakah anda berasa bahawa anda sentiasa menghadapi masalah dengan salah seorang atau kedua-dua ibu bapa anda?
    a. Ya ada masalah
    b. Sering ada masalah
    c. Kadangkala sahaja
    d. Tidak ada masalah

No.	**Soalan**	**Amat kecewa (a)**	**Kecewa (b)**	**Kecewa sedikit (c)**	**Tidak kecewa (d)**
36.	Adakah ibu bapa anda akan merasa kecewa sekiranya anda mendapat markah yang rendah dalam ujian?	a	b	c	d
37.	Adakah ibu bapa anda akan berasa kecewa sekiranya anda didapati menimbulkan masalah di sekolah?	a	b	c	d
38.	Adakah ibu bapa anda akan berasa kecewa sekiranya anda merokok?	a	b	c	d

39. Adakah ibu bapa anda pernah menegur bahawa anda dilarang merokok?
    a. Ya
    b. Tidak

40. Adakah ibu bapa anda membincangkan tentang bahaya merokok dengan anda?
    a. Pernah
    b. Tidak pernah

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

No.	**Soalan**	Pasti tidak **(a)**	Mungkin tidak **(b)**	Mungkin ya **(c)**	Pasti ya **(d)**
41.	Pada fikiran anda, adakah merokok membahayakan kesihatan anda?	a	b	c	d
42.	Pada fikiran anda, adakah asap rokok orang lain akan membahayakan kesihatan anda?	a	b	c	d
43.	Pada fikiran anda, adakah selamat jika merokok selama satu atau dua tahun dan kemudiannya berhenti?	a	b	c	d

No.	**Soalan**	**Sangat tidak setuju (a)**	**Tidak setuju (b)**	**Setuju (c)**	**Sangat setuju (d)**
44.	Apabila kawan-kawan saya mengajak saya untuk merokok saya pasti boleh menolak ajakan mereka.	a	b	c	d
45.	Jika kesemua kawan saya merokok saya akan berasa ketinggalan jika saya tidak merokok.	a	b	c	d
46.	Apabila kawan karib saya merokok dan mengajak saya merokok saya juga akan merokok.	a	b	c	d
47.	Jika saya berasa bosan, saya mungkin akan merokok.	a	b	c	d

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

48. Dalam fikiran anda, adakah lebih senang untuk bergaul dengan kawan-kawan jika anda merokok?
    a. Tidak ada kawan yang merokok
    b. Ya lebih senang untuk bergaul
    c Kurang senang untuk bergaul
    d. Tidak ada kaitan merokok dan bergaul dengan kawan-kawan

49. Pada fikiran anda, adakah seorang yang merokok akan mempunyai lebih ramai kawan atau sebaliknya?
    a. Ramai kawan
    b. Kurang kawan
    c. Tiada perbezaan dengan remaja yang tidak merokok

50. Pada fikiran anda adakah merokok membuatkan seseorang itu lebih yakin kepada diri sendiri atau sebaliknya?
    a. Lebih yakin
    b. Kurang yakin
    c. Tiada perbezaan dengan remaja yang tidak merokok

51. Pada fikiran anda adakah merokok membuatkan seorang remaja lelaki lebih menarik atau sebaliknya?
    a. Lebih menarik
    b. Kurang menarik
    c. Tiada perbezaan dengan remaja yang tidak merokok

52. Pada fikiran anda adakah merokok membuatkan seorang remaja perempuan lebih menarik atau sebaliknya?
    a. Lebih menarik
    b. Kurang menarik
    c. Tiada perbezaan dengan remaja yang tidak merokok

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

No.	Soalan	Tidak pernah (a)	Kadang-kdang (b)	Sering (c)	Sentiasa (d)
53.	Saya menunaikan solat / sembahyang seperti yang dalam agama saya	a	b	c	d
54.	Saya memohon pertolongan Tuhan dahulu kemudian orang lain apabila berhadapan dengan masalah.	a	b	c	d
55.	Saya berusaha untuk mengamalkan tingkah laku yang baik dalam agama saya di dalam kehidupan harian	a	b	c	d
56.	Saya terlibat dalam aktiviti agama.	a	b	c	d
57.	Saya berusaha untuk memahami ajaran dalam kitab suci agama saya	a	b	c	d

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

No.	Soalan	Sangat tidak setuju (a)	Tidak Setuju (b)	Setuju (c)	Sangat Setuju (d)
58.	Selalunya saya berpuas hati dengan diri saya.	a	b	c	d
59.	Adakalanya saya rasa diri saya ini tidak berguna.	a	b	c	d
60.	Saya mengambil sikap yang positif terhadap diri saya.	a	b	c	d
61.	Saya selalu rasa yang saya ini seorang yang gagal	a	b	c	d
62.	Saya rasa yang saya ada beberapa kualiti yang baik	a	b	c	d
63.	Saya rasa saya seorang yang mempunyai nilai sekurang-kurangnya sama seperti orang lain.	a	b	c	d
64.	Hajat saya ialah saya lebih menghormati diri saya.	a	b	c	d
65.	Kadangkala saya terfikir yang saya ' bukan baik selalu'.	a	b	c	d
66.	Saya boleh melakukan tugas sama seperti orang lain.	a	b	c	d
67.	Saya boleh merasakan yang tidak banyak yang boleh saya banggakan.	a	b	c	d

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

No.	Soalan	Sangat tidak setuju (a)	Tidak setuju (b)	Setuju (c)	Sangat setuju (d)
68.	Kehidupan saya berjalan lancar.	a	b	c	d
69.	Kehidupan adalah sebagaimana saya kehendaki.	a	b	c	d
70.	Saya ingin mengubah banyak benda/perkara di dalam kehidupan saya.	a	b	c	d
71.	Saya menginginkan kehidupan yang berbeza daripada kehidupan saya sekarang.	a	b	c	d
72.	Saya mempunyai kehidupan yang cukup baik.	a	b	c	d
73.	Saya memiliki apa yang saya ingini di dalam kehidupan.	a	b	c	d
74.	Kehidupan saya lebih baik daripada kehidupan budak-budak yang lain.	a	b	c	d

No.	Soalan	Tidak pernah (a)	Kadang-kadang (b)	Sering (c)	Sentiasa (d)
75.	Adakah anda sering berasa stress di dalam bulan yang lalu?	a	b	c	d
76.	Adakah anda sering dapat mengawal gangguan di dalam kehidupan anda di dalam bulan yang lalu?	a	b	c	d
77.	Adakah anda sering berasa tidak dapat mengawal hal-hal yang penting dalam kehidupan anda dalam bulan yang lalu?	a	b	c	d
78.	Adakah anda sering berasa bahawa semua perkara berjalan mengikut kehendak anda dalam bulan yang lalu?	a	b	c	d
79.	Adakah anda sering berasa anda tidak dapat menangani semua hal yang anda perlu lakukan dalam bulan yang lalu?	a	b	c	d

Ini bukan suatu ujian. Tiada jawapan yang betul atau salah, bagi semua soalan ini.

No.	Soalan	Sangat tidak setuju (a)	Tidak setuju (b)	Setuju (c)	Sangat setuju (d)
80.	Saya suka menerokai tempat-tempat aneh.	a	b	c	d
81.	Saya suka jika boleh pergi dalam mengembara tanpa apa-apa perancangan tentang arah perjalanan, destinasi atau jadual waktu.	a	b	c	d
82.	Saya akan berasa bosan jika berada terlalu lama di dalam rumah saya.	a	b	c	d
83.	Saya lebih suka pada kawan-kawan yang "excitingly unpredictable" (perangainya menghairahkan dan tidak menentu).	a	b	c	d
84.	Saya suka melakukan benda yang menakutkan.	a	b	c	d
85.	Saya ingin mencuba lompatan bungee.	a	b	c	d
86.	Saya suka parti yang menghairahkan.	a	b	c	d
87.	Saya suka mendapatkan pengalaman yang baru dan mengujakan walaupun ia suatu yang illegal.	a	b	c	d

SEKIAN, TERIMA KASIH

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JABATAN PERUBATAN KEMASYARAKATAN DAN PENCEGAHAN PENYAKIT
FAKULTI PERUBATAN
UNIVERSITI MALAYA

回答这份问卷之前，请您仔细阅读以下指示。

- 这份问卷包括这一页共有17页。
- 这份问卷共有87个问题。
- 您在这份问卷给予的资料对于研究目的非常重要和为了理解及解决青少年健康问题。
- 主办单位将储存本表格中的资料为**机密。**

二零一一年问卷调查表

尊敬的先生/小姐，

首先， 我要对您们回答这一调查问卷的合作表示万二分的感谢。

作为您的讯息，这份问卷的问题一部分有关各层次青少年吸烟和没吸烟的课题评。

所有提供的资料不公开和机密的。 这些信息目的只供未来的研究和方案规划。

对于你们忠诚及诚恳地回答这些问题表示珍惜并致于万二分的感激。

祝 ： 成功

Dr. Premila Devi,MD (Ind.),MPH (USM)

（019-2757421）

指示

- 请回答表内的全部问题。
- 回答前请仔细阅读。
- 劝着您最正确的答案。
- 每一题只有<u>一个</u>答案。
- 请用所提供的铅笔把答案圈起来。
- 如果您想更改所选的答案，请彻底擦干净。
- 注意， 每一题只有一个答案。

<u>例子</u>

问题：

27. 你认为，树是不是一种生物？

a.	是
b.	可能是
c.	可能不是
d.	不是

1. 你几岁？

a. 12岁　　b. 13岁

c. 14岁　　d. 15岁以上

2. 你的性别？

a. 男　　b. 女

3. 你是什么种族？

a. 马来人　　b. 华人

c. 印度人　　d. 其他 请注明_____

4. 你信奉什么宗教？

a. 回教　　b. 佛教

c. 兴都教　　d. 基督教

e. 其他　请注明_____

5. 我的父亲的职业是_____

6. 我父亲受过的教育是至

a. 没接受过正统教育　　b. 小学

c. PMR/SRP　　d. SPM/MCE

e. STPM　　f. Diploma(文凭)

g. Ijazah (大专文凭)　　h. Ijazah tinggi (高级大专凭)

7. 我的母亲的职业是_____

8. 我母亲受过的教育是至

a. 没接受过正统教育　　b. 小学

c. PMR/SRP　　d. SPM/MCE

e. STPM　　f. Diploma(文凭)

g. Ijazah(大专文凭)

h. Ijazah tinggi (高级大专凭)

9. 父母的婚姻状况

a. 结婚

b. 离婚

c. 分居

10. Nama dan No.IC: _____(No.IC_____)

11. Kelas : _____

这不是一项测验， 所有问题都没有对或错的答案

序	问题	非常不同意 (a)	不同意 (b)	同意 (c)	非常同意 (d)
12	我在这所学校觉得开心与舒适。	a	b	c	d
13	我是这所学校的一份子。	a	b	c	d
14	这所学校的老师公平对待每个学生。	a	b	c	d
15	我喜欢参与学校活动，如学会、运动、话剧。	a	b	c	d
16	我经常集中精神于课堂里的教学。	a	b	c	d
17	我容易与学校其他同学相处。	a	b	c	d

序	问题	比较困难 (a)	困难 (b)	容易 (c)	比较容易 (d)
18	你认为与其他同级同学相比，在学校时，你觉得较容易或较难专注于学校学业？	a	b	c	d
19	你认为与其他同级同学相比，你觉得较容易或困难以完成限时规定的家课？	a	b	c	d

20. 在你生活中， 你曾经即使一次吸烟或尝试吗？

a. 是 - 如答案是a （是）请回答第21、

b. 不是 - 如答案是b （不是）请回答第22、23及 24题

这不是一项测验， 所有问题都没有对或错的答案

21. 在过去的30天（一个月），你有几天吸烟？

a. 0天

b. 1至10天

c. 11至19天

d. 20至29天

e. 30天

f. 已戒烟少于一年

g. 已戒烟超过一年

22. 如果你的其中一个好友给你一根烟， 你会吸吗？

a. 肯定不会 b. 可能不会

c. 可能会 d. 肯定会

23. 在未来的12个月里，你有想过要吸烟吗？

a. 肯定不会 b. 可能不会

c. 可能会 d. 肯定会

24. 你认为在未来的5年里， 你将会吸烟吗？

a. 肯定不会 b. 可能不会

c. 可能会 d. 肯定会

25. 你的好友当中有吸烟的吗？

a. 他们都没有 b. 少于一半的朋友

c. 超过一半的朋友 d. 全部吸烟

26. 你的好友有吸烟吗？

a. 是 b. 不是

27. 你的朋友当中， 有人邀你吸烟吗？

a. 是 b. 不是

这不是一项测验， 所有问题都没有对或错的答案

28. 你觉得曾经被朋友逼你吸烟吗？

a. 不曾　　b. 偶尔

c. 时常　　d. 常常

29. 你的父母是不是有吸烟？

a. 不是　　b. 两者

c. 父亲而已　　d. 母亲而已

e. 父亲已戒烟　　f. 母亲已戒烟

30. 你的哥哥或姐姐吸烟吗？

a. 没有　　b. 哥哥

c. 姐姐　　d. 不知道

e. 我没有哥哥或姐姐

31. 你的家庭成员（爷爷、奶奶、叔叔、婶婶堂兄弟姐妹及其他亲人）有几个吸烟的？

a. 没有人吸烟　　b. 1至3人

c. 4至7人　　d. 8至10人

e. 超过10人

32. 你认为你的父母时常注意你的举止和活动吗？

a. 是　　b. 不是

c. 偶尔而已　　d. 不肯定

33. 你认为你的父母认识你的朋友吗？

a. 是　　b. 不是

c. 认识一些朋友而已　　d. 不肯定

这不是一项测验， 所有问题都没有对或错的答案

34. 我的父母时常确保我已完成他们所吩咐我做的。

a. 是　　b. 不是

c. 偶尔而已　　d. 不肯定

35. 你是否觉得你时常与你的父亲、母亲或父母亲面对难题？

a. 是，有难题　　b. 经常有难题

c. 偶尔而已　　d. 没有难题

序	问题	非常失望 (a)	失望 (b)	有点儿失望 (c)	不会失望 (d)
36	如果你考试考取低分数，你的父母是否会失望？	a	b	c	d
37	如果发现你在学校制造问题，你的父母是否会失望？	a	b	c	d
38	如果你吸烟，你的父母是否会失望？	a	b	c	d

39. 你的父母曾责备你吸烟吗？

a. 是　　b. 不是

40. 你的父母是否有与你讨论过有关吸烟的害处？

a. 经常　　b. 不曾

这不是一项测验， 所有问题都没有对或错的答案

序	问题	肯定不会 (a)	可能不会 (b)	可能会 (c)	肯定会 (d)
41	你认为吸烟会危害你的健康吗？	a	b	c	d
42	你认为二手烟会危害你的健康吗？	a	b	c	d
43	你认为吸烟一或两年后戒烟会安全没事的？	a	b	c	d

序	问题	非常不同意 (a)	不同意 (b)	同意 (c)	非常同意 (d)
44	当朋友要我吸烟时，我肯定会拒绝他们。	a	b	c	d
45	假设我的所有朋友都吸烟，我如果不吸烟就会觉得很落伍。	a	b	c	d
46	当我的好友吸烟并邀我一同吸烟，我也会跟着吸烟。	a	b	c	d
47	如果我觉得很厌烦时，我可能会吸烟。	a	b	c	d

48. 你认为吸烟是不是更容易与朋友交往？
    a. 没有朋友是吸烟的
    b. 是，比较容易交往
    c. 比较不容易交往
    d. 吸烟和与朋友交往无关

49. 你认为一个吸烟者会有更多朋友或相反？
    a. 多朋友
    b. 少朋友
    c. 与没有吸烟的少年没有差别

这不是一项测验， 所有问题都没有对或错的答案

50. 你认为吸烟会使一个人更有自信或相反？
    a. 更有自信

    b. 缺少自信

    c. 与没有吸烟的少年没有差别

51. 你认为吸烟会使一名男性少年更具吸引力或反之？
    a. 更具吸引力

    b. 缺乏吸引力

    c. 与没有吸烟的少年没有差别

52. 你认为吸烟会使一名女性少年更具吸引力或反之？
    a. 更具吸引力

    b. 缺乏吸引力

    c. 与没有吸烟的少年没有差别

序	问题	不曾 (a)	偶尔 (b)	时常 (c)	常常 (d)
53	我根据我的宗教规定进行祈祷。	a	b	c	d
54	当我遇到难题，我会先请求神明、主，然后才别人。	a	b	c	d
55	在日常生活中，我努力实践我的宗教中的良好行为。	a	b	c	d
56	我参与宗教活动。	a	b	c	d
57	我努力去理解宗教教义中的教诲。	a	b	c	d

这不是一项测验， 所有问题都没有对或错的答案

序	问题	非常不同意（a）	不同意 (b)	同意 (c)	非常同意 (d)
58	我总是对自己很满意。	a	b	c	d
59	有时，我觉得自己没有用。	a	b	c	d
60	我对自己采取积极的态度。	a	b	c	d
61	我时常觉得我是个失败者。	a	b	c	d
62	我觉得我有一些良好的素质。	a	b	c	d
63	我觉得我是个拥有至少与别人一样的价值。	a	b	c	d
64	我的期望是我更尊重自己。	a	b	c	d
65	偶尔我想到我“不是经常很好”。	a	b	c	d
66	我可以完成与别人一样的任务。	a	b	c	d
67	我可以感觉到我没有很多可以感到自豪的。	a	b	c	d

序	问题	非常不同意（a）	不同意 (b)	同意 (c)	非常同意 (d)
68	我的生活一帆风顺。	a	b	c	d
69	我的生活就有如我所要的。	a	b	c	d
70	我想改变我生活中的很多东西。	a	b	c	d
71	我期望与现在不同的生活。	a	b	c	d
72	我有很好的生活。	a	b	c	d
73	我拥有我生活中所要的一切。	a	b	c	d
74	我的生活比其他孩子们更好。	a	b	c	d

这不是一项测验， 所有问题都没有对或错的答案

序	问题	不曾（a）	偶尔 (b)	时常 (c)	常常 (d)
75	你上个月有没有觉得压力？	a	b	c	d
76	你上个月是否经常能控制生活上的干扰？	a	b	c	d
77	你上个月是否觉得经常无法控制生活上重要的事？	a	b	c	d
78	你上个月是否经常觉得所有事情都依你所愿？	a	b	c	d
79	你上个月是否经常觉得你无法处理所有必须完成的事？	a	b	c	d

序	问题	非常不同意（a）	不同意 (b)	同意 (c)	非常同意 (d)
80	我喜欢探险奇特的地方。	a	b	c	d
81	我喜欢如果可以无计划方向、目的或时间表地流浪。	a	b	c	d
82	如果在家呆太久，我会觉得很厌烦。	a	b	c	d
83	我比较喜欢刺激、无法捉摸的朋友。	a	b	c	d
84	我喜欢做使人害怕的东西。	a	b	c	d
85	我想尝试高空弹跳。	a	b	c	d
86	我喜欢强烈、刺激的舞会。	a	b	c	d
87	我喜欢得到新的及具鼓励的经验，即使它是不合法的。	a	b	c	d

SEKIAN, TERIMA KASIH

KOD											

SCHOOL NAME:……

UNIVERSITY OF MALAYA
The Leader in Research & Innovation

DEPARTMENT OF SOCIAL AND PREVENTIVE MEDICINE
FACULTY OF MEDICINE
UNIVERSITY MALAYA

PLEASE READ THESE INSTRUCTIONS BEFORE YOU ANSWER THE QUESTIONS

- There are 6 pages in this booklet including this page.
- There are 21 questions in this booklet.
- The information that you provide in this questionnaire is very important in helping us understand the health concerns of the adolescents
- We will treat all information in this booklet as CONFIDENTIAL.

Dear Students,

Firstly I would like to thank you for your cooperation on answering the 1st phase questionnaire. This is a continuation of the same research

For your kind information, these research questions are a part of evaluating the different stages of smoking among teenagers.

All the information given will be treated confidentially and be made anonymous. All information will be used for research purposes and for planning new programmes.

Your cooperation in answering the questions honestly and truthfully is appreciated and I would like to thank you in advance.

Wish you all the best for your future undertakings

Dr.Premila Devi, MD (Ind.), MPH (USM)
(019-2757421)

INSTRUCTIONS

- Please read each question carefully before answering it.
- Choose the answer that best describes what you believe and feel to be correct.
- Choose only **ONE** answer for each question.
- Circle your answer with the pencil that has been provided to you.
- If you have to change your answer, don't worry; just erase it completely, without leaving marks.
- Remember, each question only has one answer.

Example

27. Are you sure, that trees are living things?

a. Yes

b. Maybe yes

c. Maybe no

d. No

DEMOGRAPHY QUESTIONS

1. How old are you?
   a. 13 years old b. 14 years old
   c. 15 years old

2. What is your sex?
   a. Male b. Female

3. What race are you?
   a. Malay b. Chinese
   c. Indian d. Others state :_____

4. What is your religion?
   a. Islam b. Buddhist
   c. Hindu d. Christian
   e. Others Please state :_____

5. Name: …….

6. IC Number: ……..

7. Class: …….

8. When you watch TV, videos, or movies, how often do you see actors smoking?
   a. Never
   b. Sometimes
   c. Often
   d. Always

9. During the last 1 year how often did you see or hear anti-smoking media messages / advertisement via TV, radio, newspaper, magazines, internet or in the school bus?
   a. Never
   b. Sometimes
   c. Often
   d. Always

10. During the last one year of school (2011), how often has your teacher discussed in classroom about smoking and the effects of smoking?
   a. Never
   b. Sometimes
   c. Often
   d. Always

11. Has someone working for cigarette companies ever offered you a free cigarette?
   a. Yes b. No

12. During the last one year did you see any posters advertising on dangers of smoking?
   a. Yes b. No

13. During the last one year did you see any pamphlets advertising on dangers of smoking?
   a. Yes b. No

14. During the last one year (2011), did you attend any talks or seminars about dangers of smoking, during school or non-school events?
   a. Yes b. No

15. Have you seen, the health warnings pictures on cigarette packages?
   a. Yes b. No

16. Is it easy to get cigarettes?
    a. Very easy

    b. Easy

    c. Hard

    d. Very hard

17. Have you ever smoked cigarettes?
    a. Yes - If your answer is a (yes) please answer question 18

    b. No - If your answer is b (no) please move on and answer question 19, 20 &21

18. During the past 30 days (one month), on how many days did you smoke cigarettes?
    a. 0 day
    b. 1 to 10 days
    c. 11 to 19 days
    d. 20 to 29 days
    e. 30 days
    f. I quit smoking less than a year ago
    g. I quit smoking more than one year ago

19. If one of your best friends offered you a cigarette, would you smoke it?
    a. Definitely not b. Maybe not

    c. Probably yes d. Definitely yes

20. At any time during the next 12 months do you think you will smoke a cigarette?
    a. Definitely not b. Maybe not

    c. Probably yes d. Definitely yes

21. Do you think you will be smoking cigarettes 5 years from now?
    a. Definitely not b. Maybe not

    c. Probably yes d. Definitely yes

THANK YOU

KOD												

RAHSIA

NAMA SEKOLAH :……

UNIVERSITY OF MALAYA
The Leader in Research & Innovation

JABATAN PERUBATAN KEMASYARAKATAN DAN PENCEGAHAN PENYAKIT
FAKULTI PERUBATAN
UNIVERSITI MALAYA

SILA BACA ARAHAN BERIKUT SEBELUM ANDA MENJAWAB BORANG KAJIAN INI

- Terdapat 6 muka surat di dalam borang kajian ini termasuk mukasurat ini.
- Terdapat 21 soalan dalam borang ini.
- Maklumat yang anda berikan di dalam kajian ini adalah amat penting bagi tujuan kajian ini dan untuk memahami dan menangani masalah kesihatan remaja.
- Pihak penganjur akan menyimpan maklumat yang terkandung di dalam borang ini sebagai SULIT .

Saudara / Saudari yang dihormati,

Terlebih dahulu saya ingin mengucapkan ribuan terima kasih atas kerjasama yang diberikan oleh saudara-saudari dalam menjawab soal selidik ini fasa I. Ini adalah sambungan ari penyelidikan yang sama.

Untuk makluman saudara / saudari, soalan-soalan di dalam borang soal selidik ini adalah sebahagian daripada penilaian terhadap isu-isu berkaitan dengan pelbagai tahap merokok dan tidak merokok di kalangan remaja.

Segala maklumat yang diberikan adalah SULIT dan akan DIRAHSIAKAN. Maklumat ini adalah hanya untuk tujuan penyelidikan dan perancangan program untuk masa hadapan.

Kerjasama saudara/saudari dalam menjawab soalan-soalan ini secara jujur dan tulus adalah amat dihargai dan didahului dengan ucapan ribuan terima kasih.

Selamat maju, jaya

Dr. Premila Devi,MD (Ind.),MPH (USM)
(019-2757421)

ARAHAN

- Sila jawab semua soalan yang terkandung di dalam borang ini.
- Sila baca setiap soalan dengan teliti sebelum menjawab.
- Pilih jawapan yang paling tepat bagi anda.
- Hanya SATU jawapan untuk setiap soalan.
- Sila bulatkan jawapan dengan menggunakan pensil yang disediakan.
- Sekiranya anda ingin menukar pilihan jawapan, sila padam sehingga bersih.
- INGAT, hanya satu jawapan bagi setiap soalan.

Contoh

Soalan:

27. Pada fikiran anda, adakah pokok sesuatu benda yang hidup?

a. Ya
b. Mungkin ya
c. Mungkin tidak
d. Tidak

SOALAN DEMOGRAFI

1. Berapakah umur anda?

   b. 13 tahun b. 14 tahun

   c. 15 tahun

2. Apakah jantina anda?

   b. Lelaki b. Perempuan

3. Apakah bangsa anda ?

   a. Melayu b. Cina

   c. India d. Lain-lain nyatakan :_____

4. Apakah agama anda?

   a. Islam b. Budha

   c. Hindu d. Kristian

   e. Lain-lain nyatakan:_____

5. Nama :.....

6. Nombor IC : .....

7. Kelas :.....

8. Berapa seringkah anda melihat adegan pelakon merokok sewaktu anda menonton televisyen, video ataupun wayang?
   a. Tidak pernah
   b. Kadang-kadang
   c. Sering
   d. Sentiasa

9. Dalam masa setahun yang lalu berapa seringkah anda melihat atau mendengar iklan/ mesej kempen ANTI MEROKOK yang lain di televisyen, radio, surat khabar, majalah, internet atau bas sekolah?
   a. Tidak pernah
   b. Kadang-kadang
   c. Sering
   d. Sentiasa

10. Berapa seringkah dalam sesi persekolahan tahun lalu anda dan guru anda berbincang dalam kelas di sekolah mengenai merokok dan kesannya?
   a. Tidak pernah
   b. Kadang-kadang
   c. Sering
   d. Sentiasa

11. Pernahkah anda ditawarkan rokok percuma oleh wakil jualan dari syarikat rokok?
   a. Ya b.Tidak pernah

12. Dalam masa setahun yang lalu pernahkah anda melihat poster berkaitan dengan bahaya merokok?
   a. Ya b. Tidak pernah

13. Dalam masa setahun yang lalu pernahkah anda membaca risalah berkaitan dengan bahaya merokok?
   a. Ya b. Tidak pernah

14. Dalam masa setahun yang lalu pernahkah anda mendengar ceramah tentang tentang bahaya merokok di sekolah atau di luar sekolah?

   a. Ya b. Tidak pernah

15. Pernahkah anda melihat amaran kesihatan bergambar pada kotak rokok?
   a. Ya b. Tidak pernah

16. Adakah senang untuk mendapatkan rokok?
    a. Sangat senang
    b. Senang
    c. Susah
    d. Sangat susah

17. Pernahkah anda merokok atau mencuba waluapun sekali dalam hidup and
    c. Ya - Jika jawapan a (ya) sila jawab soalan-soalan 18

    d. Tidak - Jika jawapan b (tidak) sila jawab soalan-soalan 19,20 & 21

18. Dalam tempoh 30 hari (satu bulan) yang lepas, berapa harikah anda telah merokok?
    c. 0 hari
    d. 1 hingga 10 hari
    c. 11 hingga 19 hari
    d. 20 hingga 29 hari
    e. 30 hari
    f. Telah berhenti merokok selama kurang dari setahun.
    g. Telah berhenti merokok untuk lebih setahun yang lalu

19. Jika salah seorang daripada kawan karib anda menawarkan anda sebatang rokok, adakah anda akan merokok?
    b. Pasti tidak
    b. Mungkin tidak
    c. Mungkin ya
    d. Pasti ya

20. Dalam masa 12 bulan yang akan datang adakah anda berfikir untuk menghisap rokok?
    a. Pasti tidak
    b. Mungkin tidak
    c. Mungkin ya
    d. Pasti ya

21. Pada fikiran anda adakah anda akan merokok dalam masa 5 tahun yang akan datang?
    a. Pasti tidak
    b. Mungkin tidak
    c. Mungkin ya
    d. Pasti ya

SEKIAN , TERIMA KASIH

KOD											

NAMA SEKOLAH:…….

JABATAN PERUBATAN KEMASYARAKATAN DAN PENCEGAHAN PENYAKIT
FAKULTI PERUBATAN
UNIVERSITI MALAYA

回答这份问卷之前，请您仔细阅读以下指示。

- 这份问卷包括这一页共有6页。
- 这份问卷共有21个问题。
- 您在这份问卷给予的资料对于研究目的非常重要和为了理解及解决青少年健康问题。
- 主办单位将储存本表格中的资料为机密。

二零一一年问卷调查表

尊敬的先生/小姐，

首先， 我要对您们回答这一调查问卷的合作表示万二分的感谢。

作为您的讯息，这份问卷的问题一部分有关各层次青少年吸烟和没吸烟的课题评价。

所有提供的资料不公开和机密的。 这些信息目的只供未来的研究和方案规划。

对于你们忠诚及诚恳地回答这些问题表示珍惜并致于万二分的感激。

祝 ： 成功

Dr. Premila Devi,MD (Ind.),MPH (USM)

（019-2757421）

指示

- 请回答表内的全部问题。
- 回答前请仔细阅读。
- 劝着您最正确的答案。
- 每一题只有一个答案。
- 请用所提供的铅笔把答案圈起来。
- 如果您想更改所选的答案，请彻底擦干净。
- **注意， 每一题只有一个答案。**

例子

问题：

27. 你认为，树是不是一种生物？

a. 是

b. 可能是

c. 可能不是

d. 不是

SOALAN DEMOGRAFI

1. 你几岁？

a. 13岁　　b. 14岁

c. 15岁

2. 你的性别？

a. 男　　b. 女

3. 你是什么种族？

a. 马来人　　b. 华人

c. 印度人　　d. 其他
请注明_____

4. 你信奉什么宗教？

a. 回教　　b. 佛教

c. 兴都教　　d. 基督教

e. 分居　　请注明_____

5. NAMA: _____

6. NOMBOR IC: _____

7. KELAS: _____

8。 请问你从电视、影片或电影看见演员吸烟的情节的频率是多少?

a. 不曾

b. 偶尔

c. 经常

d. 多次

9。请问在一年前，你从电视、收音机、报纸、杂志、网上或学校巴士上看到或听到过其他 关于"请戒烟"的广告或讯息的频率是多少?

a. 不曾
b. 偶尔
c. 经常

d. 多次

10。请问在去年学期内你在学校课室内与你的老师讨论关于吸烟及其坏处的频率是多少?

a. 不曾

b. 偶尔

c. 经常

d. 多次

11。 请问你曾否接受过香烟公司的代售员派发的免费香烟?

a. 有 b. 不曾

12。 在一年内，你曾否看见过关于吸烟的危险的海报?

a. 有 b. 不曾

13。 在一年内，你曾否阅读过关于吸烟的危险的传单?

a. 有 b. 不曾

14。 在一年内，你曾否在校外或校内出席过关于吸烟的危险的讲座?

a. 有 b. 不曾

15。 请问你曾否看见过香烟盒上的健康警告图?

a. 有 b. 不曾

16。 请问你认为你能轻易获得香烟吗?

a. 非常容易

b. 容易

c. 困难

d. 非常困难

17. 在你生活中， 你曾经即使一次吸烟或尝试吗？

a. 是 - 如答案是a （是）请回答第18、

b. 不是 - 如答案是b （不是）请回答第19、20及，21题

18. 在过去的30天（一个月），你有几天吸烟？

a. 0天

b. 1至10天

c. 11至19天

d. 20至29天

e. 30天

f. 已戒烟少于一年

g. 已戒烟超过一年

19. 如果你的其中一个好友给你一根烟， 你会吸吗？

a. 肯定不会 b. 可能不会
c. 可能会 d. 肯定会

20. 在未来的12个月里，你有想过要吸烟吗？

a. 肯定不会 b. 可能不会
c. 可能会 d. 肯定会

21. 你认为在未来的5年里， 你将会吸烟吗？

a. 肯定不会 b. 可能不会

c. 可能会 d. 肯定会

SEKIAN, TERIMA KASIH

Appendix B: Funding Approval

UNIVERSITI MALAYA

Jab. Perubatan Kemasyarakatan & Pencegahan
TERIMA
07 MAY 2010

UM.TNC2/IPPP/UPGP/GERAN(PPP)PS240/2010A

15 April 2010

Premila Devi A/P Jeganathan
Jabatan SPM
Fakulti Perubatan
Universiti Malaya

Tuan/Puan,

KEPUTUSAN PERMOHONAN PERUNTUKAN PENYELIDIKAN PASCASISWAZAH (PPP) DAN KATALALUAN BAGI AGIHAN 1-2010 DI BAWAH PERUNTUKAN UNIVERSITI PENYELIDIKAN 2010

Dengan hormatnya saya merujuk kepada perkara di atas

2. Sukacita dimaklumkan bahawa permohonan tuan/puan telah **diluluskan oleh Jawatankuasa Peruntukan Penyelidikan Pascasiswazah Agihan 1-2010** untuk dibiayai di bawah Peruntukan Universiti Penyelidikan 2010.

3. Butiran kelulusan adalah seperti berikut:

Tajuk	:	Factors Influencing The Transition Of Smoking Stages Among Secondary School Students In Kuala Lumpur And Kelantan : A Longitudinal Study
No. Akaun	:	PS240/2010A
Password	:	U8ushhfJ
Tempoh	:	15 April 2010 – 14 April 2011

Pecahan	**RM**
Kelengkapan & Alat Kursus	0.00
Bekalan	5,000.00
Perjalanan & Sara Hidup	5,000.00
Bayaran Saguhati	3,000.00
Jumlah	**13,000.00**

4. Untuk makluman tuan/puan, **peruntukan untuk menghadiri persidangan** tidak lagi diluluskan di bawah PPP. Sebaliknya pihak Unit Pengurusan Geran Penyelidikan (UPGP) telah menyediakan satu tabung khas di mana pelajar Ijazah Tinggi boleh memohon bantuan kewangan untuk menghadiri persidangan.

5. Tuan/Puan juga layak untuk memohon bantuan dari **tabung *page charge*** yang telah disediakan oleh pihak IPPP untuk membantu membiayai kos penerbitan di dalam jurnal ISI.

Unit Pengurusan Geran Penyelidikan
Institut Pengurusan dan Pemantauan Penyelidikan, A205 Bangunan IPS, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
Tel: (603) 7967 4522 / 4647 / 4652 / 4653 / 4654 / 4675 / 4521 / 6952 • **Faks**: (603) 7967 4648
Emel: ketua_upd_ippp@um.edu.my • http://www.ippp.um.edu.my

6. **Urusan perbelanjaan** (pembelian & pembayaran) **dan semakan akaun** boleh dibuat melalui sistem kewangan penyelidikan: http://www.efinance.ippp.um.edu.my. Sebarang **perbelanjaan selain dari kelulusan asal** perlu mendapat kelulusan Ketua UPGP dengan mengisi borang permohonan dan kelulusan yang telah disediakan di laman web IPPP: http://www.ippp.um.edu.my. Satu taklimat berkenaan perkara ini akan dibuat pada minggu kedua bulan Mei. Tarikh sebenar akan diberitahu melalui e-mel tuan/puan.

7. Tuan/Puan dikehendaki menghantar **laporan projek** seperti berikut:

   i) **Laporan Kemajuan Projek** dalam tempoh setiap enam bulan dengan menggunakan borang yang telah ditetapkan.

   ii) **Laporan Akhir Projek** dalam tempoh satu bulan setelah akaun projek tamat dengan menggunakan borang yang ditetapkan.

Kegagalan tuan/puan berbuat demikian akan menyebabkan akaun tuan/puan dibekukan dan akan menjejaskan permohonan peruntukan pada masa akan datang.

8. Sila sahkan **penerimaan tawaran** dengan mengembalikan borang penerimaan tawaran (lampiran 1) **selewat-lewatnya pada 30 April 2010** (Jumaat). Akaun anda hanya akan diaktifkan setelah pihak kami menerima jawapan penerimaan tawaran tersebut. Jika tiada sebarang maklum balas diterima sehingga tarikh tersebut, tawaran ini akan terbatal dengan sendirinya.

9. Tuan/Puan diminta untuk berbelanja mengikut kelulusan yang telah diberikan. Semua inbois dan tuntutan perlu dikemukakan kepada UPGP selewat-lewatnya pada tarikh akhir projek.

Sekian, terima kasih.

Yang benar,

PROF. DR. SHALIZA IBRAHIM
Ketua

s.k. PM Dr. Nabilla Abd Mohsein (Penyelia)
Fakulti Perubatan
Universiti Malaya.

Appendix C: Ministry Of Education Approval

BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
KEMENTERIAN PELAJARAN MALAYSIA
ARAS 1 - 4, BLOK E - 8,
KOMPLEKS KERAJAAN PARCEL E
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62604 PUTRAJAYA

Telefon : 03-88846591
Faks : 03-88846579

Rujuk. kami : KP(BPPDP)603/5/JLD11 (21
Tarikh 1 Nov 2010

Dr Premila Devi A/P Jeganathan IC 710723085412
No 37 Jalan 5/58A Gasing Indah
46000 Petaling Jaya
Selangor

Tuan/Puan,

Kelulusan Untuk Menjalankan Kajian Di Sekolah, Institut Perguruan, Jabatan Pelajaran Negeri dan Bahagian-Bahagian di Bawah Kementerian Pelajaran Malaysia

Adalah saya dengan hormatnya diarah memaklumkan bahawa permohonan tuan/puan untuk menjalankan kajian bertajuk:

Factors Influencing The Transition Of Smoking Stages Among Secondary School Students In Kinta, Perak : A Longitudinal Study

diluluskan.

2. Kelulusan ini adalah berdasarkan kepada cadangan penyelidikan dan instrumen kajian yang tuan/puan kemukakan ke Bahagian ini. Kebenaran bagi menggunakan sampel kajian perlu diperoleh dari Ketua Bahagian / Pengarah Pelajaran Negeri yang berkenaan.

3. Sila tuan/puan kemukakan ke Bahagian ini senaskah laporan akhir kajian setelah selesai kelak. Tuan/Puan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak dibentangkan di mana-mana forum atau seminar atau diumumkan kepada media

Sekian untuk makluman dan tindakan tuan/puan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DR. SOON SENG THAH)
Ketua Sektor,
Sektor Penyelidikan dan Penilaian
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan
Dasar Pendidikan
Kementerian Pelajaran Malaysia

Appendix D: Perak State Of Education Department Approval

JABATAN PELAJARAN PERAK
JALAN TUN ABDUL RAZAK,
30640 IPOH,
PERAK DARUL RIDZUAN.

Telefon : 05-501 5000
Faks : 05-527 7273
Portal : http://www.pelajaranperak.gov.my

" 1 MALAYSIA : RAKYAT DIDAHULUKAN, PENCAPAIAN DIUTAMAKAN "

Ruj.Kami : J.PEL.PK.(AM)5114/4 JlLD.6 (34)
Tarikh : 18 November 2010

Dr. Premila Devi a/p Jeganathan
N0.37, Jalan 5/58 A, Gasing Indah
46000 Petaling Jaya
Selangor

Tuan,

KEBENARAN UNTUK MENJALANKAN KAJIAN DI SEKOLAH-SEKOLAH MENENGAH / RENDAH NEGERI PERAK

Saya diarahkan merujuk surat tuan bertarikh 16 November 2010 yang ada kaitannya dengan surat Kementerian Pelajaran Malaysia bilangan KP(BPPDP)603/5/JLD.11 (21) bertarikh 01 November 2010 tentang perkara di atas.

2. Sukacita dimaklumkan bahawa pihak Jabatan Pelajaran Perak **tiada halangan** memberi kebenaran kepada tuan untuk menjalankan kajian dan soal selidik bertajuk **"Factors Influencing The Transition Of Smoking Stages Among Secondary School Students In Kinta, Perak: A Longitudinal Study"** di sekolah-sekolah di negeri Perak dengan syarat mendapat persetujuan terlebih dahulu daripada Pengetua/Guru Besar sekolah berkenaan.

3. Sila tuan/puan kemukakan senaskhah laporan akhir kajian ke Unit Perhubungan dan Pendaftaran , Jabatan Pelajaran Perak setelah selesai kajian dijalankan.

4. Kehadiran tuan/puan membuat kajian di sekolah berkenaan tidak seharusnya menjejaskan proses pengajaran dan pembelajaran di sekolah berkenaan.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA'

Saya yang menurut perintah,

(KHAIROL AZMI B. AHMAD ARIFIN)
Penolong Pengarah,
Unit Perhubungan dan Pendaftaran
Jabatan Pelajaran Negeri Perak
b.p. Pengarah Pelajaran Negeri Perak.

Sk. - Pengarah Pelajaran Negeri Perak

Khazupp10

"CINTAILAH BAHASA KITA"
(Sila catatkan rujukan pejabat ini apabila berhubung)

Appendix E: Title Approval

UNIVERSITI MALAYA

UM.M/PDG/606

7 Januari 2016

Dr. Premila Devi A/P Jeganathan (MHC090015)
No. 37, Jalan 5/58A
Gasing Indah
46000 Petaling Jaya
Selangor Darul Ehsan

(Email: premilausm@yahoo.com)

Tuan/Puan,

KELULUSAN TAJUK TESIS

Dengan segala hormatnya perkara di atas adalah dirujuk.

Sukacita dimaklumkan bahawa Lembaga Fakulti dalam mesyuaratnya pada 6 Januari 2016 telah meluluskan pindaan tajuk tesis tuan/puan seperti berikut:-

"ADVERSE TRANSITION OF SMOKING STAGES AMONG LOWER SECONDARY SCHOOL STUDENTS OF KINTA, PERAK: A PROSPECTIVE COHORT STUDY."

Sekian, terima kasih.

Yang benar,

HARIL MUZAMMIL AWANG
Penolong Pendaftar Kanan (Ijazah Tinggi)
Fakulti Perubatan.

s.k. Ketua, Jabatan Perubatan Kemasyarakatan dan Pencegahan

Prof. Madya Dr. Nabilla Al-Sadat binti Abdul Mohsein - Penyelia
Prof. Madya Dr. Noran Naqiah binti Mohd Hairi - Penyelia
Prof. Madya Dr. Karuthan Chinna - Penyelia
Jabatan Perubatan Kemasyarakatan dan Pencegahan

Cik Joan Tang May Yin
Penolong Pendaftar (Unit Tesis)
Institut Pengajian Siswazah

CDCM/Kelulusan tajuk tesis/disertasi – 2016

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Appendix F: Proof Of Publication And Submission

Paper 1

DOI:http://dx.doi.org/10.7314/APJCP.2013.14.6.3483

RESEARCH ARTICLE

Smoking Stage Relations to Peer, School and Parental Factors among Secondary School Students in Kinta, Perak

Premila Devi Jeganathan[1,3,4*], Noran N Hairi[1,4], Nabilla Al Sadat[1,2], Karuthan Chinna[1,4]

Abstract

Background: To identify the prevalence of different stages of smoking and differences in associated risk factors. Materials and Methods: Thos longitudinal study started in February 2011 and the subjects were 2552 form one students aged between twelve to thirteen years of from 15 government secondary schools of Kinta, Perak. Data on demographic, parental, school and peer factors were collected using a self-administered questionnaire. We examined the effects of peer, school and parental factors on the five stages of smoking; never smokers, susceptible never smokers, experimenters, current smokers and ex-smokers, at baseline. Results: In the sample, 19.3% were susceptible never smokers, 5.5% were current smokers 6% were experimenters and 3.1% were ex-smokers. Gender, ethnicity, best friends' smoking status, high peer pressure, higher number of relatives who smoked and parental monitoring were found to be associated with smoking stages. Presence of parent-teen conflict was only associated with susceptible never smokers and experimenters whereas absence of home discussion on smoking hazards was associated with susceptible never smokers and current smokers. Conclusions: We identified variations in the factors associated with the different stages of smoking. Our results highlight that anti-smoking strategies should be tailored according to the different smoking stages.

Keywords: Smoking stages - adolescent - peer factors - parental factors - school factors

Asian Pacific J Cancer Prev, **14 (6)**, 3483-3489

Introduction

Over the past few decades cancer has become the leading cause of death across many Asian countries (Chassin et al., 1990). Different countries utilize different systems or strategies to manage this growing problem (Mahari, 2011). Tobacco use is highly associated with lung cancer and more than half of this malignant disease is said to be caused by tobacco smoking (Kaplan et al., 2001). Although tobacco use is one of the biggest threats to public health (Gritz et al., 2003), lack of case control and cohort studies in Asia and the complex relationship between cancer and tobacco use makes it difficult to derive conclusions (Kaplan et al., 2001).

Tobacco use is one of the most modifiable causes of not only cancer but also other diseases in Malaysia (Conrad et al., 1992). Annually, in Malaysia, nearly 10000 deaths are said to be related to smoking and the government spends about USD 1 billion to treat smokers for various smoking related diseases (Thornton et al., 1999). It is not surprising that anti-smoking campaign is one of the important strategies of the National Cancer Control Program.

Most adult smokers became tobacco users from the time they were only an adolescent (Mosavi-Jarrahi et al., 2004; Seo et al., 2008). Among adolescents, smoking can be conceptualized as a multi-stage process occurring over time (Kaplan et al., 2008) or as progressing through a sequence of developmental stages characterized by differences in smoking frequency and intensity (Pierce et al., 2005).

Although many studies related to tobacco use have been conducted in Malaysia, we still lack information on smoking stages among adolescents in Malaysia, the factors associated with the different stages and predictors of smoking progression from one stage to another. It is important to identify factors associated with the different stages of smoking so that preventive measures can be tailored accordingly. This paper discusses the prevalence of different smoking stages and its association with peer, school and parental factors.

Materials and Methods

Study design and selection of participants

Perak is the second largest state in Peninsular Malaysia. This study was conducted in Kinta, the largest district of Perak. Schools in Kinta were classified as urban or rural schools according to Malaysian Ministry of Education's criteria. Schools within a city or town municipality are considered as urban schools and the others are categorized

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Paper 2

DOI:http://dx.doi.org/10.7314/APJCP.2013.14.11.6769

RESEARCH ARTICLE

Incidence of Adverse Transition in Smoking Stages among Adolescents of Kinta, Perak

Premila Devi Jeganathan[1,3,4]*, Noran N Hairi[1,4], Nabilla Al Sadat[1,2], Karuthan Chinna[1,4]

Abstract

Background: Few local studies have explored the process of adverse transition of smoking stages among adolescents. The present investigation aimed to identify adverse transitions prospectively from the early stages till the escalation of the stages after one year. Materials and Methods: Data were collected in two waves from a cohort of 2,552 adolescents aged 12-13 years old studying in 15 secondary schools based in Kinta, Perak. A multistage sampling method was used to select the schools and a self-administered structured questionnaire was applied to help categorize the participants into five different smoking stages. Nonsmokers were divided into never smokers and susceptible never smokers. Ever-smokers were categorized as experimenters, current smokers or ex-smokers. Results: Among the participants 46.8% were Malay, 33.5% Chinese and 17.1% Indians. At baseline, we had 85.3% non-smokers and 14.6% ever smokers. Incidence of adverse transition among all our participants was 24.1%, with a higher value among male participants (16.8%). A higher proportion of susceptible never smokers and experimenters progressed to current smoking stage compared to never smokers. Conclusions: This study highlights the changes and patterns of adverse transition among adolescents. Male adolescents, those who are susceptible to smoking and those who had already tried experimenting with cigarettes have a higher chance of escalating to a higher smoking stage.

Keywords: Adolescents - smoking stages - adverse transition - Perak, Malaysia

Asian Pac J Cancer Prev, **14 (11)**, 6769-6773

Introduction

The long term health consequences and the immediate effects of tobacco use have been well documented for the last five decades. World Health Organization reported tobacco use to be linked to six of the eight main causes of death including cancer (World Health Organization, 2012). Although smoking is prevalent in all ages, adolescents are more vulnerable (Binu et al., 2010). Smoking among adolescents is a dynamic process involving progression through several stages (US Department of Health and Human Services, 2012).

In Malaysia, the National Health Morbidity and Mortality Survey III, 2006 identified the prevalence of smoking among adolescents aged between 13-18 years old to 8.7% and Malaysian Global Youth Tobacco Survey, 2009 reported the prevalence to be 18.2%. There are also several local studies that have investigated not only on prevalence of smoking but also examined the factors associated with smoking (Naing et al., 2004; Lee et al., 2005; Al-Naggar et al., 2011). A study on oral cancer, found students to be more aware of unfavourable effects of tobacco use compared to working adults (Ghani et al., 2013). Unfortunately, most of these studies are cross-sectional in nature and lack information on progression of smoking stages among adolescents.

Long-term abstinence from tobacco use usually involves many unsuccessful attempts to quit and cessation after becoming nicotine dependent is difficult (Yasin et al., 2013). Hence, preventing smoking initiation, uptake and experimentation is important. In addition, identifying progression or adverse transition of smoking stages is crucial as it has been shown as an efficient way to understand the development of smoking behavior among adolescents (Mosavi-Jarrahi et al., 2004; Hampson et al., 2013). This study aims to examine the different stages of smoking and identify the incidence of adverse transition among adolescents.

Materials and Methods

Study design

Longitudinal design with two point data collection was used in this study. This study cohort was carried out in Kinta educational institutions. Kinta is the largest district in Perak, Malaysia. As part of a longitudinal survey, started in February 2011, the incidence of adverse transition was studied over the period of one year.

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Submission 1

Subject: [APJCP] Thank you for submitting your manuscript to the Asian Pacific Journal of Cancer Prevention.

From: APJCP Main Office (apjcpedit@gmail.com)

To: premilausm@yahoo.com;

Date: Wednesday, April 15, 2015 3:38 PM

ASIAN PACIFIC JOURNAL
OF CANCER PREVENTION

[APJCP] Your manuscript has been submitted.

Apr. 15. 2015 04:29:29

Dear Dr. Premila Devi Jeganathan,

Type : Research Article

Title of MS : Adverse transition of smoking stages among adolescents in Kinta, Perak of Malaysia: a prospective cohort study

Authors : Premila Devi Jeganathan, Noran Naqiah Mohd Hairi, Nabilla Al-Sadat Abdul Mohsein, Karuthan Chinna

Affiliation : Social and Preventive Medicine, Faculty of Medicine, University of Malaya

Abstract : Objective: Smoking behavior normally begins with initiation during adolescence and progress through different stages. Yet, few prospective longitudinal research has been conducted to examine the influence of various factors on progression to a higher smoking stage. The aim of this study was to describe the factors associated with adverse transition of smoking stages among adolescents. Method: A school based study among a cohort of 2552 secondary students aged 12 to 13 years old was conducted. Students answered a self-administered questionnaire. The procedures in the complex samples add-on module were used in the analyses after adding appropriate student and school weights that were adjusted for non-response. The predictors of the four adverse transitions were tested using multinomial logistic regression analysis. Results: At Time 1, there were 1669 never smokers, 474 susceptible never smokers, 168 experimenters and 83 ex-smokers in this study. At T! ime 2, 77.2% of the never smokers remained stable never smokers while 22.8% had Adverse Transition I. Adverse Transition II was 27.8 % among the susceptible never smokers. Among the experimenters, 43.5% had adverse Transition III and 36.0% of the ex-smokers 25 had adverse Transition IV. The analyses of this

Submission 2

Subject: Nicotine & Tobacco Research - Manuscript ID NTR-2015-500

From: ntr.editorialoffice@oup.com (ntr.editorialoffice@oup.com)

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Cc: premilausm@yahoo.com; noran@um.edu.my; nabilla@ummc.edu.my; karuthan@ummc.edu.my;

Date: Monday, July 20, 2015 3:58 PM

20-Jul-2015

Dear Dr JEGANATHAN

Your manuscript entitled "Self-efficacy and smoking stages among adolescents of Perak, Malaysia" has been successfully submitted online and is presently being evaluated for consideration for publication in Nicotine & Tobacco Research.

If you have followed the author guidelines in preparing and submitting your manuscript, it will be forwarded to the editors for evaluation. If your manuscript does not comply with the guidelines, you will be asked to bring it into compliance before the manuscript is considered for review.

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Thank you for submitting your manuscript to Nicotine & Tobacco Research.

Yours sincerely,

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