This study provides knowledge on adolescents’ substance use and emotional and behavioral problems in Nepal. The results revealed that attention should be paid to these issues by researchers and health professionals. Substance use is not a separate issue with regard to understanding adolescent health. Therefore, in the future, it is important to know how adolescents’ value their health and how aware they are of the consequences of substance use. Interventions, such as school-based and community-based programs, would be beneficial for low-income countries because of their scarce resources.
Substance use and psychosocial problems among Nepalese adolescents
SUYEN KARKI

Substance use and psychosocial problems among Nepalese adolescents

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ABSTRACT
Adolescence is a transitional phase from childhood to adulthood and various health risk behaviors are developed at this age. Substance use and psychosocial problems, such as emotional and behavioral problems, are common during adolescence and these can result in various health consequences. However, little attention has been paid to substance use and psychosocial problems among adolescents in Nepal. Therefore, the aims of this study were to describe substance use and psychosocial problems, namely emotional and behavioral issues, and the factors that were associated with them in Nepalese adolescents. The ultimate aim of this study was to point out the multi-dimensional factors related to substance use among Nepalese adolescents.

This study consisted of a systematic review and empirical study. The systematic review was conducted by searching for scientific articles from the CINAHL, PubMed, SocIndex and Academic Search Premier databases. Scientific articles (n=27) published between 2007 and 2010 were identified by the screening process and these were analysed using content analysis. The empirical, cross-sectional study focused on 408 adolescents, aged from 12-18, and 19 class teachers selected from the Western Developmental region of Nepal. The data were collected by the Youth Self-Report (YSR), the Adolescents’ Substance Use Measurement (ADSUME) tool, demographic questions and a questionnaire for teachers. Data of this empirical study were analysed by using statistical methods.

The results showed that girls had higher scores for internalizing problems, including feeling anxious/depressed, and that boys had higher scores for delinquent behavior. In addition, the boys used more substances than the girls. Living in an urban area and belonging to an older age group were factors that influenced emotional and behavioral problems and substance use. Furthermore, the substance use habits of the father or grand parents, and the mother’s occupation, were associated with the adolescent’s substance use. A strong association was also observed between emotional and behavioral problems and substance use in these adolescents. Teachers reported that substance use among adolescent pupils was mostly influenced by peer relationships and problems in the family.

In conclusion, this study may help researchers, health professional and governmental bodies to consider the important factors involved in adolescent health and well-being. However, various factors, including cultural and social factors, need to be considered by future studies in order to understand the possible relationship between psychosocial problems and substance use among adolescents.

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Kuopio, February 2017

Suyen Karki
List of the original publications,

This dissertation is based on the following original publications:


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# Contents

1 INTRODUCTION ..............................................................................................................................................1

2 ADOLESCENT HEALTH AND SUBSTANCE USE IN THE GLOBAL CONTEXT .........................................................3
   2.1 Adolescent health ........................................................................................................................................... 3
   2.2 Substance use in adolescents ......................................................................................................................... 4
   2.2.1 Prevalence and trends in smoking ........................................................................................................... 6
   2.2.2 Prevalence and trends of alcohol and other substances ........................................................................... 8
   2.2.3 Protective factors ......................................................................................................................................... 10
   2.2.4 Risk factors ............................................................................................................................................... 11
   2.3 Adolescent psychosocial problems in the global context ............................................................................. 17
   2.3.1 Prevalence of psychosocial problems in adolescents ............................................................................. 17
   2.3.2 Factors related to psychosocial problems ................................................................................................. 18
   2.4 Substance use and its associated factors among Nepalese adolescents ........................................................ 22
   2.4.1 Policy related to tobacco, alcohol and drugs ............................................................................................ 23
   2.4.2 Substance use ........................................................................................................................................... 24
   2.4.3 Mental health ............................................................................................................................................ 26
   2.5 Interventions for adolescent substance use ................................................................................................. 26
   2.6 Summary of the literature review ................................................................................................................ 29

3 AIMS OF THE STUDY ........................................................................................................................................31

4 METHODS ..........................................................................................................................................................32
   4.1 Study design ................................................................................................................................................... 32
   4.2 Systematic literature review ......................................................................................................................... 33
   4.2.1 Searches and selection of literature ......................................................................................................... 33
   4.2.2 Data extraction and analysis .................................................................................................................... 34
   4.3 Quantitative methods .................................................................................................................................... 34
   4.3.1 Sample ....................................................................................................................................................... 34
   4.3.2 Material and data collection ...................................................................................................................... 36
   4.3.3 Analysis method ........................................................................................................................................ 38
   4.4 Ethical considerations ................................................................................................................................... 38

5 RESULTS ............................................................................................................................................................40
   5.1 Description and effects of interventions (Sub-Study 1) .................................................................................. 40
   5.2 Patterns of psychosocial problems among Nepalese adolescents (Sub-study 2) .......................................... 41
   5.2.1 Prevalence of emotional and behavioral problems .............................................................................. 41
   5.2.2 Associated factors of emotional and behavioral problems ................................................................... 42
   5.3 Adolescents’ substance use and associated factors in Nepal (Sub-study 3) ................................................. 43
   5.3.1 Prevalence of substance use .................................................................................................................... 43
   5.3.2 Substance use problems, reasons and exposures ................................................................................... 44
   5.3.3 Factors associated with substance use .................................................................................................... 45
5.4 Association between psychosocial problems and substance use in Nepal (Sub-study 4) ................................................................. 45
5.5 Teachers’ perspectives regarding substance use ........................................... 45
5.6 Summary of the results ............................................................................. 47

6 DISCUSSION ......................................................................................... 49
6.1 Effects of interventions in reducing substance use ........................................ 49
6.2 Psychosocial problems and similar trends to other multicultural societies .... 52
6.3 Substance use problems among boys and girls .............................................. 54
6.4 Emotional or behavioral problems and substance use .................................. 56
6.5 Validity and reliability of the study ............................................................ 58

7 CONCLUSIONS ..................................................................................... 60
7.1 Conclusions derived from the main results .................................................. 60
7.2 Suggestions for future research .................................................................. 60

REFERENCES ............................................................................................ 62

ORIGINAL PUBLICATIONS (I-IV)
Abbreviations

A-CRA  Adolescent Community Reinforcement Approach
ADSUME  Adolescents’ Substance Use Measurement
ANCOVA  Analysis of Covariance
AUDIT  Alcohol Use Disorder Identification Test
CBS  Central Bureau of Statistics, Nepal
CINAHL  Cumulative Index to Nursing and Allied Health Literature
CRAFFT  Car, Relax, Alone, Forget, Friends, Trouble
CU  Callous Unemotional
CWIN  Child Workers in Nepal
ESPAD  European School Survey Project on Alcohol and Other Drugs
FCTC  Framework Convention on Tobacco Control
GYTS  Global Youth Tobacco Survey
HBSC  Health Behavior in School-aged Children
MoHP  Ministry of Health Population, Nepal
NHEICC  National Health Education, Information and Communication Center
NHRC  Nepal Health Research Council
SAMHSA  Substance Abuse and Mental Health Services Administration
SEAR  South-East Asia Region
SPSS  Statistical Package Social Sciences
UNDP  United Nations Development Program
UNICEF  United Nations Children’s Fund
UNODC  United Nations Office of Drugs and Crime
WHO  World Health Organization
YSR  Youth Self-report
1 Introduction

Adolescence is the development phase from childhood to adulthood, from the age of 10 to 19 years (UNICEF 2016). Characteristics during physical, mental and sexual maturation are influenced by culture and the individual’s socioeconomic situation (WHO 2016a). There are about 1.2 billion adolescents worldwide, they make up 18% of the world’s population and about 90% of them live in developing countries (UNICEF 2012). This means that adolescent health and well-being is a major concern across the world. Various health risk behaviors develop during the transition from childhood to adolescence (Blum 2009, Denny et al. 2011, Raphael 2013, Stickley et al. 2013, Wetherill & Tapert 2013, Lazzeri et al. 2014). Common health risk behaviors during adolescence include substance use and mental health problems (Tarter & Vanyukov 1994, Sher & Gotham 1999, Cunningham et al. 2008, Stickley et al. 2013, Wetherill & Tapert 2013). These behaviors are associated with various factors, for example risky sexual behavior, poor relationships with parents and peers, poor school performance, injuries and violence (Flay et al. 1994, Hanson & Chen 2007, Brown et al. 2008, Skala & Walter 2013, Benjet et al. 2014, Moss, Chen & Yi 2014).

The World Health Organization (WHO) has estimated that tobacco kills around 6 million people worldwide each year and 21% of the global population aged 15 years and above have been reported to smoke tobacco (WHO 2016b). By the year 2030, it is estimated that 70% of all tobacco-related deaths will occur in low-income and middle-income countries (Blum & Nelson-Mmari 2004). Also, 3.3 million deaths occur globally every year due to the harmful use of alcohol and 5.1% of the global disease burden is due to the consumption of alcohol (WHO 2014a). A WHO report estimated that 38.3% of the worldwide population aged 15 years and above had consumed alcohol in the past year and 16% of them were heavy drinkers. It also estimated that 11.7% of adolescents aged 15-19 years were involved in heavy episodic drinking in the WHO region (WHO 2014a). In addition, the United Nations Office on Drugs and Crime has reported that 5.2% of the global population used drugs when they were aged 15 years and over (UNODC 2015).

Similarly, peer influence was another factor for adolescents’ substance use (Chilcoat et al. 1995, Steinberg, Fletcher & Darling 1994, Hawkins et al. 1997, Alexander et al. 2001, Jackson et al. 2014, Lazzeri et al. 2014, Lee et al. 2015). Friends who used substances often influenced their peers, either through social interaction or to reduce anxiety or depression (Flay et al. 1994, Curran, Stice & Chassin 1997, Alexander et al. 2001, Lee et al. 2013, Virtanen et al. 2015). In addition, the school environment also influenced substance use in adolescents. Pressure at school, poor school performance, poor teacher-student relationships and moving into a higher grade or going to high school have often been shown to be related to substance use among adolescents (Kalpan, Martin & Robbins 1984, Tyas & Pederson 1998, Al-Sahab et al. 2012, Lazzeri et al. 2014, Moor et al. 2015).

Studies have indicated that another major reason for substance use among adolescents is psychosocial problems such as emotional and behavioral problems (Brook et al. 1998, Fergusson, Horwood & Swain-Campbell 2002, Cranford, McCabe & Boyd 2013, Pedersen & von Soest 2015). Behavioral problems such as internalization and externalization problems have often been related to substance use in adolescents (Windle 1990, Chassin et al. 1999, Díaz et al. 2011, McCarty et al. 2012). Depression, anxiety, delinquency and violent behavior have also been reported to be significant factors in initiating substance use in adolescents (Covey & Tam 1990, Hawkins, Catalano & Miller 1992, Jones & Bradley 2007, Burdzovic Andreas & Jackson 2015, Richmond et al. 2015, Virtanen et al. 2015). However, epidemiological data about substance use in adolescents and its associated factors mostly come from high-income countries (Chassin et al. 1986, Chassin et al. 1991, Hawkins, Catalano & Miller 1992, Tyas & Pederson 1998, Moor et al. 2015) which makes it difficult to formulate a global policy to reduce health risks among adolescents (Degenhardt et al. 2016). The priorities for adolescent health seem to be different in high-income countries and low-income countries (Patel et al. 2007, Kieling et al. 2011, Patel et al. 2013). Adolescent health, including risky behavior, has often been ignored in low-income countries (Blum & Nelson-Mmari 2004) due to the low level of resources that are available and other disease burdens (Sharan et al. 2009, Carnet & Myers 2012). In these countries, few studies have been conducted on adolescents’ substance use, associated factors and interventions to reduce substance use (Carnet & Myers 2012), including mental health (Keinert 2007, Sharan et al. 2009). However, due to cultural, social and socioeconomic differences, the earlier findings may not be generalized. Therefore, this study aimed to explore substance use and its associated factors in one low-income country, Nepal, where researchers have tended to ignore issues like adolescent substance use and psychosocial problems. The limited studies that have been produced on Nepalese adolescents have focused on alcohol or tobacco use and the small number of studies that have focused on psychosocial problems, such as emotional and behavioral problems, have not looked at their association with substance use. Therefore, the aims of this study were to describe substance use and psychosocial problems, namely emotional and behavioral issues, and the factors that were associated with them in Nepalese adolescents.
2 Adolescent health and substance use in the global context

2.1 ADOLESCENT HEALTH

Adolescence is a transitional period from the age of 10 to 19 years, when young people undergo physical, biological, psychological, cognitive, social and economic changes (Fatusi & Hindin 2010, Stickley et al. 2013, UNICEF 2016) that affect the development of their health, well-being and health behavior (Currie & Alemán-Díaz 2015). Adolescence can be divided into two parts: early adolescence (10–14 years) and late adolescence (15–19 years). During early adolescence, the physical changes in the development of the brain are obvious (Dowsett & Livesey 2000, UNICEF 2011). Late adolescence comprises the latter teenage years and, at this stage, most of the physical changes have already occurred, with the continuous development of both the body and mind. During these years, cognitive abilities are enhanced with analytical and reflective thoughts (UNICEF 2011) and the adolescent’s understanding of the social perspectives, their self-awareness and their inhibitory control are increased (Dowsett & Livesey 2000).

Over the past two decades, there have been noteworthy changes in the mortality and morbidity of children, adolescents and youths (Blum 2009). Blum (2009) noted that infectious diseases were previously the leading causes of mortality among young people, but that in recent decades, mortality in these groups had mostly been due to behavioral causes, such as injuries, homicide, suicide, the HIV infection and its transmission and substance abuse, all of which are worsened by poor health policies and healthcare systems. The early use of tobacco and alcohol heightens the risk of cancer and cardiovascular diseases in later life, which are exacerbated by poor lifestyles (Patton et al. 2014). Patton et al. (2014) also noted that, in high-income countries, the health of adolescents has progressed immensely, but in low-income and middle-income countries, progress has been decelerated by the negligence, or failure, in identifying the determinants of adolescents’ health. Furthermore, most low-income and middle-income countries have inadequate health services for adolescents and lack the services that address their specific needs (Fatusi & Hindin 2010). In particular, adolescents often share mental health facilities with adults or, in contrast, are treated as children (Kleinert 2007).

Viner et al. (2012) identified two levels (structural and proximal) to explain the social determinants of health in adolescence based on the WHO’s Commission on Social Determinants of Health. Structural determinants are related to the nation’s wealth, gender and income inequality, educational status and political or social welfare frameworks. Proximal or intermediate determinants originate from the structural determinants, in addition to cultural, religious and community factors. These are related to the conditions of daily life: relationships with family and peers, school environment, neighborhoods, and health behaviors (Viner et al. 2012).

The health and well-being of adolescents is influenced by a wide range of determinants, for instance, living conditions, environment, home, society, access to care, physical conditions, physical activities, good relationships with parents, peers and teachers, being
free from physical and mental complaints, a stress-free school environment, safe sexual intercourse (Lazzeri et al. 2014, Kuntsche & Ravens-Sieberer 2015), health-related legislation, employment opportunities and opportunities to participate and engage in social activities (Patton et al. 2014). Thus, adolescent’s health and well-being are determined by their family, peers, school, neighborhood and socioeconomic status (Hanson & Chen 2007, Lazzeri et al. 2014, Sonenstein 2014, Currie & Alemán-Díaz 2015). A number of factors have been reported to reduce the risk of having poor health that, in turn, affects the well-being of adolescents: positive home and family relationships, good relationships with peer groups, a fair school environment and community cohesion, improved emotional health, adequate nutrition and exercise, reduced injuries and violence (Denny et al. 2011).

Furthermore, adolescent health outcomes have been shown to vary according to socioeconomic status (Sawyer et al. 2012, Elgar et al. 2015, Quon & McGrath 2015). A lower socioeconomic status at an individual and community level has been associated with reduced self-rated health, low life-satisfaction and higher mental health problems, such as anxiety, depression, aggressiveness and low self-esteem (Lazzeri et al. 2015, Quon & McGrath 2015). In addition, adolescents with lower socioeconomic status have been reported to have poor living conditions and consume foods with a low nutritional value (Chen, Matthews & Boyce 2002), engaging in low levels of physical activities, and having high levels of general health symptoms (Quon & McGrath 2015). A study conducted among young people in Latin America and the Caribbean indicated that poverty had a strong correlation with risky behavior (Cunningham et al. 2008). Living in poverty and a society with high disparities can prompt more violence or substance use (Cunningham et al. 2008). Therefore, behavioral and social connections now have a greater impact on the health and well-being of adolescents than infectious diseases (WHO 2014a).

During the developmental period, adolescent health and well-being has been shown to be threatened by engaging in risky behavior (Denny et al. 2011), such as watching TV or playing games for long periods of time, skipping breakfast, physical inactivity, multiple health complaints, taking sexual risks, isolation from society, violent behavior and using substances such as tobacco, alcohol and other intoxicating substances (Stickley et al. 2013, Wetherill & Tapert 2013, Lazzeri et al. 2014, Raphael 2013). These risky behaviors have been shown to produce adverse health risks, both in the short-term and long-term, and could impede the development of adolescents and lead to poor health outcomes in middle and late adulthood (Denny et al. 2011, Raphael 2013).

2.2 Substance Use in Adolescents

Adolescents’ risky behavior, such as substance use that includes tobacco, alcohol, illicit drugs, medicines and glue, has been a public health concern as it can manifest in injuries, violent behavior, unprotected sexual behavior and social maladjustment (Arata, Stafford & Tims 2003, Chatterji et al. 2004, WHO 2014a). Moreover, it also adds to the epidemic of non-communicable diseases, such as increased blood pressure, cholesterol, glucose, decreased physical activities and obesity, in later life (Sawyer et al. 2012). This behavior is prevalent in both high-income countries and in low-income and middle-income countries (Kleinert 2007). Evidence has been published by the US Substance Abuse and Mental Health Services Administration that substance use in adolescence increased from early to late adolescence
and peaked during the transition into adulthood (SAMHSA 2012), causing long-term effects on physical and mental health (Brown et al. 2008, Catalano et al. 2012, Rooke et al. 2013), social problems (Brown et al. 2008, Skala & Walter 2013) and life-threatening behavior, such as suicide attempts (Hall & Solowij 1998, Miller et al. 2007, Moore et al. 2007, Kokkevi et al. 2012, Van Gastel et al. 2013). Therefore, due to its age-related patterns, substance use has been suggested to be developmental disorder (Tarter & Vanyukov 1994, Sher & Gotham 1999).

At the beginning of the 21st century, Chassin et al. (2000) identified different subgroups of smoking based on the age of onset, stability and amount of smoking. The groups were further divided into abstainers, an early onset group, an experimenting group, a late onset group and a quitting group. Abstainers were the socially conventional group of adolescents who did not violate social norms, had a good relationship with their parents, had better education and were most satisfied with life. Furthermore, they had the fewest number of smoking peers and parents and held negative views about smoking. The early onset group started smoking at an early age and smoked at high levels throughout the period. They were most likely to violate social norms, least likely to continue college education, had the lowest levels of parental support, had parents and peers who smoked and had positive views about smoking. The experimental group had friends who smoked, accepted violent behavior, and had moderately positive beliefs about smoking. However, this group were most likely to go college and had some degree of parental support as well as the lowest number of smoking parents. A further group was the late onset group who had similar characteristics to the abstainers. They started to smoke in adulthood and Chassin et al. (2000) explained that these people started smoking after leaving their parents’ home or to cope with the college life. Lastly, the quitter group stopped smoking after 22 years of age as they started to assume adult roles and become more responsible towards their lives (Chassin et al. 2000).

In line with Chassin et al. (2000), several studies have supported the idea that adolescent smoking is associated with age (Chen, Matthews & Boyce 2002), family relationships and attitudes, parents’ smoking habits (Flay et al. 1994), peer and sibling smoking habits, peer characteristics and relationships, the school environment, mental problems, socioeconomic status, and self-esteem (Tyas & Pederson 1998). The longitudinal study pointed out that smoking during adolescence greatly increased the risk of regular smoking in adulthood and that those smoking during early adolescence were less likely to quit smoking in adulthood (Chassin et al. 1990). This indicates that smoking is addictive behavior and exposure to smoking for longer periods of time contributed to continuing this risk behavior (Chassin et al. 1990).

Similarly, Chassin, Flora & King (2004), also identified three major subgroups for the trajectories of substance use, which include “heavy drinking/heavy drug use, moderate drinking/experimental drug use, and light drinking/rare drug use”. The adolescents with heavy drinking or drug use risked developing alcohol or drug dependence. This group had the highest parental alcohol problems, emotional problems and lack of constraint. Studies have also showed that heavy alcohol users had peers with alcohol or drug abuse, antisocial behavior and higher externalizing problems, especially among boys (Chassin, Pitts & Prost 2002). The moderate or experimental group were at a risk of developing alcohol dependence, but not drug dependence, and had less emotional problems and greater
constraint. Similar characteristics were also found among those with light or infrequent substance use (Chassin, Flore & King 2004).

Substance use during adolescence has been found to be associated with major depressive disorders, alcohol dependence and substance use disorders in adulthood (Chassin, Pitts & Prost 2002, Brook et al. 2002, Chassin, Flora & King 2004). Earlier studies on the predictors of substance use by adolescents have shown that early onset use is related to later or continuous use in adulthood (Kandel et al. 1986, Hawkins, Catalano & Miller 1992). Similar to smoking, adolescents who increased their substance use in early adolescence were found to have poor family relationships and support (Hawkins, Catalano & Miller 1992), poor academic performance (Miller et al. 2007), lower socioeconomic status (Hawkins, Catalano & Miller 1992, Hanson & Chen 2007), greater levels of stress, and parental or peer substance use (Chilcoat et al. 1995, Wills et al. 1996, Kilpatrick e al. 2000, Nigg et al. 2006). In addition, weak response inhibition or poor self-regulation have been found to be associated with substance use, as these may relate to poor planning, judgement, behavioral or impulse control (Kuntsche et al. 2006, Nigg et al. 2006). Adolescents with motivational problems often perceive their substance use behavior as non-problematic and can engage in the heavy use of substances, including smoking (Wiers et al. 2007). Furthermore, adolescents who had experienced traumatic events, such as a history of sexual or physical assaults and had witnessed violence increases were more likely to use or be dependent on alcohol (Kilpatrick et al. 2000). It has been found that females are more likely to have been abused sexually, whereas being victims of physical abuse or violent acts was more commonly observed in males (Clark, Lesnick & Hegedus 1997).

Other reasons for adolescent drinking behavior have been found to be associated with social or recreational purposes (Kuntsche et al. 2005). These drinking adolescents want to feel better or relax, forget about their problems, overcome their shyness, celebrate an occasion (Kairouz et al. 2002, Kuntsche et al. 2005) and be accepted by their peers (Jerez & Coviell 1998). Various studies have shown harmful health effects caused by substance use in adolescence (Arata, Stafford & Tims 2003, Chatterji et al. 2004). These include social health consequences, such as traffic accidents, unsafe sexual practices, harming others or oneself, poor relationships, poor academic performance, decreased self-esteem and antisocial behaviors (Kandel et al. 1986, Brook, Balka & Whiteman 1999, Tapert et al. 2001, Arata, Stafford & Tims 2003, Chatterji et al. 2004, Skala & Walter 2013, Benjet et al. 2014, Moss et al. 2014). Other adverse consequences on health are concerned with impairments in cognitive or behavioral functioning, anxiety, depression, respiratory problems, reproductive problems and dependence syndrome (Hall & Solowij 1998, Moore et al. 2007). Therefore, to understand substance use, various dimensions, such as “cognitive, biological, social and affective changes” should be considered (Brown et al. 2008).

### 2.2.1 Prevalence and trends in smoking

In 2015, more than 1.1 billion people globally used tobacco and in 2012, approximately 36% of males and 7% of females smoked. The rates among young people aged 13 to 15 years were approximately 18% for boys and 8% for girls (WHO 2016d). Thus, worldwide, one in five boys and one in ten girls aged 13 to 15 years used tobacco (WHO 2014c). The Global Youth Tobacco Survey (WHO 2014c) indicated that one in three teenagers smoked tobacco in 12 out of 158 countries it examined. Across the 35 countries in Europe and North America, 17% of boys and 18% of girls were reported to smoke weekly (Moor et al. 2015).
The age of initiation of smoking among the adolescents was found to be 13 years or younger in many countries (Harrell et al. 1998, Everett et al. 1999, Guthrie et al. 2001).

The highest rates of smoking were found in the WHO regions of the European and Western Pacific. In most high-income countries, there has been a significant decline in the rates of tobacco use among adolescents aged 12 to 15 years (WHO 2015a). In contrast, the highest prevalence of smoking among adolescents was observed in Greenland, Indonesia, Papua New Guinea and Timor-Leste, with rates varying from 40% to 60% (WHO 2014c). The Health Behavior in School-aged Children (HBSC) 2009/2010 survey found that the prevalence of weekly cigarette smoking among 15-year-old adolescents in high-income countries was: 53% of boys and 61% of girls in Denmark (Greenland), 39% of boys and 27% of girls in Iceland, 33% of boys and 11% of girls in Luxembourg, 25% of boys and 29% of girls in Austria, 20% of boys and 19% of girls in Finland, 9% of boys and 14% of girls in the United Kingdom, 9% of boys and 7% of girls in the United States (WHO 2014d).

In addition, in low-income countries, 16.7% of males and 8.2% of females aged 13 to 15 years use tobacco (WHO 2016d). Furthermore, a study conducted among the adolescents in developing countries in Africa, Asia and Europe, namely Nigeria, India, Indonesia, Serbia, Turkey, Bulgaria and Croatia, showed that the prevalence of regular tobacco use was 14.5% in the past 12 months (Atilola et al. 2014).

In the WHO South-East Asia region (SEAR) in 2007-2014, the prevalence of current tobacco use in the 13 to 15 years age category was 21% for males and 7% for females (WHO 2016d). The highest prevalence of current smoking in boys in SEAR was found in Timor-Leste (65.5%) followed by Bhutan (39%) and the lowest prevalence was found in Bangladesh (9.2%) and the Maldives (15.2%). Similarly, for girls, the highest prevalence of current tobacco use (any) was found in Timor-Leste (23.2%) followed by Bhutan (23.2%), while the lowest prevalence was found in Bangladesh (2.8%) and Sri Lanka (5.4%) (WHO 2015a). In another study in Bangladesh, the prevalence of current smoking among secondary school pupils was 7% (12.3% among boys and 4.5% among girls). The pupils had started to smoke at the mean age of 10.8 years, and the study indicated the students above 16 years of age were around two times more likely to smoke than the younger students (Rahman et al. 2011). In another member country of the WHO SEAR, India, the prevalence of current tobacco use among the population of 3,799 students was around 2.24% and the rate of students who had ever used any tobacco products was around 8% (Dhavan et al. 2010). A further study that covered a large adolescent population in India revealed that the highest rates of current smokers were found in Sikkim (19%) and Manipur (17%), and the highest rates of those who had ever used tobacco were found in the East (75%) and North (58%) States. Furthermore, it also revealed that Bihar had the largest number of current smokeless tobacco users (39%) (Oswal 2015).

An increasing trend for smoking can be observed in past and recent Global Youth Tobacco Surveys in the WHO SEAR: the prevalence rates of current adolescent smokers in boys aged 13 to 15 years increased compared to past and recent surveys, except in Bangladesh, where there was a slight increase. Among girls in same age category, a trend indicating a rise in smoking prevalence was observed in Bhutan, Maldives and Nepal, with a slight difference in Sri Lanka (see Table 1). In addition, a declining trend among girls was observed by the survey in Bangladesh, India, Indonesia and Myanmar (WHO 2015a).
Table 1. Prevalence of smoking by adolescents aged 13 to 15 in the WHO South-East Asia Region (SEAR), according to the Global Youth Tobacco Survey (GYTS)

<table>
<thead>
<tr>
<th>Country</th>
<th>Years</th>
<th>Male (%)</th>
<th>Female (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>2013</td>
<td>9.2</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>9.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Bhutan</td>
<td>2013</td>
<td>39.0</td>
<td>23.2</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>27.6</td>
<td>11.6</td>
</tr>
<tr>
<td>India</td>
<td>2009</td>
<td>19.0</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>2006</td>
<td>16.8</td>
<td>9.4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2014</td>
<td>36.2</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>41.0</td>
<td>6.2</td>
</tr>
<tr>
<td>Maldives</td>
<td>2011</td>
<td>15.2</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>8.5</td>
<td>3.4</td>
</tr>
<tr>
<td>Myanmar</td>
<td>2011</td>
<td>30.0</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>22.5</td>
<td>8.2</td>
</tr>
<tr>
<td>Nepal</td>
<td>2011</td>
<td>24.6</td>
<td>16.4</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>13.0</td>
<td>5.3</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2011</td>
<td>15.7</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>12.4</td>
<td>5.8</td>
</tr>
<tr>
<td>Thailand</td>
<td>2009</td>
<td>26.9</td>
<td>9.2</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>2013</td>
<td>65.5</td>
<td>23.9</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>39.7</td>
<td>23.8</td>
</tr>
</tbody>
</table>

2.2.2 Prevalence and trends of alcohol and other substances

Alcohol and drug use among adolescents is a major concern worldwide. In high-income countries, the prevalence of alcohol use reported by HBSC in 2009/2010 showed that the prevalence of any alcohol use during the previous week among boys aged 15 years was highest in the Czech Republic, Croatia, Greece (approximately 44%), while the lowest prevalence in the same age category was found in Denmark, Finland, Iceland, USA, Sweden and Norway (11% and below). The highest prevalence among 15-years-old girls was found in Greece, the Czech Republic and Wales (United Kingdom) at approximately 30% to 34%. The lowest prevalence among 15-year-old girls was observed in Portugal, Iceland, Denmark, Finland, the USA, Sweden, Russia and Ireland (below 10%) (WHO 2014e). Moreover, among boys in high-income countries, the prevalence of having ever used marijuana at the age of 15 was found to be highest in Switzerland, Canada, the Czech Republic, France, Latvia, Spain, and the United States, ranging from 30% to 35%, while the lowest rates were found in Finland, Greece and Russia, at up to 11%. Similarly, among girls, the highest prevalence was found in Canada, the Czech Republic, the United States and Spain, ranging from 25% to 33% (WHO 2014e).

In low-income and middle-income countries, around 18% of boys and 14% of girls aged 13 to 15 years consume alcohol. The highest alcohol consumption has been found in the Western Pacific region, especially in Cambodia, where 80% of boys and 50% of girls aged 10 to 19 years had any previous alcohol use (WHO 2016e). A study that included adolescents (9th to 12th graders) from seven low-income and middle-income countries, i.e. India, Indonesia, Nigeria, Serbia, Turkey, Bulgaria and Croatia, showed that around 50% of the respondents had consumed alcohol or had taken other substances at least once during the previous 12 months. Specifically, around 38% had consumed alcohol and around 8% had used marijuana or other substances (Atilola et al. 2014).

According to the most recent Global school-based student health survey conducted among 13 to 17 year-olds in low-income and middle-income countries, the prevalence of boys and girls who had consumed two or more alcoholic drinks per day in the past 30 days
was found to be highest in the WHO Africa region, ranging from 25% to 53%, for instance, in the Seychelles, Ghana, Swaziland, Namibia and Botswana. In the WHO Americas region, the prevalence of this level of alcohol consumption was high in most of the countries and accounted to 29% to 60% of boys and 23% to 59% of girls. The lowest alcohol prevalence for boys in the WHO region of Americas was the Dominican Republic and the highest was Colombia. However, for girls, the lowest rates were found in Suriname and the highest rates were in Colombia. In the WHO Western Pacific region, the prevalence of this level of alcohol consumption in China was 11% among boys and the highest prevalence was in Nauru at 58% of boys and 54% of girls (WHO 2016f).

The survey also indicated that Samoa had the highest rate of using marijuana at least once during the previous 30 days in this WHO region, at 44% of boys and 28% of girls. In the WHO Africa region, the highest incidence of this level of marijuana use was found in Mauritius, in around 8% of boys and girls, and in the WHO Americas region, Barbados had the highest rates, at 13% of boys and 6% of girls (WHO 2014f).

In South-East Asia, 2014/2015 data provided by the Global school-based student health survey (WHO) for adolescents aged 13 to 17, showed that the prevalence of drinking two or more alcoholic drinks per day in Thailand the past 30 days, was 38% for boys and 48% for girls. The 2014/2015 survey found that Thailand and Timor-Leste had the highest rates of alcohol consumption, as respondents had consumed at least one alcoholic drink during the previous 30 days (see Table 2) (WHO 2016f).

In addition, Thailand, Timor-Leste and the Maldives had the highest prevalence of using marijuana at least once and 70-80% of females had used marijuana for the first time before the age of 14 (WHO 2016f). A study of 6,000 students in Sri Lanka reported that the prevalence of cannabis and cocaine use among boys was 3.85% and 2% respectively, while it was very low in girls, at 0.24% and 0.55%, respectively (Liyanage et al. 2012).

The trend of weekly alcohol use among adolescents in 28 European and North American countries significantly decreased from 2002 to 2010 (HBSC study) (Looze et al. 2015). In the so-called Anglo-Saxon countries, there was a decline in alcohol use between the years 2002 and 2010, from 12% to 6% overall and from 11% to 8% in Western Europe, 9% to 4% in Northern Europe, 16% to 10% in Southern Europe and from 12% to 10% in Eastern Europe. A major shift was found in the UK, from 23% to 10%, and in Germany and the Netherlands, as the prevalence fell from around 14% to 6.5%, and in Russia from 14.5% to 5.5%, in Denmark from 18% to 8.5% and in Italy from 24% to 12%. This trend might be due to increased awareness or prevention programs initiated within the countries or changes in social factors or policies (Looze et al. 2015).
Table 2. Prevalence of alcohol and drug use among 13–17 year-olds in the WHO South-East Asia Region, according to the Global school-based student health survey 2014/2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Alcohol use (%)</th>
<th>Drug use (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At least one drink during last 30 days</td>
<td>Binge drinking during lifetime</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>Male: 2.4</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Female: 0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Maldives</td>
<td>Male: -</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Female: -</td>
<td>-</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Male: 7.2</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Female: 1.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Thailand</td>
<td>Male: 27.2</td>
<td>26.6</td>
</tr>
<tr>
<td></td>
<td>Female: 19.2</td>
<td>23.3</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>Male: 21.5</td>
<td>16.4</td>
</tr>
<tr>
<td></td>
<td>Female: 9.3</td>
<td>4.8</td>
</tr>
</tbody>
</table>

* Data not available, including Nepal

2.2.3 Protective factors

Protective factors reduce the probability of having behavioral problems by decreasing the impact of risk factors (Arthur 2002). As stated earlier, substance use among adolescents was associated with family, peer groups and the society in which they lived. Adolescents who had autonomy within the family, and had a sense of belonging at school and community cohesion were less likely to use substances. Parents who spent leisure time with adolescents and gave them autonomy served as a protective factor for these risky behaviors (Chassin et al. 1986, Kobus 2003, Brooks et al. 2012.) Having a caring family, being close to their parents and low levels of family conflict lessened emotional distress and risk-taking behavior such as substance use (Denny et al. 2011, Clark et al. 2013, Su & Supple 2014). There was a positive association between children who delayed alcohol use until late adolescence and parents who communicated with their children, children who received consistent supervision and discipline and lower levels of family conflict during childhood (Hawkins et al. 1997). Not using substances has been associated with high levels of parental monitoring during high school, which increased the prosocial behavior in late adolescence (White et al. 2006).

Furthermore, if parents monitored their adolescents’ behavior and limited their access and exposure to alcohol, their adolescent children tended to use fewer substances than those who received less surveillance (Steinberg, Fletcher & Darling 1994, Clark et al. 2015, Benjet et al. 2014). A longitudinal study found that individuals who did not drink during adolescence were less likely to have parents with alcohol problems and had fewer peers who drank alcohol and used drugs (Chassin, Pitts & Prost 2002). However, when these adolescents entered adulthood and left the family home, meaning they received less parental supervision, they were more likely to engage in moderate or heavy alcohol use (Chassin, Pitts & Prost 2002).

Schools were a second home for adolescents and provided opportunities for them to learn, socialize and feel connected (Denny et al. 2011). Close connections with school teachers and being positively connected to the school were protective factors for adolescents and reduced substance use (Brooks et al. 2012, Su & Supple 2014). Similarly,
neighborhoods that were safe and cohesive and were bonded with the community were less likely to be associated with substance use (Brooks et al. 2012, Su & Supple 2014). In addition, adolescents who believed in spiritual practices and the moral order were less likely to use substances (White et al. 2006, Wongtongkam et al. 2014). In summary, adolescents who spent plenty of time with their parents, had higher grades at school and had friends who did not use substances were less likely to smoke and use alcohol and other substances (Steinberg, Fletcher & Darling 1994, White et al. 2006, Kristjansson, Sigfusdottir & Allegrante 2013).

### 2.2.4 Risk factors
Risk factors are “those characteristics, variables, or hazards that, if present for a given individual, make it more likely that this individual, rather than someone selected at random from the general population, will develop a disorder” (Arthur et al. 2002). Arthur et al. (2002) explored the validity of risk factors for adolescent development and identified them as the availability of drugs, policies on drug use, attitudes towards substance use and peer use. Furthermore, adolescence substance use has been identified as the individual behavior most likely to be associated with families, peer groups, schools and cultures (Chassin et al. 1986, Cox et al. 2011). Biological changes and major environmental transitions during adolescence could contribute to early substance use (Abadi et al. 2011). Adolescent substance use has been found to be influenced by various factors, as follows (see also Table 3, page 16).

#### Influence of family
Parenting has often been seen as a responsible risk factor for adolescent smoking and substance use habits (Chassin et al. 1986, Tyas & Pederson 1998, Chassin et al. 2000, Moor et al. 2015, Dickson et al. 2015, Lee et al. 2015). Physical and mental problems in children have been reported to occur more likely in families with conflicts, physical assaults, and careless and uncooperative demeanours (Repetti, Taylor & Seeman 2002). When adolescents received low supervision and support from their parents, their risk of consuming substances increased (Chassin et al. 1986, Steinberg, Fletcher & Darling 1994, Stice & Barrera 1995, Al-Sahab et al. 2012, Dickson et al. 2015). In younger adolescents, stricter parents increased the risk of smoking as they saw it as a form of rebellion, but having less strict parents increased the risk of smoking in older adolescents (Chassin et al. 1986). On the other hand, parental smoking (Tyas & Pederson 1998, Chassin et al. 2000) indirectly affects when adolescents start smoking, and how their smoking escalates, as it affects their views on smoking (Flay et al. 1994).

Evidence has supported the fact that parents influenced drinking behavior in adolescents (Hung et al. 2015), in particular if the parents had alcohol problems themselves (Chassin et al. 1991, Chassin, Pitts & Prost 2002, Benjet et al. 2014, Hung et al. 2015) or smoked (Flay et al. 1994, Joffer et al. 2014). Studies have found that alcoholism among parents is associated with early drinking in adolescents (Chassin et al. 2002) and alcohol-related disorders (Jackson et al. 2014). Children learn or adopt behavior from parents and, therefore, parental alcohol drinking is most likely to be perceived to have less harmful and children are more likely to use alcohol at an earlier age (Hawkins et al. 1997). Alcohol use in parents has been shown to have a greater association with poor parenting, which damages the family environment and increases stress among adolescents, resulting in more negative outcomes in the adolescent’s life (Chassin et al. 1991). Alcohol in adolescence has been reported to be
predicted by adolescents living in incomplete or one-parent families (Hawins, Catalano & Miller 1992, Moor et al. 2015, Tomcikova et al. 2015) or in homes with conflict and lack of nurturing (Hawins, Catalano & Miller 1992, Kandel et al. 1986). It has been found that adolescents who had poor communication with their mothers were at risk of frequent smoking, drinking and drunkenness (Moor et al. 2015, Tomcikova et al. 2015).

In addition, parents who had negative attitudes towards underage drinking, had a moderate effect on adolescents drinking alcohol (Hung et al. 2015). Interestingly, the drinking behavior and attitude of fathers influenced the male adolescents’ drinking behavior, whereas both the fathers’ and mothers’ drinking behavior and the mothers’ attitudes influenced the female adolescents’ drinking behavior (Hung et al. 2015). Girls who matured early and had lower supervision from their parents were more likely to have a drinking problem (Dickson et al. 2015).

Parents with higher education who had a higher source of income gave adolescents more pocket money or allowances, which resulted in them buying more alcohol (Pierce et al. 1996, Liu et al. 2013, Benjet et al. 2014, Lee et al. 2015). Therefore, adolescents from wealthier families had better resources than less affluent adolescents (Liu et al. 2013). In contrast, low socioeconomic status among parents (income, education or occupation) was related to between 1.4 and 2.5 times higher risk of smoking as well as drug abuse among the adolescents (Hawkins, Catalano & Miller 1992) compared to adolescents with parents with high socioeconomic status (Chen, Matthews & Boyce 2002, Hanson & Chen 2007). Furthermore, if parents were receiving social welfare benefits, the risk of their adolescent offspring of becoming alcohol users and engaging in binge drinking was heightened (Pedersen & von Soest 2015).

**Influence of peers**


Adolescents whose friends smoked or used alcohol were more likely to try it out of curiosity, to look attractive or because they felt it made them look successful, intelligent or sophisticated (Lee et al. 2013) or to imitate their peers’ behavior (Flay et al. 1994). Taking substances to be included peers’ social circles raised the risk for the use of substances among adolescents (Chassin, Flora & King 2004). Further, they led to delinquent behavior, when adolescents got involved with groups that used drugs, which in turn made them more likely to get involved in crime (Doria et al. 2015). Another study also supported the fact that having gang affiliated friends and friends who were popular were risk factors for substance use (Forster et al. 2015). In addition, adolescents who had a higher status or were popular were more likely to influence their peers to engage in substance use than lower status or unpopular adolescents. This was because adolescents wanted to make a good
impression on their higher status peers (Teunissen et al. 2012). Another study conducted among school students in the United States showed that popular students were more likely to smoke than their less popular classmates (Alexander et al. 2001). In addition, school peers increased the risk of alcohol use during the final year of high school, which could be due to their desire to expand their circle of friends (Lynch et al. 2015).

Adolescents who spent more time with friends in the evenings had a higher risk of smoking (Moor et al. 2015) and adolescents who spent time with drinking friends were more likely to start drinking alcohol. Girls who matured early found it difficult to fit in with girls of the same age, so they often mixed with older peers, which exacerbated the problem of alcohol use among this group. (Dickson et al. 2015). A study that compared the effects of peer influence on different ethnic groups in the US, found that European American adolescents were more likely to be associated with the use of substances than African Americans, Hispanic Americans or Southeast Asian Americans (Su & Supple 2014).

Influence of gender and age
A lot of studies have reported that gender and age has an impact on perceiving risk. For instance, girls have been reported to perceive risky behavior differently to boys, making boys more vulnerable to using substances than girls (Windle 1990, Hawkins et al. 1997, Siciliano et al. 2012, Kristjansson, Sigfusdottir & Allegrante 2013, Whitebeck & Armenta 2015). A recent study among Mexican American youth found that males were twice as likely to use chewing tobacco than females (Wilkinson et al. 2015). Another study also reported that boys were more likely to start substance use earlier in adolescence than girls (Whitebeck & Armenta 2015). Being in the middle of puberty has been associated with alcohol use in boys, whereas it was advanced puberty for girls (Li et al. 2014). However, a Swedish study showed that low self-esteem among girls in early adolescence influenced smoking habits in middle or late adolescence (Joffer et al. 2014). A high percentage of adolescent boys (18%) who took part in a Swedish study had used alcohol in the last year, compared to 12% of the girls (Joffer 2014).

Similarly, young adolescents underestimated the risk and were prone to using substances (Siciliano et al. 2012). A Mexican study showed that lifetime alcohol use increased with age, from 35% at 13 year of age to nearly 83% at 17 year of age (Benjet et al. 2014). Hawkins et al.’s (1997) study showed that the early onset of alcohol use was related to higher abuse rates in late adolescence. Brown et al. (2008) noted that, in the United States, alcohol use increased between the ages of 16 and 20 years and there was a surge in hazardous alcohol use that was staggered from 18 to 20 years of age. A study of that used Chinese and Finnish data from the Health Behavior and Lifestyle Survey for School-aged Children, reported that one-fourth of Chinese adolescent and one-third of Finnish adolescent had drunk alcohol by the time they were 13 or younger (Liu et al. 2013). Similarly, studies that evaluated young adult behavior concluded that the early-onset drug users were more likely to experience drug-related problems than the late-onset drug users (Chassin. Flora & King 2004, Anthony 1995).

Influence of school
A negative school environment was associated with unhealthy behavior and was linked to risky health outcomes and was an important factor for substance use among adolescents (Kalpan, Martin & Robbins 1984, Tyas & Pederson 1998, Lazzeri et al. 2014). Adolescents who were dissatisfied with school and had low academic performance were more likely to
smoke (Chassin et al. 1986, Moor et al. 2015) and use alcohol (Al-Sahab et al. 2012). Furthermore, adolescents who were expelled from school (Kaplan, Martin & Robbins 1984) and had poor school environments were more likely to use alcohol, marijuana or other illicit drugs. A low sense of bonding with school was related to the initiation of alcohol use (Hawkins et al. 1997) and academic failure and a lack of commitment towards school were associated with early drug use (Hawkins, Catalano & Miller 1992).

When adolescents started high school, the use of alcohol increased because of social integration with their peers (Burdzovic Andreas & Jackson 2015). Those adolescents who had externalizing problems or were bullies were more likely to use alcohol than their victims, as the victims were often isolated and did not get involved with other social groups (Moore et al. 2014). Adolescents who behaved badly tended to socialise with peers with similar characteristics, making them more vulnerable to using alcohol and other substances (Moore et al. 2014). In addition, adolescents who smoked on school property were more likely to use substances in their lifetime than those who did not (Sneed et al. 2015).

**Influence of behavioral problems**

There is a complex relationship between substance use and mental health problems and problems such as depression and anxiety may lead to the use of substances and vice-versa (Brook et al. 1998, Fergusson, Horwood & Swain-Campbell 2002, Virtanen et al. 2015). Behavioral problems, such as externalizing and internalizing problems, are closely associated with substance use initiation (Windle 1990, King, Iacono & McGue 2004) and have been identified as a potential risk factor for their use (Díaz et al. 2011, McCarty et al. 2012). Externalizing and internalizing problems have different aetiologies among boys and girls with regard to substance use (Windle 1990, Chassin et al. 1999). For example, externalizing problems in boys has been identified as a predictive factor for substance use (Cranford, McCabe & Boyd 2013, Pedersen & von Soest 2015) and has been associated with substance use (Chilcoat et al. 1995, Englund & Siebenbruner 2012, Colder et al. 2013, Doria et al. 2015).

A study identifying trajectories of binge drinking showed that early binge drinkers had high levels of externalizing problems, especially boys, and low rates of depression (Chassin, Pitts & Prost 2002). Girls who were infrequent alcohol users had higher rates of depression (Chassin, Pitts & Prost 2002). On the other hand, adolescent smokers were more likely to have depression than non-smokers (Covey & Tam 1990). Early delinquency was also an indicator of drinking problems in adulthood (Virtanen et al. 2015). Being aggressive during early adolescence has also been identified as a predictor for substance use during middle adolescence (Clark et al. 2015) and adolescents who had high levels of early delinquency problems were reported to have greater alcohol use than their less delinquent peers (Burdzovic Andreas & Jackson 2015). Aggressive behavior, conduct problems, hyperactivity and hyperkinetic disorders in early childhood and during adolescence have been related to adolescent drug use (Hawkins, Catalano & Miller 1992, Jones & Bradley 2007).

Similarly, internalizing problems, such as anxiety and depression, was another predictor for substance use (Virtanen et al. 2015). However, depression has been found to be a stronger antecedent than anxiety for predicting alcohol use in adolescents (Chen, Matthews & Boyce 2002). An initial level of depressive symptoms among adolescents increased the frequency of intoxication (Richmond et al. 2015). The adolescents who drank most
frequently between the ages of 13 and 15 experienced depression in late adolescence. Drinking frequently has been associated with both depression and anxiety in girls, but only with depression in boys (Edwards et al. 2014). Cross-sectional studies have often proved that internalizing problems and alcohol use were positively associated (Boden & Fergusson 2011, Boschloo et al. 2011). A longitudinal study suggested that poor parenting was most likely to generate behavioral problems among adolescents, which might increase the risk of substance use and disorders (Chassin, Flora & King 2004).

In addition, the low socioeconomic status of parents indicated a higher likelihood of abuse or mistreatment of children in the family, which, in turn, increased the risk of developing emotional or behavioral problems that might heighten the risk of early substance use (Hanson & Chen 2007). These adolescents with low socioeconomic status had higher levels of hopelessness and depression and were more susceptible to contact with peers with substance use problems (Chen, Matthews & Boyce 2002).
Table 3. Factors associated with adolescent substance use in the low-income and middle-income countries

<table>
<thead>
<tr>
<th>Author</th>
<th>Country</th>
<th>Sample</th>
<th>Substances</th>
<th>Associated factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atilola et al.</td>
<td>Bulgaria, Croatia, India, Indonesia, Nigeria, Serbia, Turkey</td>
<td>2,454 adolescents in 9th – 12th grade</td>
<td>Smoking, alcohol and drugs</td>
<td>Older age, less devoted to religion, poor school grades, fewer siblings, low participation in sports, single parent/non-parents, parental substance use, low maternal education and unemployment</td>
</tr>
<tr>
<td>Balogun et al.</td>
<td>Botswana, Grenada, Indonesia, Kenya, Myanmar, the Philippines, Saint Lucia, Saint Vincent and the Grenadines, Thailand, Trinidad and Tobago, and Uganda</td>
<td>32,001 adolescents aged 13-15 years</td>
<td>Alcohol use</td>
<td>Depression and anxiety-induced sleeplessness</td>
</tr>
<tr>
<td>Dhavan et al.</td>
<td>India</td>
<td>Cross-sectional: 3,799 students; Cohort sample: 2,586 students</td>
<td>Tobacco use</td>
<td>Academic status or failure</td>
</tr>
<tr>
<td>Doku et al.</td>
<td>Ghana</td>
<td>1,165 students aged 13-18 years</td>
<td>Tobacco use</td>
<td>Low paternal education, non-nuclear family, lower socioeconomic status</td>
</tr>
<tr>
<td>Islam &amp; Johnson</td>
<td>Egypt</td>
<td>1,930 students from 7th, 9th and 12th grades</td>
<td>Tobacco use</td>
<td>Smoking by brother/sister, family or peers, and having positive beliefs about smoking</td>
</tr>
<tr>
<td>Kabir et al.</td>
<td>Bangladesh</td>
<td>3,113 students from 52 schools (GYTS)</td>
<td>Tobacco use</td>
<td>Smoking peers, exposure at home or other places, pocket money, free tobacco from the vendor and exposure to advertisements</td>
</tr>
<tr>
<td>Katulanda et al.</td>
<td>Sri Lanka</td>
<td>6,000 students from 10 and 12th grades</td>
<td>Tobacco use</td>
<td>Being male, parental smoking, students who studied other subjects than science, peer smoking and involvement in sports</td>
</tr>
<tr>
<td>Liyanage et al.</td>
<td>Sri Lanka</td>
<td>6,000 students from 10th and 12th grades</td>
<td>Illicit substances</td>
<td>Students taking non-science subjects, involvement in sports, low school performance and peer smoking</td>
</tr>
<tr>
<td>Mugisha et al.</td>
<td>Kenya</td>
<td>Data from National Census 1999 (slum residents, aged 12-24 years)</td>
<td>Alcohol and drug use</td>
<td>Older age, being male, not in school, disruption in parent's marriage, substance use by peers and sexual abuse and low household income</td>
</tr>
<tr>
<td>Oswal 2015</td>
<td>India</td>
<td>62,737 students (Global Youth Tobacco Survey, GYTS)</td>
<td>Tobacco use</td>
<td>Having pocket money, peer smoking and parental smoking</td>
</tr>
<tr>
<td>Peltzer 2009</td>
<td>Kenya, Namibia, Swaziland, Uganda, Zambia, Zimbabwe</td>
<td>20,765 students aged 13 to 15 years (Global School-Based Health Survey)</td>
<td>Tobacco, alcohol, illicit drugs</td>
<td>School absenteeism, feeling alone, difficulty in sleeping, hopelessness, suicidal thoughts or plans and poverty</td>
</tr>
<tr>
<td>Pradhan et al.</td>
<td>Nepal</td>
<td>1,312 students from 9th, 10th, 11th and 12th grades</td>
<td>Tobacco use</td>
<td>Older age, being male, Janajati ethnic group, pocket money, living in joint family and students from government schools.</td>
</tr>
<tr>
<td>Rahman et al.</td>
<td>Bangladesh</td>
<td>6,877 students from 8th, 9th and 10th grade</td>
<td>Tobacco use</td>
<td>Smoking teachers, exposure at school (peer smoking), being male, older age</td>
</tr>
<tr>
<td>Sanchez et al.</td>
<td>Brazil</td>
<td>2,691 students from 28 private high schools</td>
<td>Binge drinking</td>
<td>Being male, older age, high tuition fees at schools, spending time with peers at night, living without mother, low levels of communication between parents and children and who does not participate group prayers</td>
</tr>
</tbody>
</table>


2.3 ADOLESCENT PSYCHOSOCIAL PROBLEMS IN THE GLOBAL CONTEXT

Psychosocial problems have been reported to be highly prevalent among adolescents and could severely interfere with their everyday functioning and worsen their mental health (Castle & Parsons 1997, Plenty et al. 2014, Duinhof et al. 2015). However, these behavioral problems are often perceived as a natural process of development into adulthood and are mostly ignored or disregarded (Hoven et al. 2008). Diagnosing behavioral problems in adolescence helped to identify mental health issues during adulthood (Roza et al. 2003 cited in Fink et al. 2015). However, only a few adolescents with mental health problems or problem behavior sought help from health professionals, as they were uncomfortable sharing those problems with healthcare providers (Tsai et al. 2013) or because of the stigma attached to mental health problems (Hinshaw 2005). Therefore, providing information to different groups, such as children, parents and school staffs helps to ameliorate their knowledge and attitudes, offering them an opportunity to express opinions and discuss the topic freely (Hoven et al. 2008).

2.3.1 Prevalence of psychosocial problems in adolescents

WHO estimated that up to 20% of adolescents had one or more mental or behavioral problems (WHO 2016c). Studies conducted on emotional and behavioral problems in adolescents in different parts of the world have reported that the prevalence ranged from 16.5% to 40.8% (Rescorla et al. 2012). They have increased over the past three decades in Europe (Collishaw et al. 2004, Collishaw et al. 2010, Fichter et al. 2004, von Soest & Wichstrøm 2014). In addition, the Global Burden of Disease Study found that mental and behavioral disorders, such as anxiety and depression, were found to increase from 1990 to 2010 worldwide (Murray et al. 2012). A study conducted in England from 2009 to 2014 showed few variations in mental health difficulties, but distinct differences between genders (Fink et al. 2015). The results showed that emotional problems increased by 7% among girls from 2009 to 2014, but no differences were observed in emotional problems among boys (Fink et al. 2015). It also found that internalizing problems in girls increased, whereas externalizing problems among boys did not change over that period (Bor et al. 2014, Fink et al. 2015).

In the Danish Health Behavior in School-aged Children survey, the prevalence of emotional symptoms in girls (14%) was found to be higher than in boys (6%) (Nielsen et al. 2015a). Meanwhile, studies in Europe and the USA showed that emotional and behavioral problems had increased and girls tended to show more emotional problems whereas boys tended to show more behavioral problems (Plenty et al. 2014, Duinhof et al. 2015). A comparative survey in Denmark, Finland, Iceland, Norway and Sweden of 11, 13 and 15-year-old school children showed that emotional symptoms, such as feeling low, irritability, bad temper or feeling nervous, were lowest in Denmark at 8% and highest in Iceland at 13% (Nielsen et al. 2015b). The prevalence was found to be higher in girls than boys in all countries. In particular, 9.5% of adolescents in Iceland had irritability/bad temper followed by 6% who felt low and Finnish adolescents had the highest level of feeling nervous at nearly 5%. As the children’s ages increased the prevalence in girls also increased, with the exception of Finland. Emotional symptoms were associated with a low level of socioeconomic status (Nielsen et al. 2015b).
Health complaints, such as pain, nervousness and sleeping difficulties, reported by adolescents were a key indicator in detecting problem behavior (Ottova-Jordon et al. 2015). The highest multiple health complaints in adolescents were found in Italy (52%) and the lowest prevalence was found in Slovenia (19.5%). Health complaints in adolescents had decreased from 1994 to 2010 in Croatia, Greece, Macedonia, Portugal, Slovenia, Spain and the Ukraine, but increased in countries such as Belgium, Denmark, Finland, Greenland and Norway (Ottova-Jordon et al. 2015).

In low-income and middle-income countries, the rate of mental health problems in adolescents is higher than in developed countries. However, due to scarce resources, it is challenging to track down the trends and nature of the issues (Kieling et al. 2011). These countries account for around 35% to 50% of the population of children and adolescents in the world (Patel et al. 2007). In Asian countries, around 10% to 20% of children and adolescents have mental health problems (Srinath, Kandasamy & Golhar 2010). The highest prevalence of mental health problems has been found in countries that have conflicts or war (Panter-Bricka et al. 2009). A study that explored behavioral problems in Sri Lankan early adolescents (aged 11 to 12 years) showed that the prevalence reported by parents was 11.7%, by teachers it was 13.7% and by the children themselves it was 6.2% (Prior, Virasinghe & Smart 2005). In another study on Sri Lanka, it was revealed that the prevalence of emotional and physical abuse was 25% and 16% among girls and 31% and 22% among boys, respectively (Perera et al. 2009). A study conducted in India with 13 to 17-year-old students showed that 21% of the female students and 17% of the male students had symptoms of anxiety or depression. In the same study, it was also revealed that around 41% of male and female adolescents had internalizing problems and 18% of the female students and 38% of male students had externalizing problems (Mathew et al. 2015). In Kenya, the prevalence of mental disorders was around 38% and this included 26% for somatic complaints, 14% for affective disorders and 12.5% for conduct disorder (Ndetei et al. 2016).

2.3.2 Factors related to psychosocial problems

Evidence has supported the idea that mental health problems or behavioral problems among adolescents are influenced by social and cultural factors (Bor et al. 2014), such as peers, parents, the school environment and the neighborhood (Sanford et al. 1995, Patterson DeBaryshe & Ramsey 1989, Bradley & Corwyn 2002, Drukker et al. 2003, Kleftaras & Didaskalou 2006, Sweeting et al. 2010, Plenty et al. 2014) and one in five adolescents from different nations experienced mental health problems (Bor et al. 2014). Anxiety in adolescents has been reported to be related to behavioral problems, parenting, traumatic events, temperamental behavior, social skills and peer relationships (Letcher et al. 2012). An Indian study found that adolescents developed stress because of their physical appearance, pressures in their family, relationship problems, pressure at school, lower performance at school, greater workload at school, failing in examinations and arguments with teachers and peers (Mathew et al. 2015). Higher depressive symptoms increased the risk of having violence-related injuries, road-related injuries and other unintentional injuries among young people, especially boys (Taliaferro et al. 2012, Asbridge et al. 2014). Adolescents who had been victims of domestic violence, physical and sexual abuse (Phillips et al. 2000, Holt, Buckley & Whelan 2008) or parental mental disorders (Srinath et al. 2005) were also prone to developing emotional and behavioral problems. Being a victim of bullying (Arsenault,
Adolescents who were at a high-risk of having externalizing problem behavior showed low commitment, moderate reflections on their choices and high reconsideration of commitment compared to low-risk peers (Crocetti et al. 2013). Depression and anxiety levels in adolescents increased if they had a lack of clear self-concept and commitment, leading them to reconsider these values (Schwartz et al. 2012). Therefore, commitment to education, peer relationships, being competent at sport and physical appearance may have lessened the risk of developing behavioral problems (Schwartz et al. 2012).

**Influence of individual factors**

Less social engagement, negative reactivity, low social preference or trust and low self-worth increased the risk of loneliness in young people and thus increased the odds of having depression and poor self-reported general health (Qualter et al. 2013). A study conducted among adolescents living in child welfare and juvenile institutions showed that the presence of callous unemotional (CU) traits heightened the risk of having conduct disorders and the presence of both anxiety and CU traits increased the severity of conduct disorder symptoms or externalizing problems (Euler et al. 2015). Similarly, lower self-concept clarity increased the risk of higher depressive and anxiety symptoms in adolescents (Van Dijk et al. 2014). Girls with a conduct disorder with CU traits showed more aggressive and antisocial behavior than boys, but were less likely to be diagnosed with conduct disorders (Euler et al. 2015). Therefore, early childhood aggression and hyperactivity were predictive factors for adolescent internalizing outcomes (Wootton et al. 1997, Weeks et al. 2014).

Studies have found that internalizing problems, such as anxiety and depression, were more prevalent in girls than boys (Farbstein et al. 2009, Letcher et al. 2012, Weeks et al. 2014) and externalizing problems were more prevalent among boys (Farbstein et al. 2009, Rescorla et al. 2012). Girls showed higher emotional symptoms in terms of home life, school environment and peer groups (Moksnes et al. 2013). Girls with high anxiety showed that they had low social skills and academic performance and were shy, hyperactive, had low parental affection and negative reactivity (Letcher et al. 2012). A study of Iranian adolescents suggested that emotional and behavioral problems were associated with high levels of depressive symptoms and girls had more somatic complaints and depressive symptoms than boys (Essau et al. 2013). Various studies have confirmed that pubertal changes in girls, followed by poor body image and academic performance, were risk factors for developing internalizing symptoms (Negriff, Hillman & Dorn 2011, Joinson et al. 2012, Essau et al. 2013). Also, girls who had internalizing symptoms reported multiple pains, including more frequent headaches and abdominal pains, than boys (Kröner-Herwig et al. 2011). Stress was more prevalent in females and was exacerbated by high demands, low self-esteem, poor social support and poor sleeping habits (Schraml et al. 2011). Stress during middle adolescence has been highly associated with internalizing and externalizing problems (Windle 1992). Similarly, boys with high anxiety were more anxious and shy and had poorer relationships with peers and higher levels of depression (Letcher et al. 2012). Barber (1994) noted that shy children had an increased risk of internalizing problems if they
lived in stricter families; in contrast this can also serve as a protective factor against developing externalizing problems. In addition, Guille (2004) found that resilience was related to having better relationships with friends and siblings, which helped individuals to overcome emotional problems such as stress. Guille (2004) also suggested that having higher self-esteem and control enhanced an individual’s competence to cope with different life situations.

**Influence of family**

Studies have shown that higher levels of parental acceptance and knowledge were positive factors for a child’s disclosure and predicted lower levels of depressive symptoms, as they enhanced communication between the child and parents and increased warm feelings and support (Bacchini et al. 2011, Garthe, Sullivan & Kiewer 2015). Open communication with parents or caregivers increased the self-concept clarity in middle adolescence (Van Dijk et al. 2014), encouraging children to actively disclose information and confronting problems (Basanez et al. 2014). Family obligation was an important factor in reducing internalizing problems among adolescents. It provided a sense of belonging and connection to the family, increasing the self-esteem of adolescents (Telzer et al. 2015). Therefore, parental involvement enhanced the emotional functioning of adolescents (Wang & Sheikh-Khalil 2014).

However, inadequate parenting (Wootton et al. 1997, Kleftaras & Didaskalou 2006), poor relationships with parents (Sanford et al. 1995, Kleftaras & Didaskalou 2006), parental behavior (Wootton et al. 1997, O’Connor & Dvorak 2001), a poor family environment (Srinath, Kandasamy & Golhar 2010) and hostile parenting (King et al. 1997, Holt, Buckley & Whelan 2008, Weeks et al. 2014) increased risky problem behavior in adolescents. For adolescents with low maternal support, controlling and monitoring were the predictive factors for adolescent delinquency and aggression (O’Connor & Dvorak 2001). In addition, adolescents living with parents who are not married (Collishaw et al. 2015) or whose parents were divorced had more behavioral problems (Farbstein et al. 2009). Adolescents who had experienced family violence felt they had low personal stability, were dissatisfied with their appearance and had more inner conflicts (Lepistö et al. 2012). If they were victims at home, they were at greatest risk of having internalizing and externalizing problems (Kleftaras & Didaskalou 2006, du Plessis et al. 2015). Being moderately victimized contributed to emotional distress, such as depression and anxiety, whereas exposure to violence increased delinquency in young people (Phillips et al. 2000, Goldner et al. 2015).

Exposure to violence was associated with aggression, conduct disorder and depression in adolescents (du Plessis et al. 2015). Depression, feeling of not belonging and being a burden were related to the suicidal ideation (Barzilay et al. 2015). Adolescents who were physically abused (Phillips et al. 2000) developed low self-esteem and suffered from more stress and the abuse contributed to suicidal ideation (Kwok et al. 2015). Furthermore, adolescents born into poor families (Kleftaras & Didaskalou 2006) or who were poor until 11 years of age had a higher risk of developing conduct problems at 15 years of age than adolescents in high-income families (Anselmi et al. 2012). The adolescents developed emotional problems due to the stress experienced by their parents (Anselmi et al. 2012) and changes in family income (Anselmi et al. 2012). A cross-cohort comparison study conducted among Scottish adolescents revealed that the depression levels increased among
adolescents who worried about their family situation and had regular disputes (Sweeting et al. 2010).

With regard to gender, girls who were dissatisfied with their family were more at risk of developing depression than boys (du Plessis et al. 2015), but boys were more likely to develop violent behavior than girls (dos Santos Silva, Soares & Cabral de Oliveira 2014). Parenting style also increased the risk of having depression (Weeks et al. 2014) and anxiety among adolescents, especially in girls (Letcher et al. 2012). Similarly, the absence of a child’s father in early childhood increased the odds of having depressive symptoms, with girls being more affected than boys (Culpin et al. 2013). Girls who had more somatic complaints and adolescents whose parents had a low level of education were susceptible to experiencing more anxiety (Lazaratou et al. 2013).

The quality of relationships with siblings was also important in determining behavioral problems (Buist et al. 2014).Sibling conflict and having less support from siblings increased the risk of having internalizing or externalizing problems and this was observed in a study of Dutch adolescents (Buist et al. 2014). However, cultural differences may have affected this factor (Buist et al. 2014). A study that compared externalizing and internalizing problems between Moroccan and Dutch adolescent siblings showed that Moroccan siblings were more supportive and had fewer conflicts than Dutch siblings, which decreased the risk of having externalizing problems (Buist et al. 2014). Interestingly, the study found that adolescents who had internalizing problems often reported conflicted relationships with siblings. In particular, the invasion of their personal domain, the level of anxiety and equality and conflicts about what was fair increased the risk of depressive symptoms among adolescents living with siblings (Campione-Barr, Greer & Kruse 2013).

Influence of school

It has also been noted that adolescents who worried about their academic performance (West & Sweeting 2003, Kleftaras & Didaskalou 2006, Sweeting et al. 2010), had more pressure at school and had a poor school environment (Kleftaras & Didaskalou 2006) were at higher risk of having emotional and conduct problems (Plenty et al. 2014). Stress related to performance at school was related to depressive symptoms among both genders (Wahab et al. 2013, Moksnes, Espnes & Haugan 2013). Depression and anxiety in adolescents caused them to fail at school and depression and internalizing problems were associated with lower school grades (Riglin et al 2014, Basanez et al. 2014). However, depression and anxiety were found to be more problematic with regard to school grades during late rather than early adolescence, (Riglin et al. 2014). Girls showed higher anxiety symptoms than boys (Weeks et al. 2014) and this was associated with low school grades (Riglin et al. 2014). Interpersonal and school stress was associated with depressive symptoms in girls (Brière et al. 2012), whereas stress about school performance increased the risk of anxiety in boys (Moksnes et al. 2013). A longitudinal study showed that emotional support by teachers could reduce depressive symptoms among boys and girls (Pössel et al. 2013).

Influence of socioeconomic and community factors

In addition, adolescents who had lower socioeconomic status had a higher risk of developing psychosocial issues, such as emotional problems, compared to adolescents with higher socioeconomic status (Bradley & Corwyn 2002, Costello et al. 2003, Fan et al. 2010, Srinath, Kandasamy & Golhar 2010, Langton et al. 2011, Reiss 2013, Nielsen et al. 2015a). These adolescents also showed lower levels of trust (Nielsen et al. 2015a) and were likely to
experience more stressful life events and family disharmony (Langton et al. 2011). Living in a poor neighborhood also increased the risk of having behavioral problems (Drukker et al. 2003, Sampson, Morenoff & Gannon-Rowley 2002). Thus, neighborhood is an important element for child development and well-being and restricting the adolescent’s daily activities may hinder his or her development and increase risks (Sampson, Morenoff & Gannon-Rowley 2002). Furthermore, the neighborhood’s socioeconomic situation and prevailing “social climate” (social support, social cohesion, stability, cooperation and participation) have been found to be associated with child behavioral problems (Phillips et al. 2000, Sellström & Bremberg 2006). In urban African American adolescents from low income households, aggressive behavior was associated with exposure to community violence and lower academic performance, but on the other hand, community violence was associated with internalizing problems (Busby, Lambert & Ialango 2013). Adolescents who had poor relationships with school peers or friends (Kleftaras & Didaskalou 2006) and teachers developed violent behavior, especially boys who wanted to boost their reputation at school (Simoes et al. 2012). However, adolescents who participated in the community had lower levels of violent behavior at school and had a favorable family climate at home, suggesting that these were protective factors against violence in school and in the neighborhood.

2.4 SUBSTANCE USE AND ITS ASSOCIATED FACTORS AMONG NEPALESE ADOLESCENTS

Nepal is situated between India and China and has a population of about 26.6 million people, with an annual projected growth rate of 1.4% (MoHP 2012). It has three distinct ecological regions: the mountains, the hills and the Terai. About 52% of the total population live in the mountains and hills. The mountains lie between an altitude of 4,877 and 8,848 meters and account for 35% of the land area. The hills, which lie between an altitude of 610 to 4,876 meters and cover 42% of the land area. The remaining 48% of the population live in the Terai region, which lies below 610 meters and covers 23% of the total land area. According to the 2011 census, 37.2% of the population were under 15 years of age, 54.4% were between 15 and 59 years and 8.4% were aged 60 years or above (WHO 2013). The capital of Nepal, Kathmandu, has the highest population and is inhabited by one million people. Adolescents account for about 28% of the total population of Nepal, defined as those aged 10-19 years (MoHP 2012).

The population living below the national poverty line in 2010 was 25% and Nepal had the lowest Human Development Index of 0.548 (UNDP 2015). The unemployment rate was very high at 39%, which resulted in people living in poverty migrating to other countries. The country has been underdeveloped due to political instability, a decade of conflict, discrimination, social and economic inequality and weak governance. However, Nepal is rich in cultural aspects and is multi-ethnic, multi-religious, multicultural and multilingual (CBS 2012). It has 126 caste or ethnic categories and 123 different mother tongues (CBS 2012). When it comes to religion, 81% of the total population are Hindu, 11% Buddhist, 4% Muslims and 4% others.
2.4.1 Policy related to tobacco, alcohol and drugs

The Government of Nepal signed the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) in 2003 and it was ratified by Nepal’s House of Representatives in 2006. A new Tobacco Control and Regulation Act was implemented in August 2011, which prohibited the sale and distribution of tobacco-related products in public places: namely cigarettes, bidi, chewing tobacco such as khaini or guthikha, a quid of tobacco, cigars, pipes and kankad. The public places listed in the Act were Governmental bodies, educational institutions, libraries, other health institutions, public transport, public bus stands and ticketing centers, child care centers, children’s parks or clubs, public toilets, industrial work places and factories, theatres, hotels, stadiums, covered halls, departmental stores and religious places. It also prohibited advertising and sponsoring tobacco products in the media. Sales of tobacco products were also restricted to people under 18 years of age and pregnant women. The FCTC Ministry of Health and Population (MoHP) has also implemented various anti-tobacco programs such as community education programs in the mass media, via the National Health Education, Information and Communication Center (NHEICC) in schools and work places. Furthermore, it has placed tax on tobacco products at a rate of two paisa per cigarette (100 paisa = one Nepalese rupee), to raise revenue and discourage consumption. However, the implementation of this policy is not strongly monitored and not practised consistently. Therefore, tobacco sales to minors and smoking in public places can still be seen in Nepal (MoHP 2016, WHO 2014b).

However, there is currently no written national policy or national action plan regarding alcohol in Nepal (WHO 2014b). With the cooperation of the WHO, the Health Ministry of
Nepal has banned the advertising of alcohol and related products in the electronic media. In addition, the distribution and consumption of alcohol was regulated in 2001 (WHO 2014b) and the national legal minimum age for alcohol consumed on premises or taken away to consume elsewhere is now 18 years of age. However, there are no restrictions relating to when and where alcohol is sold (WHO 2014b).

In Nepal, the Narcotic Drugs Control Act of 1976 controls drug issues. Nepal is part of the 1961 Single Convention on Narcotics Drugs and the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances. The 1976 Act was amended in 1993 to include the 1992 South Asian Association for Regional Cooperation Convention on Narcotic Drugs and Psychotropic Substances. The revised Act has addressed the legislation of controlled delivery, penalties for drug offences, money laundering, seizure of properties, advanced investigation techniques and destruction of drugs (UNODC 2005). The recent amendment of the National Policy for Drug Control was regulated in 2006 and aimed to control the supply, reduce the demand through drug abuse prevention and treat and rehabilitate offenders (Nepal Law Commission 2006). The aim of the Drug Control Strategy, which was established in 2010, was the “attainment of a healthy and prosperous society free from drug addiction” (Nepal Law Commission 2010).

2.4.2 Substance use

Smoking and the use of alcohol and drugs are major health issues in Nepal, but they have not been investigated properly (Luitel et al. 2013). According to the National Representative Household Survey 2010/2011, which also includes the Nepal Adolescent and Youth Survey 2010/2011, 18% of the 11,477 adolescents aged 10 to 24 years had used alcohol, 13% had used tobacco and 6% had used illicit drugs. Boys reported using three times more alcohol use than girls and 26% of urban adolescents drank alcohol compared to 17% of their rural counterparts. When the different regions were examined, Kathmandu had the highest number of adolescent and youth alcohol users at about 35%, followed by the Eastern Region (23%) and the Mid-Western Region (17%). Alcohol consumption by ethnic indigenous groups (Janajatis and Dalits) were highest among the relatively advantaged Janajatis (33%), disadvantaged Janajatis (28%) and Dalits (19%). Similarly, the number of youths aged 20 to 24 who had ever used tobacco, was 25% and was higher than other age groups. Adolescents and youths living in urban areas were more likely to use tobacco (18%) than rural areas (11%), with as much higher percentage in the Kathmandu valley (20%) than in other regions (9-13%). Also, 17% of adolescents and youths belonging to the relatively disadvantaged Janajatis group used tobacco followed by 15% of the Dalits and 14% of the disadvantaged Janajatis, which was more than any other social group (MoHP 2012). The easy access and availability of tobacco and alcohol were favorable conditions for using them (Dhital 2000, Pradhan et al. 2012, Pradhan et al. 2013). Homemade liquors (raksi, jand, tongba and chhang), beers, distilled liquors and other imported drinks were common in Nepal (Dhital 2000, MoHP 2012, Pradhan et al. 2012).

One study that included nationally representative data on youths from Nepal (Global Youth Tobacco Survey 2007) reported that 6.9% of the 10 to 14-year age group (n=1,444) had used alcohol, 3.41% had used tobacco and 0.43% had used other drugs (Kabir, Goh & Khan 2013). The same study stated that the prevalence of tobacco use was 9.4% in 13 to 15-year-old Nepalese adolescents: 13.2% in males and 5.3% in females (Kabir, Goh & Khan 2013). Meanwhile, Government figures showed that 23.52% of 15-19 year olds had used alcohol,
16.74% had used tobacco and 3.82% had used other drugs (MoHP 2012). In addition, another study reported that 19.7% of 14 to 19 year olds had used tobacco at some point, but this figure was 33.6% for boys (Pradhan et al. 2013) and just 4% for girls (Pradhan et al. 2013, Singh Pradhan & Kalra 2015). The mean age of initiating tobacco use among Nepalese adolescents was 13.79 years (Pradhan et al. 2013).

The use of tobacco was associated with gender, age, whether their parents or peers smoked, tobacco exposure at home and in communal places and products being easily available (Sreeramareddy et al. 2008, Kabir et al. 2013). It was found that peer influence strongly affected tobacco use among Nepalese adolescents (Kakde, Bhopal & Jones 2012, Kabir, Goh & Khan 2013, Pradhan et al. 2013). They mostly used tobacco because they liked it, were curious, it made them feel relaxed or released tension, it relieved boredom, it was recreational and they wanted to look mature (Binu et al. 2010, Subba et al. 2011, Pradhan et al. 2013, Singh Pradhan & Kalra 2015). The most predictable factors were having more friends who smoked, habitually chewing tobacco or using alcohol and being male (Binu et al. 2010, Subba et al. 2011). People were more likely to have ever used tobacco in late adolescence than middle adolescence (Pradhan et al. 2013). Ethnicity, family structure, the father’s profession and having more pocket money were factors predicting the use of tobacco products (Pradhan et al. 2013).

Meanwhile, alcohol use in adolescents was influenced by age, education level, residential area and ethnicity (Pradhan et al. 2013). Older age adolescents (16 to 19 years) and the low levels of education increased the use of alcohol among adolescents (Pradhan et al. 2013, MoHP 2012). Adolescents in urban areas were more likely to drink alcohol than those in rural areas and Janajatis and Dalits were more likely to drink alcohol than other ethnic groups. Boys were found to drink more of any type of alcohol products than girls (Timsinha, Kar & Agrawal 2011). On the basis of traditional alcohol use in Nepal, the society could be divided into two groups: traditional non users and traditional users (Parajuli Macdonald & Jimba 2015). The traditional non-alcohol users prohibited the use of alcohol through cultural norms and belonging to the Brahman, Chhetri and Thakuri castes. Other Hindu castes belonging to ethnic groups or tribal communities of Nepal used alcohol in line with traditional cultural norms (Parajuli Macdonald & Jimba 2015). Even though the Nepalese Government controls the production and sales of commercial alcohol, traditional alcohol users produce alcohol at home and use it for ceremonies, where adolescents and young people are also served (Dhital 2000, Parajuli Macdonald & Jimba 2015). However, due to changes in social structure and the influence of Western culture and globalization, a major shift has been observed in Nepalese society. Alcohol use is now also common among traditional non users and is consumed during festivals and ceremonies (Dhital 2000, Parajuli Macdonald & Jimba 2015). Alcohol use among adolescents living in families that traditionally use alcohol has been reported to be twice the level in families that traditionally do not use alcohol. Traditional alcohol users used home-made alcohol rather than commercial drinks but it was more common for the traditional non-alcohol adolescents to use commercial drinks. Interestingly, it was observed that adolescents belonging to both groups were more vulnerable to consuming alcohol with their family than with their peers. Social factors had more significant associations for “ever used alcohol” including age, daily allowances, ethnicity and parental and peer approval. The first “ever used alcohol” age in both groups was 11 years old (Parajuli Macdonald & Jimba 2015).
2.4.3 Mental health
In low-income countries like Nepal, the scientific evidence on adolescents’ mental health is relatively limited (Adhikari et al. 2015). It is estimated that 25% of the total population has mild to severe mental health problems (MoHP 2012). A recent survey, Nepal Adolescents and Youth Survey 2010/11, reported that 11% of adolescents, had felt sad and depressed (MoHP 2012). The survey also showed that adolescents residing in the Mountain and Far-Western regions had more psychological problems than other regions and girls were more likely to be affected (MoHP 2012). The most common psychological problems among the adolescents who reported mental symptoms were anxiety at 75% and hopelessness at 44% (MoHP 2012).

In a recent qualitative study among Nepalese children the most common behavioral problems were: low interest in studies, substance use, stealing, being short-tempered, frequently fighting about small matters and disobedience (Adhikari et al. 2015). The reasons for such behaviors were due to the family environment, discrimination between daughters and sons, poor school environment, peer pressure and having unmet needs. Furthermore, those who were male, belonged to a younger age group (12 to 15 years), were in a minor ethnic group (Janajatis and Dalit) and had poor income were more prone to developing such behavior (Adhikari et al. 2015). Apart from the 2012 survey by the MoHP, very little research regarding adolescent mental health has been conducted in Nepal, especially regarding mental disorders in adolescents in hospital (Shakya et al. 2009, Shakya 2010, Chapagai et al. 2013) and on mental health conditions of war children or child soldiers (Jordans et al. 2010, Kohrt, Harper 2008, Tol, Kohrt et al. 2010).

2.5 INTERVENTIONS FOR ADOLESCENT SUBSTANCE USE
The burden of morbidity and premature mortality in adolescence and adulthood can be prevented by focusing on the risky behaviors of children and adolescents. Thus, the introduction of health promotion programs, early intervention, prevention and treatment can improve behaviors among adolescents, leading to healthy lifestyles (Catalano et al. 2012). During the 1960s, the first prevention programs that aimed to prevent problematic behavior, such as substance abuse, among adolescents, were developed in high-income countries, mainly in the United States (Snow, Gilchrist & Schinke 1985, Ennett et al. 1994). These programs mainly focused on knowledge or attitudes and ignored the influence of peers and the community (Jepson 2000). In the Unites States, during the 1980s, school-based prevention programs were implemented to reduce smoking among adolescents, but only short-term effects were observed (Chassin et al. 1990). These programs usually failed to reach the adolescents at risk (Chassin et al. 1990) and were often eliminated from schools (Jepson 2000). Similarly, earlier prevention and intervention programs on drug abuse failed to identify the possible risk factors for drug abuse, resulting in disappointing outcomes (Hawkins, Catalano & Miller 1992), and very few prevention programs were successful (Ennett et al. 1994). As a result, behavioral development science was imbedded in the programs and this entailed exploring protective and risk factors to address specific problem behaviors (Jepson 2000) and to understand the history of such behaviors (Johnston 1997).

It was also recognized that longitudinal studies that explored predictors of problem behavior, i.e. protective and risk factors, had favourable outcomes on interventional
programs (Hawkins, Catalano & Miller 1992, Hawkins et al. 1995). Therefore, those planning intervention programs included the protective and risk factors as important elements for prevention programs (Arthur et al. 2002). Prevention programs should focus on two groups, namely those who are already using substances and those who have just started experimenting with them (Blum & Nelson-Mmari 2004). Measurements exploring protective and risk factors in a specific population or region should be prioritised in interventional programs (Hawkins 1999, Arthur 2002).

In past few decades, different approaches have been initiated to prevent substance use among adolescents, either at the individual, group or community level through educational and psychosocial interventions (Hawkins, Catalano & Arthur 2002, Carvalho et al. 2014). If a prevention program is to be successful, the structural risk factors, including family, individual and school risk factors, should be addressed in order to produce benefits to the overall population (Hawkins, Catalano & Arthur 2002, Catalando et al. 2012). Interventions on adolescent substance use usually contained family-based approaches, motivational interviews (MI), behavioral therapy and cognitive-behavior therapy (CBT) (Wetherill & Tapert 2013).

Family-based intervention has been shown to be effective in preventing substance use in adolescents (Cranford, McCabe & Boyd 2013). Therefore, family prevention programs should strengthen parenting skills and improve communication and relationships between parents and children (Hawkins et al. 1997, Hawkins et al. 1999, Hawkins, Catalano & Miller 2002, Burdzovic Andreas & Jackson 2015). Early education, parental support, improving academic performance and the quality of the school environment can create better outcomes for the prevention initiatives (Hawkins, Catalano & Miller 1992). Furthermore, programs that enhance parenting styles, provide information about the risks of substance use, encourage delaying the initiation of smoking or substance use, and reduce or help to manage conflicts in the family have had promising effects on adolescent health (Hawkins et al. 1997). Interventions that involve parents, teachers and children in early education can also produce lasting results in preventing risky behaviors among adolescents (Hawkins et al. 1999).

Furthermore, adolescents are influenced by their higher status peers who act as role models for either anti-substance use or pro-substance use (Teunissen et al. 2012). Indeed, it has been suggested that implementing intervention programs that are led by higher status or popular peers who abstain from substance use is important (Teunissen et al. 2012). In addition, Curran, Stice & Chassin (1997) noted that an interventional program that focused on the peer groups should consider: 1) whether peer relationships are a predictive factor for adolescent substance use, 2) whether peer and adolescent substance use is due to other factors, and 3) whether adolescents start using substances and then seek the company of substance-using peers. Identifying these correct underlying causes might enhance the effectiveness of interventions (Curran, Stice & Chassin 1997).

For individuals, the intervention programs should promote interpersonal skills, relationships with peers and the ability to refuse to engage in harmful behaviors when confronted by people who are a negative influence (Catalando et al. 2012). A review by Kuntsche et al. (2006) suggested that prevention programs should focus on the motives for adolescent drinking, as drinking motivations vary according to gender and age. For example, boys and younger adolescents have social development motivations to drink, while anxious girls and older adolescents are motivated by their need to cope with life.
Therefore, an increase in self-reliance can decrease the risk of substance use among adolescents (Patchell et al. 2015).

Adolescents spend most of their time outside of the home - in their community and in the school environment - where they are influenced by the community and the school’s norms and culture. As adolescents are undergoing a period of development, interventions need to be timely so that early delinquency and other risky behaviors such as substance use, can be prevented. Evidence suggests that most adolescents use alcohol around the time that they enter high school and several intervention programs have been initiated during middle school (Burdzovic Andreas & Jackson 2015). Programs that aim to prevent substance use should be targeted at both schools as well as individuals (Kristjansson, Sigfusdottir & Allegante 2013). Similarly, the prevention programs provided by schools should improve the students’ cognitive, emotional and social competencies (Catalando et al. 2012). However, a meta-analysis of the effectiveness of school-based interventions on alcohol showed only small positive outcomes when it came to preventing alcohol use (Strøm et al. 2014). This might have been due to the fact that alcohol was considered socially acceptable and this could have influenced the adolescents’ use of alcohol (Strøm et al. 2015).

In addition, school-based interventions may not reach adolescents with risky behavior, as they might drop out of school due to family, individual or community problems. Therefore, enhancing parenting skills and communication is a primary approach for preventing substance use among most adolescents (Weinberg et al. 1998). A review conducted on intervention and prevention programs for adolescents’ substance use found that if programs included improving personal and social competence and prevented harmful social influence, ameliorating self-management skills among adolescents, the use of substances among adolescents could be delayed or prevented (Skara & Sussman 2003). Alexander et al. (2001) suggest that anti-smoking information in schools might be viable if students take this information as normative. In addition, enforcing non-smoking policies at schools, so that non-smoking was the norm among students and other school staff, was suggested (Alexander et al. 2001).

Another model developed for preventing substance use is the early intervention model (Pirskanen 2007), which was developed by using the sum scores of the Adolescents’ Substance Use Measurement (ADSUME) and the level of concern expressed by public health nurses. The model included four areas: 1) positive feedback was provided to abstinent or experimental users; 2) an early brief intervention was implemented for recurring users if the nurses had expressed only a little concern about them; 3) a brief intervention, including co-operation when required, was provided to the risky users who prompted moderate concern, and 4) extra support and follow up was provided by the nurses for the hazardous users who prompted the greatest level of concern. Elements of the brief intervention were also included in this model, including health education, motivation, empathy and support. The intervention also included encouraging communication between the young people and public health nurses, in order to increase self-evaluation among the adolescents (Pirskanen, Laukkalan & Pietilä 2007).

Many prevention programs have been assessed in high-income countries, while less research has been conducted in low-income or middle-income countries (Catalando et al. 2012). These prevention programs may not be as relevant to the low-income or middle-income countries, as the perception of life among adolescents in these countries might
2.6 SUMMARY OF THE LITERATURE REVIEW

The health and well-being of adolescents has been shown to be influenced by family, peers, school, society and their socioeconomic status (Hanson & Chen 2007, Sawyer et al. 2012, Kuntsche & Ravens-Sieberer 2015, Lazzeri et al. 2014). Adolescents who had good relationships and better communication with their parents and continuous monitoring of their behavior had better health and well-being and reduced levels of risky behavior, such as the use of tobacco, alcohol, drugs and other substances (Steinberg, Fletcher & Darling 1994, Hawkins et al. 1997, White et al. 2006, Denny et al. 2011). In addition, choosing peer groups that abstained from substance use, demonstrating caring behavior and having a good relationship with them increased the likelihood of having better health outcomes in late adolescence (Steinberg, Fletcher & Darling 1994, White et al. 2006). Similarly, close relationships with teachers and good performance at school reduced the chance of using substances (White et al. 2006, Su & Supple 2014). In addition, the social environment played an important role in the development of adolescents, including culture, safe neighborhoods and community participation. Better socioeconomic status enhanced the likelihood of reduced substance use in adolescents (Brooks et al. 2012).

However, having poor relationships with their parents was associated with adolescents having emotional or behavioral problems and being more likely to use substances during early adolescence (Tyas & Pederson 1998, Chassin et al. 2000, Burdzovic Andreas & Jackson 2015). Similarly, being part of a peer group that used substance increased the risk of being substance users in adolescence (Hawkins, Catalano & Miller 1992, Hawkins et al. 1997, Chassin et al. 2000, Chassin, Pitts & Prost 2002, Lie et al. 2014). A poor school environment caused adolescents to have poor school performance and this exacerbated the risk of substance use (Tyas & Pederson 1998, Hung et al. 2015, Lee et al. 2015, Jackson et al. 2014, Lazzeri et al. 2014, Su & Supple 2014, Kristjansson, Sigfusdottir & Allegrange 2013). Similarly, living in a poor neighborhood and having either high or low socioeconomic status were associated with the risk of substance use among adolescents (Hawkins, Catalano & Miller 1992, Liu et al. 2013, Dora et al. 2015). However, introducing the right intervention program during early adolescence or later adolescence might ameliorate the poor health outcomes caused by substance use in adolescents (see Figure 2).

Although there have been many studies conducted on adolescent substance use and their associated factors, including psychosocial problems, in high-income countries (Brook et al. 1999, Fergusson, Chassin, Pitts & Prost 2002, Horwood & Swain-Campbell 2002, Windle 1990, King, Iacono & McGue 2004), there are only a few studies available that cover this important area in low-income and middle-income countries (Sharan et al. 2009, Calalano et al. 2012, Patel et al. 2013). In a low-income country such as Nepal, very few studies have been carried out about the use of tobacco, alcohol or illicit drugs by adolescents. In addition, psychosocial problems and associated factors in adolescents have rarely been investigated. In order to reduce the global health burden among adolescents,
especially with regard to risky behavior, it is important to investigate the factors associated with it in low-income and middle-income countries.

Figure 2. Summary of the literature.
3 Aims of the Study

The aims of this study were to describe substance use and psychosocial problems, namely emotional and behavioral issues, and the factors that were associated with these in Nepalese adolescents. The ultimate aim was to highlight the multi-dimensional factors of substance use among Nepalese adolescents.

The specific research objectives were as follows:

**Phase 1**: to describe and evaluate the effects of interventions used for preventing or reducing substance use among adolescents under 18 years of age. (Sub-study 1)

**Phase 2**: to describe the prevalence of self-reported psychosocial problems (emotional and behavioral problems) and their association with demographic factors among 12 to 18-year-old adolescents from the Western Development Region of Nepal. (Sub-study 2)

**Phase 3**: to explore the prevalence of substance use among adolescents in Nepal and to describe the background factors associated with the use of tobacco, alcohol and other substances. (Sub-study 3)

**Phase 4**: to explain the association between psychosocial problems (emotional and behavioral problems) with substance use among adolescents. (Sub-study 4)

In addition, this study also describes the teachers’ perspective on substance use, and includes advice for students regarding substance use, teacher’s expectations of students, school health services, and school curriculums on substance use. (Supplement to the summary section)
4 Methods

4.1 STUDY DESIGN

This study used a systematic review and cross-sectional study design that employed a quantitative method with a number of open-ended questions (see Figure 3). Before the empirical data were collected, a systematic literature review was performed in order to understand the theoretical background of the subject. Furthermore, the reason for selecting studies that included interventions was the fact that the ultimate aim of any substance use/abuse research is to provide knowledge and support for interventional programmes. Thus, in order to obtain a broad understanding of the phenomenon, interventions studies were selected. In the first phase, the systematic review described the interventions used for reducing substance use among adolescents. In sub-studies 2 to 4, empirical data collected from 12 to 18-year-old adolescents from urban and rural schools described the prevalence and the associated factors for substance use and psychosocial problems. Data were also collected from the teachers at those schools, but those data are only explained in this summary section.

![Figure 3. Flow chart of whole study process.](image)

aYSR = Youth Self-Report questionnaire for ages 11-18(Achenbach & Rescorla 2001)
bADSUME= Adolescents’ Substance Use Measurement (Pirskanen 2007)
c‘Teachers’ questionnaire = This part is only included in the summary part
4.2 SYSTEMATIC LITERATURE REVIEW

A systematic literature review (Glasziou, Irwig, Bain, & Colditz, 2001) was used in this study to appraise the previous knowledge about substance use in adolescents and the intervention programs that aimed to reduce such risky behavior. Therefore, the aim of the systematic review was to describe and evaluate the effects of intervention used for preventing or reducing substance use among adolescents under 18 years of age.

4.2.1 Searches and selection of literature

The databases used for searching the scientific articles were: CINAHL, PubMed, SocIndex and Academic Search Premier. The keywords used for searching the studies were discussed with the specialist in the University Librarian and with the members of research group. The keywords used in the databases were: substance use OR substance abuse AND adolescent* AND intervention*. The literature search produced 7,516 publications and this number of studies was reduced by applying the following inclusion criteria: 1) interventions used for preventing or reducing substance use 2) studies focusing on children and adolescents aged six to 18 years 3) studies that were quasi-experimental, longitudinal or cohort studies, qualitative studies, randomized controlled trials, controlled trials or clinical trials 4) studies published in English 5) peer-reviewed studies published between 2007 and 2010 6) studies that included participants who were ≤ 18 years old at baseline and 7) studies that were concerned with pupils from grades 6 to 10. The limited keywords were chosen because “substance use” and “misuse” yielded results that included alcohol, tobacco and other illicit drugs and, therefore, we used simple search keywords. Furthermore, another inclusion criterion, namely children/adolescents aged six to 18 years old was chosen because some of the studies had longitudinal or follow-up study designs. Therefore, to evaluate the effect of the intervention when the children/adolescents were older, these inclusion criteria were used. In addition, in order to include the most recent interventions on substance use, we selected articles published over three periods (Table 4).

The results provided by databases, such as abstracts, subject headings and major headings, did not yield relevant results. Therefore, selections were made by reading the abstracts and the studies that were available as full-texts in the University library. The screening process was carried out by one researcher and the quality of the selected articles was discussed with the members of the research group.
Table 4. Databases, hits, limits, selections

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<td><strong>113</strong></td>
<td></td>
<td><strong>27</strong></td>
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</table>

4.2.2 Data extraction and analysis

The data for this review were analysed by using the content analysis method (Graneheim & Lundmand 2004). It focuses on manifest content or latent content, where it interprets visible and obvious components and explains the meaning of texts (Graneheim & Lundmand 2004). Therefore, the selected articles were read repeatedly to extract the meaningful content from each study. The extracted information was summarized in the table (see Table 1, sub-study 1) and different themes emerged while categorizing the extracted information. These themes were differentiated into the intervention types. At first the principal investigator extracted and analysed the original studies and later the process and content were discussed with the research group to ensure the quality and common understanding. Thereafter, the results were presented in a narrative way.

4.3 QUANTITATIVE METHODS

The quantitative method was used in phases 2 to 5 to provide the self-reported data on substance use and psychosocial problems among adolescents.

4.3.1 Sample

This research was a cross-sectional study (Hartung & Touchette 2009) and the participants were selected from urban and rural schools in the Western developmental region of Nepal. These schools provided education until the 12th grade and the purposive sampling method was undertaken to choose the schools, which were suggested by the local police authority. They were recommended by the police authority on the basis that they were attended by adolescents from different backgrounds and would provide a good picture of substance use across the community. Thus, one urban and two rural schools were selected. Two schools were selected from the rural areas because there were not enough pupils from just one school to compare them with the urban school. All the children from grade 6 to 12 from the first rural school were chosen to take part (n=134). In the remaining rural school and urban school, student ID numbers taken from the school’s attendance book for each grade
between grades 6 to 12, were written on pieces of paper and selected randomly by using the lottery method. This resulted in 255 pupils from the urban school in grades 6-10 being selected and 162 from grades 6-12 being selected from the other rural school (see Figure 5).

Only participants who provided parental consent were included in this study. This meant that we recruited a total of 551 pupils. We also recruited the 19 class teachers (5 urban and 14 rural) from all three schools. These teachers were selected with the convenience sampling method and were also asked to fill out the consent form. At the end of the data collection, a total of 444 adolescents (response rate 81%) had filled in the questionnaire. However, adolescents aged 19 and 20 years (n=24) and participants with missing details regarding age (n=4) and sex (n=8) were also excluded during data processing. Adolescents from age 12 to 18 were included in this study because they were expected to be a vulnerable group for substance use and to have psychosocial problems. In addition, they were considered as minors, as they were all below the age of 18. The final sample used for the analysis process was 408 (see Figure 4).
4.3.2 Material and data collection
The methodology used to collect the data was mainly quantitative and this was supplemented with open-ended questions. The measures to collect data were: the Youth Self-Report (YSR) (Achenbach & Rescorla 2001), the Adolescents’ Substance Use Measurement (ADSUME) tool (Pirskanen et al. 2006, Pirskanen, Laukkanen & Pietilä 2007), demographic questions and a questionnaire for the teachers. Permission to use the selected measures were approved and all questionnaires were provided in English and Nepali versions. The Nepali versions of questionnaires were translated by a suitably qualified person in Nepal. The person was asked to translate the texts in a simple style so that students from lower grades could also understand the questions. The translated text was checked by the main researcher to ensure that the meanings of the questions were accurate.

During the data collection, the eligible participants were informed about the research process, both verbally and in writing, and were asked to return the parental consent form in
order to participate in this study. Students who provided parental consent were informed about the questionnaire in the school grounds or in classroom, and they were given permission to fill out the questionnaire in their classroom. During the data collection, no teachers were present, just the researcher, to ensure the confidentiality of the information provided.

**Youth Self-Report (YSR)**

The Youth Self-Report (YSR) is a self-reported questionnaire designed for the 11-18 year age group (Achenbach & Rescorla 2001). It consists of 105 problem items and provides a total score for eight syndrome scales: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, delinquent behavior and aggressive behaviors. These are sub-divided into two scales: the internalizing scale (anxious/depressed, withdrawn/depressed, and somatic complaints) and the externalizing scale (delinquent behavior and aggressive behavior). The score for each item is given as 0, 1, or 2, which equates to not true, somewhat or sometimes true or very true or often true, respectively. It has been shown to be valid and reliable in Western countries. It also includes a competence scale that collects demographic data, activities, social and school performances (Achenbach & Rescorla 2001).

**ADSUME**

The Adolescents’ Substance Use Measurement (ADSUME) questionnaire was studied and developed by Marjatta Pirskanen in Finland and has been shown to be valid and reliable (Pirskanen et al. 2006, Pirskanen, Laukkanen & Pietilä 2007). It was adapted from the CRAFFT screening test of substance abuse (Knight et al. 2003) and Alcohol Use Disorder Identification test (AUDIT) (Saunders et al. 1993). It consists of 17 questions, which provide information on the amount of substance used, substance related consequences, social support and exposure to substance use. The questions are about the reasons for substance use, concerns from parents or friends, peer substance use or drugs available in society (Pirskanen et al. 2006, Pirskanen, Laukkanen & Pietilä 2007). Out of the 17 questions available (see Table 1, sub-study 2), 8 questions from the ADSUME were scored to assess the amount of substance used and substance-related consequences. According to the sum scores, four different categories were determined on the basis of cut-off points: abstinence or experimental user (0-3 points), recurring user (4-6 points), risky user (7-9 points) and hazardous user (≥10 points) (Pirskanen et al. 2006, Pirskanen, Laukkanen & Pietilä 2007).

In addition, other questions were also added for this research, including some taken from the 2007 European School Survey Project on Alcohol and Other Drugs (ESPAD), which provided information on parents’ and adolescents’ substance use habits. It included influencing factors, parents’ behavior, first time usage, sources of substances, time of usage, advice from teachers and parents, school curriculum, reaction and decision making on substance use.

**Demographic data**

Demographic data was assessed by questions about gender, age, ethnic group/race, religion, grades, family type, the marital status of the student, present living status, parents’ work and parents’ education.
Teachers' questionnaire

The teachers' questionnaire was developed during discussions in the research group. We felt that the questionnaire could help us to understand the health services provided at school and the substance use by adolescents. That is why it included questions about the teacher's role (managing role or teaching), name of the school, how long they had been teaching, followed by other questions on their attitudes to substance use, the advice they provided to substance user students (open ended), their expectations of their students, school health services and any school curriculum items on substance use.

4.3.3 Analysis method

The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 19 and 23 for Windows (IBM Corp., Released 2010). A significance level of 0.05 was adopted for all the analyses. A univariate analysis of covariance (ANCOVA) was used to test the main effects on gender, place of residence and syndrome scale (sub-study 2). The descriptive data were analyzed by using frequency numbers, percentages and chi-square tests (sub-study 3). However, for three sub-studies, binary logistic regression was carried out to find the associations between the different variables (sub-studies 2-4). The dichotomized dependent variables were coded using zero and one, for example, non-smokers were coded as zero and smokers were coded as one. Similarly, for the ADSUME points, the participants who scored 0 to 9, for abstinence or low-risk user, were coded as zero and participants who scored 10 or above, for high-risk user, were coded as one. The p values (≤0.05), odd ratios (OR) and 95% confidence intervals (95% CI) were reported. Further, the Hosmer-Lemeshow test was also used to test how well the models fitted. The covariates used for this analysis were gender, age, residential area (sub-studies 2 and 3), race, religion, father's and mother's occupation, satisfaction with family income, substance use practices in parents and grandparents (sub-study 3) and syndrome scales (sub-study 2). Furthermore, the results for the teachers' questionnaire were described by just using frequencies.

4.4 ETHICAL CONSIDERATIONS

The official Research Ethics Committee of the Hospital District of Northern Savo (18.04.2011, 28/2011) and the Nepal Health Research Council, NHRC, (05.09.2011, 80/2011) were happy for this study to be carried out and we received approval from the selected schools. We received consent from the subjects' parents for further research processes and data collection, as Nepalese law requires this for any research that includes children up to 18 years of year.

Information about the research, its benefits and risks, the confidentiality of participants, together with future prospects and participation (National Advisory Board on Research Ethics 2009), were conveyed by the principal investigator in both verbal and written formats. The written information was provided in both Nepali and English languages. After the information had been provided to the schools, all the volunteer participants, namely the adolescents and class teachers, were offered the opportunity to discuss anything that was unclear about the research and the processes. Taking into account, the parents' time, information about the research and the parental consent form were provided
in a written format and the students were also asked to convey the information orally to parents who could not read. In addition, if the parents needed any further information they were welcome to attend a discussion with the principal investigator at the school or talk to them on the telephone. Students were advised to put their parents’ finger prints on the consent form, which is a common consent process in Nepal, especially among illiterate people.

To ensure the participants’ confidentiality, they were not asked to provide any personal details. The consent form asked for their name, address and school in case there were subsequent legal cases with regard to consent. None of the teachers were allowed in the classrooms when the pupils were filling in the questionnaire. The students were advised to protect their answers from other pupils and they put them in the sealed envelope after they had completed the questionnaire. The research process was entirely voluntary and we respected any decisions, such as not wishing to take part, made by the participants or their family members.
5 Results

This summary presents the main results of the study, but more detailed descriptions are available in the original sub-studies 1-4.

5.1 DESCRIPTION AND EFFECTS OF INTERVENTIONS (SUB-STUDY 1)

The review included many different types of studies and interventions, with 23 of the studies being carried out in United States, two in Australia, one in Canada and one in India. Based on the nature of this study, they were put into five categories: family-based interventions, individual-based interventions, community-based interventions, school-based interventions and combined interventions. After the content analysis process, the interventions used for reducing or preventing substance use were put into five different categories: 1) family based 2) individual based 3) community based 4) school based and 4) combined based (Figure 5). Of the 27 studies, six focused on the family, five on an individual approach, four on the community, six on schools and six on implementing one or more interventions.

Family-based interventions that focused on family management, parent-child relationships and communication improved prosocial skills in girls, helping them to reduce alcohol use, whereas no differences were observed in the boys (Mason et al. 2009). In addition, improving the way the family functioned reduced risky behavior such as substance use, externalizing problems and unsafe sex practices (Pantin et al. 2009). Interventions that only included mothers and daughters proved to be effective in reducing substance use among girls by improving communication skills between mothers and daughters (Schinke, Cole & Fang 2009, Schinke, Fang & Cole 2009).

In individual-based interventions, motivational interviewing had some effects on changing substance use perceptions and they focused on the favorable reasons to change the individual’s behavior (Baer et al. 2008). These interventions had more impact on adolescents’ readiness to change their drug use than on alcohol, marijuana, cigarettes or binge drinking (Grenard et al. 2007). The Adolescent Community Reinforcement Approach (A-CRA), which included sessions for individuals, as well as parents or caregivers, suggested that activities that included 12 or more A-CRA procedures may have reduced substance use in adolescents (Garner et al. 2009). A smoking intervention that aimed to enhance motivation or change behavior showed that the intervention group were 3.6 times as likely to stop smoking as the control group (Myers & Prochaska 2008). Also, prevention programs that were based online (RealTeen) reported lower use of substances among the intervention group than the control group and were found to improve self-efficacy and normative beliefs (Schwinn et al. 2010).

Long-term positive effects were not observed in community-based interventions. However, studying at a religious school was found to be a protective factor for alcohol and cannabis use among adolescents in the United States compared to other state schools (Jones & Rossiter 2009). On the other hand, school-based interventions were found to be successful in changing adolescents’ views and increasing their knowledge about the use of
intoxicating substances (Anderson & Moore 2009, Newton et al. 2009). Also, those who had more positive social motives drank less than others (LaBrie et al. 2009). However, combining one or more interventions, such as family therapy and individual therapy, was successful in reducing substance use in adolescents (Liddle et al. 2008, Slesnick et al. 2009, R. Spoth et al. 2008a, Stanger et al. 2009).

Figure 5. Summary of interventions.

5.2 PATTERNS OF PSYCHOSOCIAL PROBLEMS AMONG NEPALESE ADOLESCENTS (SUB-STUDY 2)

5.2.1 Prevalence of emotional and behavioral problems
The prevalence of psychosocial problems, including emotional and behavioral problems, was calculated by cut-off points that established the borderline clinical range or the clinical range (Table 4, sub-study 2). For the eight syndrome scales, raw scores that were greater than the 93rd percentile were categorized as being in the borderline clinical range and raw scores greater than the 98th percentile were categorized as the clinical range (Achenbach & Rescorla 2001). Similarly, for the broad band scales - covering internalizing, externalizing and total problem scores - raw scores that were greater than the 84th percentile were categorized as being in the borderline clinical range and raw scores that were greater than the 90th percentile were categorized as the clinical range (Achenbach & Rescorla 2001). Of
the participants, 6% to 7% were found to be in the borderline clinical or clinical range. Those adolescents showed higher scores for anxiety/depression, somatic complaints, social problems, attention problems or delinquent behavior. Furthermore, in the broad band scales 15% of the adolescents were in the borderline clinical range and 10% of them were in the clinical range.

5.2.2 Associated factors of emotional and behavioral problems

Gender only had a statistically significant effect when it came to delinquent behavior and internalizing problems such as feeling anxious/depressed. The mean scores showed that the girls had more internalizing problems (including feeling anxious/depressed), while the boys had more delinquent behavior than girls. Also, it showed that where they lived had a statistically significant effect on most of the syndrome scales, such as total problems, internalizing problems (including anxious/depressed and withdrawn/depressed), externalizing problems (including delinquent and aggressive behavior) and attention problems. The mean scores showed that girls and boys living in urban areas had more problems than those living in rural areas. All other problem scales, except somatic complaints, had statistically significant effects with age, including total problems, internalizing problems (including anxious/depressed and withdrawn/depressed), externalizing problems (including delinquent and aggressive behavior), social problems, attention problems and thought problems. It was observed that internalizing problems were common among 18-year-old adolescents, affecting 23.3%, followed by 21.1% for 17 year olds and 18.9% for 15 year olds. However, externalizing problems were found to be higher among the older age group of 16 to 18 year olds and 31.8% of adolescents aged 18 year olds were in the borderline clinical or clinical range when they were combined to form a dichotomized variable (Figure 6).

Gender had no significant association with problem scales in the borderline clinical range or clinical range and normal range in the binary logistic regression analysis. However, place of residence had significant associations with total problems, externalizing problems and attention problems. On the other hand, age was significantly associated with total problems, internalizing problems (including withdrawn/depressed), externalizing problems (including delinquent and aggressive behavior) and attention problems.
5.3 ADOLESCENTS’ SUBSTANCE USE AND ASSOCIATED FACTORS IN NEPAL (SUB-STUDY 3)

5.3.1 Prevalence of substance use

The data showed that the prevalence of smoking or chewing tobacco in adolescents was 10.5% and 22.3% had used alcohol, including 4.2% who also used other substances (for instance, medicines, solvents, drugs). Boys tended to use more tobacco than girls (Table 2, sub-study 3). For boys, the initiation age for tobacco products was 15 years and for girls it was 14.6 years. The mean initiation age for alcohol or other substances was 14.5 years in boys and 13.5 years in girls. When it came to 16 to 18 year olds, their use of tobacco products and any substance use (including alcohol) was higher than in the lower age group of 12 to 14 year olds, with more 18-year-old adolescents using tobacco or other substances than any other age group (Figure 7).

Figure 6. Syndrome scales distributed according to age.

Figure 7. Tobacco and substance users distributed with age.
Popular alcoholic drinks for adolescents were beer, Chhang (local beverages made from rice, corn or millet, which also include Tongba and Jand), wine, Jand and the locally distilled alcohol, Raksi. Beer was popular drink among boys and Chhang was popular among girls (Figure 8).

![Figure 8. Different types of alcohol used by girls and boys.](image)

### 5.3.2 Substance use problems, reasons and exposures

Irregular school attendance due to substance use was a problem for 8% of the adolescents (Table 2, sub-study 2). The common problem for the boys was hurting themselves (26%) or others (19%), harmful activities that were not found among the girls. Of those who used alcohol, 12% had lost their memory two or more times and 5% had been unconscious two or more times. However, dangerous situations, such as being unconscious, were not observed among the girls.

The common reasons to use substances (Table 2, sub-study 3) were to have fun (42%), peer usage (23%) and to feel better (22%). We also asked if their parents’ substance use habits influenced them to use substances and 15% said yes, but 60% said they wanted to try substances but were frightened it would have an impact on their health.

More than a quarter (27%) of the adolescents reported that their close friends had tried drugs such as amphetamines, barbiturates, benzodiazepines, cocaine, opioids, marijuana or gaja (Nepali name for marijuana), hashish, brown sugar, ecstasy, LSD and heroin, with 9% reporting that one close friend had tried drugs, 13% reporting two to five close friends and 5% reporting that more than five close friends had tried drugs. Another potential exposure to alcohol was in the home. About one-fifth (19%) of the adolescents said their parents brewed alcohol at home and 63% of them reported that they brewed alcohol once a month, 8% said twice a month, 8% said three times a month and 21% of them said weekly. We also found that 61% of the adolescents helped to make alcohol at home, 39% of them said their parents knew about their use of substances and 67% said that their parents or family members or friends were concerned about their substance use and had suggested that they should cut down.
5.3.3 Factors associated with substance use

Boys tended to smoke or use tobacco more than girls (P<0.0001), but there were no significant gender differences when it came to the use of substances. Being 16 to 18 years of age (P<0.0001) and having a father who used substances were significantly associated with substance use (P=0.004), including tobacco (P=0.006). Furthermore, substance use by grandparents was also associated with tobacco use among adolescents (P=0.022). In addition, living in urban areas was found to be associated with substance use (P=0.005). However, no associations were observed with regard to race, religion, the father’s occupation, the mother’s substance use habits and the level of satisfaction with family income (Table 3, sub-study 3).

5.4 ASSOCIATION BETWEEN PSYCHOSOCIAL PROBLEMS AND SUBSTANCE USE IN NEPAL (SUB-STUDY 4)

The results of our study showed statistically significant associations between syndrome scores and tobacco or substance users or high or low-risk users (Table 2 & 3, sub-study 4). Being anxious/depressed, withdrawn/depressed, having thought problems, attention problems, delinquent and aggressive behavior, internalizing and externalizing problems predicted tobacco use (P<0.05). The strongest associations for tobacco use were related to attention problems (P<0.006) and delinquent behavior (P<0.001). In an analysis of substance use, we found significant associations with most of the scales, except anxious/depressed, somatic complaints, social problems and other problems, including being withdrawn/depressed, thought problems, attention problems, delinquent behavior, aggressive behavior, internalizing problems, externalizing problems and total problems. The highest associations with substance use (except tobacco) in the syndrome scales were withdrawn/depressed, thought problems, attention problems, delinquent and aggressive behavior, internalizing problems, externalizing problems and total problems (P<0.05) (Tables 2 & 3, sub-study 4).

5.5 TEACHERS’ PERSPECTIVES REGARDING SUBSTANCE USE

The results showed that the health services provided at schools were general check-ups (50%), first aid (42%) and mental health counselling (8%) (Table 5). In schools these services were provided yearly (37%), twice a year (5%), every month (10.5%) and during school time (10.5%). A course about substance abuse was available in all schools and some teachers said they had an intervention program for substance abusers. More than two-thirds (69%) of the teachers said they had between one and five students in their class who had a substance use problem. When we asked teachers what worried them about their students, they answered that behavior that would damage their health was worrying (68%). They also said that the effects on their studies (42%), economic difficulties (21%) and violence (16%) were also worrying. Furthermore, they also thought that the causes of substance use were peer relationships (95%) and problems within the family (37%).
Table 5. Class teachers’ responses (n=19) in percentages

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teacher’s role</strong></td>
<td></td>
</tr>
<tr>
<td>Just teaching</td>
<td>16 (84)</td>
</tr>
<tr>
<td>Monitoring and coordinating</td>
<td>3 (16)</td>
</tr>
<tr>
<td><strong>Teaching subject</strong></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>5 (27)</td>
</tr>
<tr>
<td>Science</td>
<td>4 (21)</td>
</tr>
<tr>
<td>Nepali</td>
<td>4 (21)</td>
</tr>
<tr>
<td>Mathematics</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td>Economics</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td>Health</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Social studies</td>
<td>1 (5)</td>
</tr>
<tr>
<td><strong>Teaching hours</strong></td>
<td></td>
</tr>
<tr>
<td>Less than one hour (one class period)</td>
<td>17 (89.5)</td>
</tr>
<tr>
<td>At least 1.5 hours (two class periods)</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td><strong>Health services at school</strong></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7 (37)</td>
</tr>
<tr>
<td>Yearly</td>
<td>7 (37)</td>
</tr>
<tr>
<td>Twice a year</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Every month</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td>Available during school time</td>
<td>2 (10.5)</td>
</tr>
<tr>
<td><strong>Health services provided</strong></td>
<td></td>
</tr>
<tr>
<td>General check up</td>
<td>6 (50)</td>
</tr>
<tr>
<td>Counselling on mental health</td>
<td>1 (8)</td>
</tr>
<tr>
<td>First aid / as needed</td>
<td>5 (42)</td>
</tr>
<tr>
<td><strong>Course available on substance abuse</strong></td>
<td>18 (95)</td>
</tr>
<tr>
<td><strong>Information on substance use</strong></td>
<td></td>
</tr>
<tr>
<td>I just teach what is included in the course</td>
<td>1 (5)</td>
</tr>
<tr>
<td>I provide information on what I know</td>
<td>14 (74)</td>
</tr>
<tr>
<td>I get more information by searching</td>
<td>4 (21)</td>
</tr>
<tr>
<td><strong>Availability of interventional program</strong></td>
<td>9 (47)</td>
</tr>
<tr>
<td><strong>Substance users in class</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>4 (21)</td>
</tr>
<tr>
<td>1-5 students</td>
<td>13 (69)</td>
</tr>
<tr>
<td>5-10</td>
<td>1 (5)</td>
</tr>
<tr>
<td>More than 10</td>
<td>1 (5)</td>
</tr>
<tr>
<td><strong>Worries about student</strong></td>
<td></td>
</tr>
<tr>
<td>Studies</td>
<td>8 (42)</td>
</tr>
<tr>
<td>Health damaging behavior</td>
<td>13 (68)</td>
</tr>
<tr>
<td>Violence</td>
<td>3 (16)</td>
</tr>
<tr>
<td>Economic difficulties</td>
<td>4 (21)</td>
</tr>
<tr>
<td><strong>Causes of substance use</strong></td>
<td></td>
</tr>
<tr>
<td>Problems in family</td>
<td>7 (37)</td>
</tr>
<tr>
<td>Peer relationships</td>
<td>18 (95)</td>
</tr>
<tr>
<td>Economic situation</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Personal worries about future</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Poor school performance</td>
<td>2 (11)</td>
</tr>
<tr>
<td><strong>Reaction to substance user students</strong></td>
<td></td>
</tr>
<tr>
<td>Counselling</td>
<td>19 (100)</td>
</tr>
<tr>
<td>Inform the parents</td>
<td>7 (37)</td>
</tr>
<tr>
<td>Inform the school authorities</td>
<td>5 (26)</td>
</tr>
</tbody>
</table>
5.6 SUMMARY OF THE RESULTS

These results showed that multidimensional factors were associated with the use of substances by Nepalese adolescents (Figure 9). Being male, older, living in an urban area, having substance use in the family, having a mother who did not work outside the home and psychosocial problems were associated with the use of substances in the participants. The important results included:

1. A systematic review demonstrated that several interventions could be applied to prevent or reduce substance use. However, the review highlighted the fact that early intervention programs should focus on the family, school, peers and individuals in order to be effective.

2. Emotional and behavioral problems were prevalent in Nepalese adolescents, including anxiety/depression, somatic complaints, social problems, attention problems and delinquent behavior, including internalizing and externalizing problems. Nepalese girls showed higher scores on symptoms of anxiety and depression than boys, while boys showed more on delinquent behavior. Also, Nepalese adolescents living in urban areas had higher scores on emotional and behavioral problems than adolescents living in rural areas. Older adolescents were prone to having internalizing or externalizing problems than younger adolescents.

3. Alcohol use was more prevalent than tobacco use among Nepalese adolescents. The initiation age for both alcohol and tobacco was 13 to 15 years and older adolescents used more substances than younger adolescents. The main reasons given for using substances were to have fun and because their peers used them. Living in an urban area and having a father and grandparents who used substances was associated with the use of substances by adolescents.

4. Tobacco use was strongly associated with attention problems and delinquent behavior in Nepalese adolescents. The most significant association with any intoxicant use, except tobacco, were psychosocial problems such as attention problems, delinquent and aggressive behavior, and externalizing problems.
Figure 9. Multi-dimensional factors for substance use in Nepalese adolescents.
6 Discussion

This thesis has highlighted the prevalence and associated factors related to substance use and psychosocial problems, such as emotional and behavioral problems. Studies into substance use and emotional and behavioral problems in Nepalese adolescents are very limited, especially on the factors associated with risky behavior. The results of this study showed that there was a high prevalence of substance use among adolescents and the associated factors were mostly found to be parental substance use, residential area, age and having emotional or behavioral problems. Although the prevalence of emotional and behavioral problems among Nepalese participants was low, these problems were highly associated with gender, age and residential area.

This study combined a systematic literature review and empirical research in order to understand the phenomenon. The systematic review was conducted to understand the theoretical background of substance use among adolescents and to describe and evaluate the interventions used to prevent such use (sub-study 1). Empirical data collected in Nepal helped us to understand the prevalence of self-reported emotional/behavioral problems and how they were associated with demographic factors (sub-study 2). The review also described the prevalence and exposure of substance use in adolescents, the reasons for its use and the consequences. In addition, it described the background factors associated with the use of any intoxicants (sub-study 3). The fourth sub-study identified the associations between emotional/behavioral problems and substance use. The questionnaire completed by the teachers was also discussed in this summary section which added more information regarding substance use among adolescents. Therefore, this section discusses all the above aspects as well as the validity and reliability of the study.

6.1 EFFECTS OF INTERVENTIONS IN REDUCING SUBSTANCE USE

Children have been shown to learn positive and negative behavior by interacting with their parents, and parents play an important role in influencing their children’s behavior (Hawkins et al. 1997, White et al. 2006, Hanson & Chen 2007, Fagan 2013). Fagan (2013) observed that children who were ignored or maltreated by their parents were more likely to demonstrate poor performance at school, poor behavior at home and display increased negative interactions, involving delinquent behavior (Kandel et al. 1986, Clark, Lesnick & Hegedus 1997, Kilpatrick et al. 2000, Repetti, Taylor & Seeman 2002, Miller et al. 2007, Fagan 2013). Studies also showed that adolescents who used substances had less parental support and monitoring than their peers (Hawkins, Catalano & Miller 1992, Stice & Barrera 1995, Al-Sahab et al. 2012, Kuttler et al. 2015). The review of existing studies suggested that improvements in family functioning reduced substance use among risky adolescents (Slesnick & Prestopnik 2009, Pantin et al. 2009). Earlier research also showed that aspects of parenting were directly related to the development of the children’s readiness to meet social and emotional challenges, including consistent parenting, positive parenting, involvement with the child, monitoring and supervision, physical punishment and non-corporal punishment (Frick, Christian & Wootton 1999). Therefore, improving family functioning improved adolescent functioning and helped to reduce problem behaviors such
as substance use (Hawkins, Catalano & Miller 2002, Liddle 2004). Positive parenting was crucial in helping to develop children’s security and competence (Chassin et al. 1986, Hawkins, Catalano & Miller 1992, Kobus 2003, Brooks et al. 2012, Burdzovic Andreas J & Jackson 2015, Webster-Stratton & McCoy 2016). In most high-income countries, adults’ level of education has been found to be high compared to low-income or middle-income countries (WDI 2014). It is believed that higher education provides adequate knowledge and better lifestyle and parenting choices. Therefore, providing information or bringing awareness to people in low-income or middle-income countries about effective family functioning or parenting could lay a substantial foundation for the development of children and adolescents (Adewuya & Ologun 2006). In addition, in low-income or middle-income countries, the physical punishment of children and adolescents is more common (Cappa & Khan 2011). Children with lower grades or failure at school are more likely to be physically punished by their parents or teachers, which might increase their risk for developing emotional or behavioural problems. Abolishing such act is something that should be considered both at the national level, as well as by those designing interventions, so that children could grow up in the supportive environments.

Improving a child’s prosocial skills and prosocial bonds has been found to be an effective mediator in reducing alcohol use, especially among girls (Mason et al. 2009). Adolescents must develop cognitive competencies, emotional competencies and specific skills in order to develop prosocial skills and bonds (Catalano et al. 2012). It has been reported that these characteristics are developed through positive parenting (Webster-Stratton & McCoy 2016). Intervention programs that involved parents and children at the same time as, for example, computerized mother and daughter programs, were found to be effective in preventing underage drinking, use of marijuana and other drugs (Schinke, Cole & Fang 2009, Schinke, Fang & Cole 2009). These programs increased self-efficacy and being able to resist peer pressure and improved parental support and monitoring (Schinke, Cole & Fang 2009, Schinke, Fang & Cole 2009). Thus, web-based interventions are an effective way to reduce substance use among adolescents as they could reach more people because of the growing use of the Internet (Bewick et al. 2008, Jander et al. 2015). A Delphi study suggested that an important part of web-based interventions was that parents were encouraged to set the right rules, that there was open and high-quality communication between parents and adolescents and that adolescents learned skills that would enable them to resist pressure from others (Jander et al. 2015). However, interventions would not be effective if people dropped out, either during the intervention or follow-ups (Weinberg et al. 1998, Jander et al. 2015). Therefore, key strategies for making web-based interventions successful and preventing people from dropping out included providing various incentives, making the material relevant with appropriate language and using computer-tailored feedback messages (Jander et al. 2015). This study suggested that involving parents or carers and adolescents with computer-based interventions was the effective way to reduce substance use among adolescents aged 18 or under in high-income countries.

Computer-based motivational interventions have had better outcomes, as they proved to be more interesting and motivating for adolescents (Schwinn et al. 2010). Motivational interviewing is an evidence-based clinical approach designed on a person-centred conversational style, to strengthen the motivation for a specific goal (Li et al. 2015). It is strongly recommended by the American Psychiatric Association (APA) and is used to treat addiction problems in the United Kingdom and Australia (Li et al. 2015). Motivational
Interventions encourage adolescents to change their current substance abuse behavior (Grenard et al. 2007, Baer et al. 2008) by helping them to change their attitudes towards substance use (Jensen et al. 2011). However, in low-income and middle-income countries, Internet-based intervention programmes may not be as effective as in high-income countries, due to scarce resources and limited access to advanced technology (Mendis et al. 2007). For example, in Nepal, the electricity supply is always a problem and people are forced to live without electricity for many hours per day or even for their lifetime, especially in rural areas (Bhandari & Stadler 2011). Internet facilities are underdeveloped and often have expensive service charges. This makes it unlikely for Internet-based interventional programmes may to be effective at the present time.

Community transition and mobility increases the likelihood of adolescents using substances. It has been reported that a neighborhood with low socioeconomic status, a lack of community facilities and social resources might increase the risk in adolescents (Hanson & Chen 2007, Brooks et al. 2012, Dora et al. 2015, Wongtongkam et al. 2015). In our review, religious schools, like Christian schools in the United States, seemed to provide more protective factors in preventing substance use (Jones & Rossiter 2009). Religion and spirituality could serve as coping resources, as religion is expressed in an outward and communal way and spirituality is expressed as a personal, internalized and subjective expression of fear about certain behavior being a sin, such as drinking alcohol (Stewart et al. 2015). Religion is engaging in, and practising religious beliefs, and it has been well documented in the United States that religiosity is a protective factor against a variety of risk behaviors, including substance use (Stewart et al. 2015). Indeed, most of the Nepalese population follow Hinduism and the upper-caste groups, such as Brahman and Chettris, have traditionally prohibited alcohol use, while the lower-castes, such as Vaishya and Sudra, use alcohol as part of their cultural norms (Parajuli et al. 2015). These lower-caste groups use alcohol during rituals and for celebration and brew alcohol in their homes. However, due to globalization, the upper-caste groups also consume alcohol at celebrations and social gatherings (Parajuli et al. 2015). Therefore, based on the present situation, one cannot conclude that practising religion or spirituality can act as protective factor for substance use. However, in some religious schools, school norms might help protect adolescents against substance use. Nevertheless, further investigation is needed in order to establish the relationship between religious factors and substance use in Nepalese adolescents.

School-based interventions are also important for reducing substance use in adolescents (Skara & Sussman 2003). As young people spend most of their time at school, it is an ideal location to implement prevention programs (Saraf et al. 2012). However, a lack of resources, such as teachers, time and money, may impede the implementation of prevention programs (Weinberg et al. 1998). Furthermore, if the school policy is only concerned with academic achievement and imposes various academic pressures on students and teachers, there might not be the adequate time for interventions, which might affect the proper implementation of the programme (Saraf et al. 2012). Consequently, a computer-based intervention called “The Climate School” proved to be effective in preventing or reducing substance use among adolescents (Newton et al. 2009, Perry et al. 2009). This online course engaged students through cartoons and was easy to implement at school. Other studies have also provided evidence of the effectiveness of computer-based interventions in reducing problems in adolescents (Champion et al. 2013). A review of school-based interventions suggested that effective school-based interventions should have a clear
theoretical and conceptual basis, combine psychoeducational and skill-building components, provide training for teaching staff, have timely evaluation, maintain engagement, be effectively designed, carefully consider exposure to the intervention, have support from all stakeholders and be based on clear written policies and program maintenance (Wagner et al. 2004). In addition to the success of school-based programmes, one should not ignore the importance of family and the sociocultural environment where the children live (Hawkins et al. 1999, Skara & Sussman 2003, Saraf et al. 2012).

Therefore, combined interventions were found to be produce better outcomes in reducing substance use among adolescents (Liddle et al. 2008, Spoth et al. 2008a, Spoth et al. 2008b, Riggs et al. 2009, Slesnick et al. 2009, Stanger et al. 2009) and interventions that involved parents and improved the family environment had favourable results (Hawkins et al. 1999, Liddle et al. 2008, Slesnick et al. 2009, Stanger et al. 2009). Evidence also showed that combining interventions with family interventions had better results in reducing substance use behavior and there should be further research in this area (Skara & Sussman 2003, Liddle 2004).

6.2 PSYCHOSOCIAL PROBLEMS AND SIMILAR TRENDS TO OTHER MULTICULTURAL SOCIETIES

Parenting behavior was correlated with adolescents’ psychosocial behavior (Wootton et al. 1997, O’Connor & Dvorak 2001, Kleftaras & Didaskalou 2006, Letcher et al. 2012, Asbridge et al. 2014). High levels of support, such as warmth, nurturance, acceptance and responsiveness, were associated with lower levels of psychosocial behavior, higher performance and higher self-esteem (Bacchini et al. 2011, Garthe, Suvillian & Kiewer 2015, Wang et al. 2016). Problem relationships between parents and children caused psychosocial issues in adolescents, with harmful interactions resulting in severe impairment of a child’s emotions and development (Sanford et al. 1995, Kleftaras & Didaskalou 2006, Hart & Glaser 2011). Individuals exposed to psychological maltreatment had lower self-esteem compared to those who were not maltreated (Phillips et al. 2000, Kleftaras & Didaskalou 2006, Bungert et al. 2015). In our study, girls were mostly found to have internalizing problems including being anxious/depressed, whereas boys had higher mean scores for delinquent behavior. This result was also similar to other countries and provided further evidence that girls had more problems with internalizing problems including anxiety/depression (Kapi et al. 2007, Farbstein et al. 2009, Letcher et al. 2012, Weeks et al. 2014, Urben et al. 2015) and boys had more delinquent behavior (Helstelä & Sourander 2001, Kapi et al. 2007, Farbstein et al. 2009, Rescorla et al. 2012, Urben et al. 2015) The internalizing problems were driven by depression, which came from either gender-role socialization or from the consequences of gender differences in cognitive and emotional development (Urben et al. 2015). Some studies have shown that externalizing problems were positively related to violence in the community or in the media or in home (Holt, Buckley & Whelan 2008, Gaylord-Harden et al. 2011). In Nepal, there was no parental guidance to children or teenagers about watching television. From an early age they were exposed to violent material in the media, either through TV shows, games or movies. This might have an impact on boys to repeat the behavior that they have seen in the media. There was also frequent bullying at Nepalese schools. When experiencing bullying, girls were more prone to showing internalizing
problems than boys, whereas boys may have used violence to get away from bullying. This might have negative effects on Nepalese adolescents in developing internalizing and externalizing problems.

Social expectations and restrictions among boys and girls, such as the expectation that they would get high scores at school, restricted their freedom and reduced their leisure time, which might have put them under pressure and resulted in internalizing and externalizing problems. One qualitative study in Nepal showed that behavioral problems at schools were mostly related to dropping out of school, irregular school attendance, lack of interest in schoolwork and education, not completing homework, skipping classes, always failing exams, roaming around during school hours, being more interested in playing than studying and always watching television instead of studying (Adhikari et al. 2015). Other antisocial behavior included: wandering around the neighborhood aimlessly, stealing, speaking rudely, threatening others, not listening to others, and becoming aggressive for no reason (Adhikari et al. 2015). Frequently mentioned causes of child behavioral problems were an unfavorable family environment, such as domestic violence, alcohol abuse, discrimination between sons and daughters and lack of attention or too much attention from parents (Adhikari et al. 2015). Our data showed that more Nepalese girls than boys tended to agree that items such as “cry a lot”, “too fearful or anxious”, “too guilty” and “worry a lot” applied to them. Similarly, delinquent behavior was higher in boys than girls, including the items “swear or use dirty language”, “think about sex too much”, “smoke, chew or sniff tobacco” and “cut classes or skip school”. However, further study is needed to understand the clear relationship between different cultural norms and socio-environmental contexts.

Our results showed that internalizing and externalizing problems were more likely to be found in adolescents from urban areas than rural areas. The most likely problems were becoming anxious/depressed and withdrawn and displaying, delinquent behavior, aggressive behavior and attention problems. Earlier research found that one-third of the children in urban settings were directly victimized and almost all of the children had witnessed community violence, resulting in post-traumatic stress and in them developing internalizing and externalizing problems (Löfving-Gupta et al. 2015). However, as this study did not include measures to investigate rural and urban settings, no concrete conclusions could be drawn.

In our study, age was found to be a major influencing factor for emotional and behavioral problems. Older age predicted the risk of most of the problems, including total problems, internalizing problems (including withdrawn/depression), externalizing problems (including both delinquent and aggressive behavior) and attention problems. A similar finding was observed in a multicultural comparison study that showed that most of the countries recorded higher scores for internalizing problems at older age, such as withdrawn, externalizing problems including delinquent behavior and attention problems (Roussos et al. 2001, Verhulst et al. 2003). One possible explanation might be the reduction in quality of life from late childhood to early adolescence (Sharpe et al. 2015).

Mean differences were reported for most problem scales in the high-income countries, such as in the USA, Spain, Norway, Greece and Finland, and showed that Nepalese girls and boys, measured by the t-test, had higher scores on somatic complaints, social problems and thought problems. In addition, girls and boys had higher mean scores on most of the problem scales compared to the USA and Finland. However, Nepalese girls had slightly
lower mean scores on aggressive behavior than girls from the USA. Moreover, when they were compared to Spain, Norway and Greece, we observed that Nepalese girls and boys had lower mean scores on externalizing problems - with similar mean scores to the Spanish boys - aggressive behavior and attention problems (Kapi et al. 2007).

To further examine the situation in low-income countries, we compared the mean scores on different syndrome scales from another low-income country, Bangladesh, with the data on Nepalese adolescents. Our results revealed that Nepalese girls in urban areas had lower mean syndrome scores, except for delinquent behavior, than the girls living in non-slum areas in Bangladesh. However, when it came to thought problems and social complaints, Nepalese boys and girls living both in urban and rural areas had higher mean scores than the Bangladeshi boys and girls living in both non-slum or slum areas (Izutsu et al. 2006). Due to the variation in age from different countries and the lack of variables to measure cultural aspects, we could not draw any firm conclusions about cultural differences between Nepal and these countries. However, one possible explanation might be that the level of understanding of the problems and reporting the items may have varied between countries (Kapi et al. 2007). Moreover, when we compared the Nepalese data with that on adolescents in India, a country which shares most of its cultural values with Nepal, we found that Nepalese adolescents scored lower in the clinical range of all the syndrome scales (Mathew et al. 2015). This might be due to the different sampling processes in the two countries. In India, adolescents were chosen from the capital city, Delhi, which had bigger challenges and a more competitive lives (Mathew et al. 2015) than those of our sample population, who were selected from the urban and rural areas of Nepal.

6.3 SUBSTANCE USE PROBLEMS AMONG BOYS AND GIRLS

Nepal is facing a growing burden of non-communicable disease due to changes in behavioral patterns (World Bank 2011) and increases in smoking and alcohol use (Aryal et al. 2014, Mishra et al. 2015). Our study showed that 10.5% of adolescents reported using any tobacco products and this was prevalent in boys than girls, which was in line with previous studies from Nepal, which found that it was about twice as high in boys as girls (Binu et al. 2010, Pradhan et al. 2013). According to the Global Youth Tobacco Surveys in 2007 and 2011, smoking among Nepalese boys has doubled (from 13% to 24.6%) in recent years and it has been tripled for girls (5.3% to 16.4%). In comparison with Greenland, Indonesia, Timor-Leste and the WHO South-East Region (WHO 2014c, Dhavan et al. 2010, Oswal 2015), Nepalese adolescents used tobacco less and the prevalence of tobacco use among boys was nearly equal with low-income countries and some countries in Europe and North America (Moor et al. 2015). Indian studies have found that failing school exams or having low academic performance increased the likelihood of tobacco use in students (Mohan et al. 2005, Dhavan et al. 2010). As Nepal has a similar schooling system to India and shares most of its social norms and cultural values, failing a school exam might also increase the risk of tobacco use among Nepalese adolescents. However, further research is needed to come to any conclusions on this issue.

Likewise, in our study, 22.3% of the adolescents consumed alcohol. It was interesting to find that the girls were not binge drinkers, but less than 14% of the boys were. Our study reported a higher prevalence of alcohol use than the levels reported by the WHO (2016f) for
adolescents aged 13 to 15 from low-income and middle-income countries. However, this higher prevalence can be misleading, as our study included a larger age group (12 to 18 year olds) than the WHO report (WHO 2016f). Furthermore, the respondents in our study consumed less alcohol than the adolescents from South-East Asia, such as Thailand and Timor-Leste, but more than those from Bangladesh and the Maldives (WHO 2016f).

In Nepal, tobacco advertising has been banned since 1998. However, due to the ineffective implementation of national policies, adolescents are still subjected to continuous exposure to tobacco advertising and this is also the case for alcoholic products (MoHP 2015). Also, since 2010 Nepal has prohibited the sale of any tobacco or alcohol products to people under 18 years old, but these policies are not effectively practised (MoHP 2015). As alcohol and tobacco are freely available in the market, retailers often ignore these policies and sell them openly to adolescents. Studies have suggested that the quantity of alcohol consumption increased when alcoholic products were easily accessible to underage youths, were sold in close proximity to schools in formal or informal establishments and young people were not asked for identity of their age (Benjet et al. 2014). These kinds of situations are mainly observed in low-income and middle income countries where there are fewer restrictions (Blum & Nelson-Mmari 2004).

In addition, there was also ignorance from parents and relatives, as children were usually asked to fetch tobacco products or alcohol from the market. Furthermore, in some Nepalese communities, alcohol was culturally acceptable and adults consumed alcohol and tobacco in front of their children, which might have influenced the adolescents to consume alcohol and smoke in the future (Aryal et al. 2014). Also, due to major shifts in cultural aspects, such as economic liberalism, western consumer culture and globalization, alcohol use was more common among other ethnic groups in the society (Parajuli et al. 2015).

In this study we observed that adolescents were using substances because of peer usage and to make them feel happy when they were sad. A recent study in Nepal found that perceived peer approval for alcohol use and peer alcohol use were significant for “ever used alcohol” and “ever been drunk” (Parajuli et al. 2015). Similarly, adolescents who perceived more peer approval for alcohol use, as their friends used alcohol, were more likely to “ever use alcohol” (Parajuli et al. 2015). It was observed that adolescents used substances, including tobacco, if their friends at school and home also used substances and this was in line with other studies that have identified peer influence as the main predictor for adolescents’ substance use (Chilcoat et al. 1995, Hawkins et al. 1997, Alexander et al. 2001, Dishion & Owen 2002, Branstetter, Low & Furman 2011, Lopes et al. 2013, Aslam et al. 2014). During adolescence, peer relationships are important for social development, the selection of peers might have abstract reasons, and certain deviant characteristics might be transferred to adolescents, making them prone to problem behavior (Dishion & Owen 2002). However, as this study did not include other variables that explored the influence of peers in detail, we cannot speculate about the conclusion (Ahmad, Khalique & Khan 2009).

In addition, the proportion of alcohol use increased in later adolescence (Hawkins et al. 1997, Brown et al. 2008, MoHP 2012, Benjet et al. 2014, Pradhan et al. 2013). Similar to the explanation provided by Benjet et al. (2014), Nepalese adolescents finished their School Leaving Certificate at the age of 15 and above (10th grade), which was also considered the gateway to higher education and for pursuing a career. At this age they joined higher secondary school (+2 grades) which provided them with more freedom and decreased supervision from their parents (Chassin et al. 1986, Steinberg, Fletcher & Darling 1994, Al-
Sahab et al. 2012), exposing them to peers with substance use and risky behavior (Curran, Stice & Chassin 1997, Chassin, Flora & King 2004, Benjet et al. 2014, Burdzovic Andreas & Jackson 2015). Alcohol use increased when the adolescents entered high school and on the early behavioral profiles of the children (Burdzovic Andreas & Jackson 2015). At this time in their life adolescents might have felt peer pressure to adapt to their new environment and this encouraged them to drink (Flay et al. 1994, Burdzovic Andreas & Jackson 2015).

Our findings suggested that tobacco use was significantly associated with being male (Windle 1990, Hawkins et al. 1997, Binu et al. 2010, Subba et al. 2011), 16 to 18 years of age (Brown et al. 2008, MoHP 2012, Pradhan et al. 2013) and having a father or grandparent who used substances (Mohan et al. 2005). In most of the cases in Nepal, father or parents who smoked asked their children to buy them tobacco from a grocery market, a situation which might encourage smoking initiation among children or adolescents (Mohan et al. 2005). Our study suggested that older adolescents were six times more likely to use tobacco than younger adolescents aged 12 to 15 years and three times as likely to use tobacco or other substances if their father was a substance user. In another study in Nepal, family members who smoked strongly predicted smoking susceptibility among adolescents, but parental alcohol use was not associated with drinking problems among adolescents (Parajuli et al. 2015).

Our study found that substance use by the father and grandparents was associated with substance use among the adolescents. Furthermore, Parajuli et al. (2015) found that parental approval was the associated factor for the use of alcohol among adolescents, but our study did not look at parental approval. Similarly, many studies have found that parental smoking or alcohol use was associated with the risk of tobacco and alcohol use among their offspring (Poelen et al. 2009, Selya et al. 2012, Vermeulen-Smit et al. 2012, Benjet et al. 2014). As parents’ substance use habits might be perceived as less harmful, they may initiate use among young adolescents (Hawkins et al. 1997). Therefore, it was important that family members such as fathers and grandfathers acted as role models in developing or delivering the message that smoking or alcohol was not acceptable, either at home or in public.

Earlier research in Nepal showed that ethnic minority groups, for instance Janajatis and Dalits (Timsinha et al. 2011) or groups with traditional alcohol use (Parajuli et al. 2015) were more likely to use alcohol than other groups. However, in our study, no such differences were found between traditional alcohol users (Janajati) and traditional non-alcohol users (Brahmani/Chhetri) or between different religions. Our study observed an association between adolescents living in urban areas and substance use, in line with previous research, (Pradhan et al. 2013, Timsihna et al. 2011). Socioeconomic conditions were better in urban than rural areas and adolescents might have had more pocket money to buy tobacco or other intoxicating substances (Pradhan et al. 2013, Liu et al. 2013, Benjet et al. 2014, Lee et al. 2015). However, further studies are required to find more casual relationships and the relationship between substance use problems in adolescents and their age, gender, parental substance use habits, residential area and socioeconomic status.

### 6.4 EMOTIONAL OR BEHAVIORAL PROBLEMS AND SUBSTANCE USE

Our findings supported the evidence that emotional/behavioral problems were associated with the use of substances and this was consistent with previous findings (Windle 1990,
Chassin et al. 1999, King, Iacono & McGue 2004, Boden & Fergusson 2011, Diaz et al. 2011, Englund and Siebenbruner 2012, McCarty et al. 2012, Colder et al. 2013, Doria et al. 2015, Virtanen et al. 2015). Despite the cultural differences, higher levels of externalizing problems, such as delinquent behavior, attention problems, thought problems and withdrawn/depressed predicted the use of tobacco. Similar findings were observed in longitudinal studies on Dutch and Australian populations, where delinquent behavior, attention problems, aggressive behavior (Ferdinand, Blum & Verhulst 2001, Hayatbakhsh et al. 2008) and thought problems predicted the later tobacco use (Ferdinand, Blum & Verhulst 2001).

Similar to our study, many studies have found that predictors for substance use, included externalizing problems such as delinquency (Hayatbakhsh et al. 2008, Miettunen et al. 2014), aggression (Miettunen et al. 2014) and internalizing problems such as depressive symptoms (Schwinn, Schinke & Trent 2010). Earlier studies noted that antisocial behavior in early adolescence led to higher levels of substance use problems in late adolescence (Wills 1986, Windle 1990). However, the interpretation of this finding cannot be proven without strong evidence. Our study also found that adolescents with internalizing problems (including withdrawn/depressed), externalizing problems (including delinquent and aggressive behavior), thought problems, and attention problems (Hayatbakhsh et al. 2008) were more likely to use substances. Evidence has shown that parental support, such as warmth, nurturance, acceptance and guidance, is associated with lower levels of externalizing and internalizing problems in children (Stice & Barrera 1995, Greenberger et al. 2000). However, stricter parents or lower parental involvement have been found to have an inverse relationship with problems, such as externalizing (Garber & Little 2001, Reitz, Dekovic & Meijer 2006) and internalizing (Barber et al. 1994, Reitz, Dekovic & Meijer 2006) in young children. This means that parenting factor may be predictors for both substance use and internalizing or externalizing problems. Therefore, further research that investigates the relationship between these variables might help us to understand this phenomenon.

Our study did show the association between anxious/depressed adolescents and the use of substances, but the associated risk was low. However, our study did support the previous findings that being anxious/depressed was a risk factor for substance use initiation (Virtanen et al. 2015, Richmond et al. 2015, Edwards et al. 2014). On the broad band scale of internalizing problems, a significant association was found with the use of tobacco, but not for any intoxicant use. This result was in line with the Finnish study where boys with early internalizing problems had no risk for substance use (Miettunen et al. 2014). We also found that the high-risk users were likely to have social problems, thought problems, attention problems, internalizing problems and externalizing problems. No casual relationships with associated factors were considered in this study, in addition to the significant associations between substance use and emotional and behavioral problems. Therefore, further research is needed to establish the casual relationships of substance use on emotional and behavioral problems.
6.5 VALIDITY AND RELIABILITY OF THE STUDY

The validity and reliability of the study can be assessed by the study design, data collection and results. The review protocol for the systematic review was identified, namely the research question, search strategy, the definitions of the exclusion and inclusion criteria and the process undertaken by the research group to evaluate the quality of the articles. This ensured the reliability of the review (Bearman et al. 2012). Furthermore, the selected articles were analysed and combined by using the manifest or latent content analysis method (Graneheim & Lundmand 2004). The contents of the selected articles were read repeatedly and the themes were formed based on the categories of the content. These contents, categories and themes were discussed within the research group in order to develop a common understanding of the study. However, this review had some important validity issues. Firstly, the systematic review was limited to just four databases. Secondly, the search strategy for the review did not include other keywords, such as tobacco, alcohol, illicit drugs, underage drinking, teenage drinking, alcohol use, alcohol misuse, young people, teenagers, prevention and treatment. This created bias in selecting the studies. Thirdly, we only selected papers that had been published over the three-year period from 2007–2010, which could have limited obtaining relevant studies published before 2007. Fourthly, only articles that were in English language and were available in the University of Eastern Finland’s library were obtained. This could have further hindered retrieving the important information related to our aims. Fifthly, the screening process was conducted alone by the reviewer, which can maximize the risk of bias in selecting articles. Sixthly, the quality of the selected articles was discussed with the research group, but was not reported in the original article. Finally, our review included various observational studies with different study designs and the selected studies did not share the same characteristics, which made it impossible to draw conclusions from meta-analysis on the exact effectiveness of the interventions (Stroup et al. 2008).

The empirical study used a cross-sectional design and, therefore, it was not possible to demonstrate any cause and effect relationships between the different variables (Kraemer et al. 2000) and variables that defined cultural norms were not included. However, validated measurement tools, such as YSR (Achenbach & Rescorla 2001) and ADsume (Pirskanen 2007), were used in a multicultural context and the data were collected by using the self-report method, which is a common way of collecting data in behavioral science and has been shown to be both valid and reliable (Rotthon et al. 2011). However, the risk of over or under reporting might have increased and the objective might have been compromised. The response rate in this study was high, with 81% of the eligible adolescents participating. Furthermore, the study provided important information on substance use and psychosocial problems among adolescents in Nepal, an area that had been neglected by previous research studies.

The measurements were provided in both Nepali and English languages in order to ensure the validity and reliability of the information that was gathered. The YSR tool has been used in many countries and has been shown to be both valid and reliable for measuring the emotional and behavioral problems of adolescents (Achenbach & Rescorla 2001, Rescorla et al. 2012). However, the reliability and validity of the YSR has not been previously documented in the Nepalese society, thus, it was necessary to calculate the internal consistency of the YSR to gauge its reliability. Our results showed that the YSR
scales demonstrated adequate reliability to be used in the Nepalese culture. Four of the eight syndrome scales - anxious/depressed, somatic complaints, rule-breaking behavior and aggressive behavior - had an internal consistency of more than 0.7 (acceptable if Cronbach’s alpha is $0.8 > \alpha \geq 0.7$) (Streiner & Norman 1995) on the scale items when we tested them using the data from Nepal. Similarly, for the broad band scales of internalizing, externalizing and total problems, the internal consistency was more than 0.8, indicating that the measurement was good ($0.9 > \alpha \geq 0.8$). Although the reliability of most of the YSR scales were adequate, the questions on “health problems without known medical causes” were missed by many participants and these items were based on the somatic complaints scale.

Another questionnaire used for data collection was ADSUME and Pirskanen has reported on its validity and reliability (2007). However, due to cultural differences, the reliability of the questionnaire was analysed using Cronbach’s alpha. In the Nepalese context, the alpha value for the amount of substances used was 0.57 and the value for the substance-related consequences was 0.59. This indicated that internal consistency in Nepalese context was poor ($0.6 > \alpha \geq 0.5$) (Streiner & Norman 1995). The results of the empirical data were analysed using SPSS 19 for Windows. The statistician was consulted to identify the suitable data analysis methods so that we could ensure the reliability of the data. As a result, various methods, such as univariate analysis of covariance, logistic regression, chi-square tests and descriptive statistics, were used to finalize the findings.

However, this empirical study had some limitations. Firstly, it was only concerned with investigating one small region of Nepal, with three schools being selected from urban and rural areas with a purposive sampling method. As a result, our findings should not be generalized (Kraemer et al. 2000). Secondly, the purposive sampling method was used because some of the schools selected after randomization did not respond to phone calls, some schools refused to participate as they had a sports week going on at the time of the study, some schools thought it might disturb the students’ studies and some schools suggested that we left the questionnaire with them and collected them later. The randomization sampling method could have been beneficial in representing such a larger population. Thirdly, in two schools - one urban and one rural - we used the randomized method, lottery system, to select the participants as the number of potential participants was large. Fourthly, as sub-study two had missing answers for some of the items, we had to exclude those participants when we analysed the data, because the sum scores in the missing data could have misled the interpretation of the data. Therefore, responses for each problem scale varied. The possible reason that some participants were not willing to report their symptoms might have been due to either stigmatization or because they had problems understanding the item. On the other hand, rural adolescents tended to miss more items than urban adolescents and this might have been due to their different levels of understanding and knowledge. In addition, as more than half of the students were aged 12-15 years, this might have shown less substance use than if we had included more older students aged 16-18 years. Finally, in the teachers’ questionnaire, we did not use a validated questionnaire as the questionnaire was developed to find out about their attitudes or knowledge about adolescents’ substance use without investigating validity and reliability. Furthermore, the questionnaire was only provided to the 19 class teachers who were teaching 6th to 12th graders. Because of the low participation number in urban areas ($n=5$), we could not compare the results between the urban and the rural areas and only descriptive data were provided without further statistical analysis.
7 Conclusions

This study provides new information on adolescents’ substance use and emotional/behavioral problems in Nepal, which is a developing country. As it used two validated measurements (YSR and ADSUME) for the same study, this methodological design can be useful in the Nepalese context and can be useful for comparisons with developed countries. In addition, as it examined existing psychosocial problems in Nepalese adolescents, attention should be paid to these issues by researchers, health professionals and governmental bodies with an interest in Nepal or responsibility for the well-being of its citizens. Policies regarding alcohol are weak in Nepal and laws that prohibit the sale of tobacco and alcohol products to adolescents are not strictly monitored. Nepalese alcohol and tobacco policies should be reviewed and monitored at a national level and enforced more strictly.

7.1 CONCLUSIONS DERIVED FROM THE MAIN RESULTS

1. The systematic literature review showed that involving parents, teachers and individuals had favorable outcomes with regard to preventing substance use among adolescents. Interventions, such as school-based and community-based programs, would be beneficial for low-income and middle-income countries because of their scarce resources.
2. No one factor has been able to explain the psychosocial problems related to substance use, but considering cultural and social factors could help to identify health problems.
3. The perspective of teachers and parents is an important element of understanding the multidimensional factors that influence adolescents’ psychosocial health and these aspects should be considered by health professionals and researchers.
4. Substance use is not a separate issue with regard to understanding adolescent health. Therefore, it is important to know how adolescents’ value their health and how aware they are of the consequences of substance use.

7.2 SUGGESTIONS FOR FUTURE RESEARCH

To understand the nature of the factors that influence substance use in Nepalese adolescents, further research is recommended:
1. Future studies should include cultural and social factors and the home and school environment in order to gain an in-depth understanding of the factors that influence adolescent substance use.
2. Longitudinal or follow-up studies, including quantitative and qualitative studies, will help to understand the possible factors and could establish further orders of phenomena of associated factors while understanding the pattern of substance use in adolescents.
3. Larger studies that include all ethnic groups, geographical regions and socioeconomic factors are recommended in order to generalize results and to inform the implementation of policies or interventions for Nepalese adolescents who use substances.

4. There is a need for the further development and evaluation of interventions that are culturally tailored and include multidimensional factors, in order to prevent or reduce substance use in adolescents.

5. Future research that focuses on protective factors for substance use among Nepalese adolescents would be appropriate.

6. Using validated measurements for future studies would make it easier to draw comparisons between future international studies.
References


Garner BR, Godley SH, Funk RR, Dennis ML, Smith JE & Godley MD. 2009. Exposure to adolescent community reinforcement approach treatment procedures as a mediator of the


Kraemer HC, Yesavage JA, Taylor JL & Kupfer D. 2000. How can we learn about developmental processes from cross-sectional studies, or can we? The American Journal of Psychiatry 157, 163-171.


Li HK, Kelly AB, Chan GC, Toumbourou JW, Patton GC & Williams JW. 2014. The association of puberty and young adolescent alcohol use: do parents have a moderating role? Addictive Behaviors 39, 1389-1393.


Raphael D. 2013. Adolescence as a gateway to adult health outcomes. Maturitas 75, 137-141.


Sonenstein FL. 2014. Introducing the well-being of adolescents in vulnerable environments study: methods and findings. Journal of Adolescent Health 55, S1-S3.


Telzer EH, Tsai KM, Gonzales N & Fuligni AJ. 2015. Mexican American adolescents’ family obligation values and behaviors: Links to internalizing symptoms across time and context. Developmental Psychology 51, 75-86.


References


This study provides knowledge on adolescents’ substance use and emotional and behavioral problems in Nepal. The results revealed that attention should be paid to these issues by researchers and health professionals. Substance use is not a separate issue with regard to understanding adolescent health. Therefore, in the future, it is important to know how adolescents’ value their health and how aware they are of the consequences of substance use. Interventions, such as school-based and community-based programs, would be beneficial for low-income countries because of their scarce resources.