MINISTRY OF HEALTH

UNIVERSITY OF HEALTH SCIENCES, FACULTY OF PUBLIC HEALTH

And

MINISTRY OF EDUCATION AND TRAINING - MINISTRY OF HEALTH

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Khonesavanh Inthavong

THESIS TITLE

Knowledge of safe sex and STIs among students at Vientiane High School, Vientiane Capital, 2019

MASTER OF PUBLIC HEALTH

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Mrs. Khonesavanh Inthavong

ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CSE	Comprehensive Sexual Education
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
LSB	Lao Statistics Bureau
RMNCAH	Reproductive, Maternal, Newborn, Child and Adolescent Health
STIs	Sexually Transmitted Infections
STD	Sexually Transmitted Disease
SDGs	Sustainable Development Goals
SE	Sexual Education
SRH	Sexual Reproductive Health
WHO	World Health Organization

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Executive summary

Knowledge of safe sex and sexually transmitted infections (STIs) is of vital importance for adolescents because it serves as a protective factor helping to prevent unsafe sex, STIs and teenage pregnancies. Adolescents are at a high risk of a number of negative health consequences associated with early and unsafe sexual activities, including STIs, unintended pregnancies and teenage pregnancies. Thus, knowledge of safe sex and STIs is necessary for adolescents to reduce their risky sexual behaviors and their negative consequences. The aim of this study is to describe the knowledge of safe sex and STIs among high school students at Vientiane High School, Vientiane Capital, and Lao PDR and to identify related factors associated with acquiring knowledge of safe sex and STIs among high school students.

The design of this study was analytical cross-sectional. This study was conducted in Vientiane High School from January to February 2019. Questionnaires were completed by 337 respondents selected by stratified random sampling. A standardized self-administered questionnaire was used to collect information from respondents. The data collected was entered and analyzed by the EpiData and Stata 13.0 programmes. Descriptive and inferential statistics were applied to determine the factors associated with knowledge of safe sex and STIs.

The main results: Among 337 respondents, the results showed nearly half of the participants (49.5%) had a good knowledge of safe sex and 51.9% of respondents had a good knowledge of STIs. The results also found some factors related significantly to knowledge of safe sex including students who lived with other people (AOR=2.5, 95%CI=1.1-5.3), students who had studied about family planning (AOR=1.7, 95%CI=1-2.9) and students whose religious beliefs were acceptable to the use of birth control. These factors were the main determinants that increased the knowledge of safe sex (AOR=1.7, 95%CI=1-2.9,). In addition, the factors positively associated with knowledge of STIs consisted of students who studied in a higher grade, namely 12th year (AOR=0.3, 95%CI=0.1-0.6,), students who had studied about family planning (AOR=1.8, 95%CI=1.0-3.1,) and students

who had studied about STIs including HIV/AIDS (AOR=5.1, 95%CI=1.9-13.5). They were associated significantly with a more comprehensive knowledge of safe sex and STIs (P-value<0.05).

In this study, most of the participants were aware of safe sex and STIs. However, the knowledge of adolescents was inadequate. Barely half of the adolescents had a good knowledge of safe sex while half of the students had a good knowledge on STIs. The associated factors identified with knowledge of safe sex and STIs were studying family planning and STIs topics in class, and practicing a religion that was acceptable to the use of birth control. These clearly helped to improve the knowledge of safe sex and STIs.

There is essential requirement to have a comprehensive sexual education, particularly by adding more subjects content for safe sex and STIs to each grade in schools. More content knowledge about family planning and STIs/AIDs needs to be added to support the awareness of adolescents in order to protect them. Besides this, religions should be more progressive and approve the use of birth control when necessary.

Keywords: Adolescent, knowledge, family planning, **s**exual education and sexually transmitted infections.

INTRODUCTION

Knowledge of safe sex and sexually transmitted infections (STIs) is of vital importance for adolescents (WHO, 2000) who need to be enamored with a protective awareness of the ways to prevent unsafe sex, STIs and teenage pregnancies (Hendrana, Mutyara, & Rowawi, 2015). During the adolescent period, teenagers are at a high risk from a number of negative health consequences associated with early and unsafe sexual activities, including STIs and unintended pregnancies (Kotchick, Shaffer, Miller, & Forehand, 2001).

Several studies have investigated that many adolescents are involved in sexual activities that elevated their risk to having reproductive morbidity, including unwanted pregnancies, abortions, STIs and HIV/AIDS because of a lack of basic knowledge about reproductive biology and prevention methods (Titiloye & Ajuwon, 2017). Regarding the knowledge of STIs, 93% of adolescents did not know any symptoms of STIs, 50% could not identify any cause of STIs and 76% did not know that STIs could be prevented (Lan, Lundborg, Mogren, Phuc, & Chuc, 2009). Adolescents also did not know how to avoid a pregnancy or were unable to get contraceptives, including emergency contraception (WHO, 2018b).

Globally, each year an estimated 333 million new cases of curable STIs occur worldwide with the highest rates among 20-24 year olds, followed by 15-19 year olds (WHO, 2018d). Besides that, more than one million STIs are acquired every day. Each year, it is estimated there are 357 million new infections involving STIs (WHO, 2016). Moreover, an estimated 23 million girls aged 15 to 19 years have unintended pregnancies in developing regions (WHO, 2018a).

About 10.9% of Lao adolescents give birth by the age of 15-18 and 4.7% of adolescents have a live birth before age 15 (MOH & Lao Statistics Bureau, 2018). Adolescents often do not adopt safe sexual behaviors which results in unwanted pregnancies and unsafe abortions, as well as a high prevalence of STIs, which increases the risk of HIV infection (UNFPA, 2015). A study in Vientiane reported that 33.4% of adolescents aged 15-19 years have had pre-marital sexual intercourse

and 62.7% of adolescents had their first sexual experience before the age of 15. In the last six months prior to the survey, 48.5 % of adolescents did not use condoms during sexual intercourse (Sychareun et al., 2013). In addition, 2.9 % of male and 0.5% of female adolescents had multiple sexual partners (MOH & Lao Statistics Bureau, 2018). Previous research from the period 2010- 2012 has shown that the incidence of HIV among 15 to 24 year olds had equated to 16.7% (2010), 18.8% (2011) and 15.9% (2012) of all new cases in each respective year (Progress, 2014). It was reported that 23.2% of 15–24 year olds had an abortion (WHO, 2008).

Based on the Sustainable Development Goals (SDGs), adolescents' sexual reproductive health has become a priority on the global agenda, so its aim is to address low middle-income countries to reach the SDGs (EWEC, 2017). Thus, the global health agenda reiterates the need for a knowledge of safe sex and STIs to reduce adolescents 'risky sexual behaviors and their negative consequences' (Visalli, Picerno, Vita, Spataro, & Bertuccio, 2014).

In recent years, several researchers have concentrated on the knowledge of safe sex and STIs, but they were not focused on factors that affected the levels of knowledge of safe sex and STIs among adolescents (Nguyen, 2017). Therefore, the aim of this research was to study the knowledge of safe sex and STIs and its related factors among high school students in Vientiane High School. Thus, the findings from research on the knowledge of safe sex and STIs in the young generation towards sexual health is important in planning preventive and treatment strategies.

RESEARCH OBJECTIVES

1. To describe the knowledge of safe sex and STIs among high school students at Vientiane High School in Vientiane Capital, Lao PDR, in 2019.

2. To identify related factors about a knowledge of safe sex and STIs among high school students at Vientiane High School in Vientiane Capital, Lao PDR, in 2019.

Chapter 1

LITERATURE REVIEW

1.1 Definition of safe sex and STIs

"**Safe sex"** is "having sexual contact while protecting yourself and your sexual partner against sexually transmissible infections (STIs), HIV, AIDS and unplanned pregnancy. Unsafe sex may put you or your partner at risk of STIs such as chlamydia, gonorrhoea, syphilis, mycoplasma genitalium, HIV or hepatitis B, or may result in an unplanned pregnancy" (Department of Health and Health Sevices**,** 2018).

According to the UNFPA safe sex means sexual and reproductive health is "a state of complete physical, mental and social well-being in all matters relating to the reproductive system. It implies that people are able to have a satisfying and safe sex life" (UNFPA, 2016).

Sexually transmitted infections are infections that spread from one person to another through any type of sexual contact. Some types of sexual contact are: intimate skin-to-skin touching (genitals), oral sex, vaginal sex and anal sex. Anyone can get a sexually transmitted infection. Many people have a sexually transmitted infection and do not know it. Without treatment, sexually transmitted infections can cause serious health problems, even infertility. You can also spread the infection to your sexual partners. The only way to find out if you have a sexually transmitted infection (or not) is to get tested (Leeds, 2018).

Sexually transmitted diseases: any disease transmitted by sexual contact; caused by microorganisms that survive on the skin or mucus membranes of the genital area; or transmitted via semen, vaginal secretions, or blood during intercourse. Because the genital areas provide a moist, warm environment that is especially conducive to the proliferation of bacteria, viruses, and yeasts, a great many diseases can be transmitted this way. These include HIV/AIDS, chlamydia, genital herpes, genital warts, gonorrhoea, syphilis, and some forms of hepatitis.

STDs are also known as a *morbus venereus* or venereal disease (William C. Shiel Jr., 2017).

What's the difference between STDs and STIs? They are really the same thing. So why do some doctors use the word ‘infections’ instead of ‘diseases’? Because the word ‘diseases’ can make people think of having an obvious problem, but many STDs often have no signs or symptoms (Girlshealth, 2015).

The term ‘sexually transmitted diseases ‘refers to diseases that spread through sexual contact. In the modern world, many experts in public health agree to replace STDs with sexually transmitted infections (American Sexual Health Association, 2016).

Sexually transmitted diseases are caused by many different bacteria and viruses and even tiny insects. You can get a STDs by having sexual contact with someone who already has one. Sexually transmitted diseases can be transmitted through sexual intercourse, or by putting one’s mouth, hands, or genitals on the genitals or on the sore of someone who is infected (Girlshealth, 2015).

There are many definitions for the knowledge of safe sex. In this study it is a knowledge of sexual health includes information related to sexuality, reproductive and sexual health care problems and services available, autonomy over choice of partner and decision regarding family planning (Department of Health and Health Sevices, 2018). Other definition include a correct knowledge regarding sexual health is important for all especially young individuals as they are vulnerable to adopt negative behaviors if not guided properly and at the right age. Many factors affect safe sex knowledge, which range from gender, parental guidance, community awareness, school environment, economic concerns, and culture. Improper information about sexual health may lead to various types of health risks and social problems. Health risks may include getting STDs including HIV infection, early pregnancies, unsafe abortions, and maternal morbidity and mortality (Hendrana et al., 2015).

Knowledge of sexually transmitted infections includes being able to identify STIs and describe how they are transmitted, what the symptoms and consequences

of it are and how to protect yourself against them (Department of Health and Health Sevices, 2018).

Socio-demographic variables

Socio-demographic information and health behavior can be measured with multiple-choice questions, with for some questions the possibility to choose 'other' and a box to specify the answer. For example, the respondent may specify age, gender or ethnicity (Vongxay, 2017a).

Knowledge

According of the World Health Organization (2006) knowledge and knowledge of sexual health encompasses the information related to sexuality, reproduction, family planning, specific sexual health services, autonomic partner choice and sexual health problems. Knowledge of sexuality, reproduction and health care problems can be measured with three statements which participants could mark as 'true', 'false' or 'don't know'. The number of correct answers can be the outcome measure (Femke Albers, 2017).

The concept of measurement for knowledge of safe sex

The concept of safe sex constitutes, people's need to access accurate information and safe, effective, affordable and acceptable contraception methods of their choice. They must be informed and empowered to protect themselves from STIs. Also when they decide to have children, women must have access to services that can help them have a fit pregnancy, safe delivery and healthy baby (UNFPA, 2016).

Sexuality is "a fundamental aspect of human life: it has physical, psychological, spiritual, social, economic, political and cultural dimensions. Education about sexual can provide young people with age-appropriate, culturally relevant and scientifically accurate information". Sexual education is a vital part of HIV prevention and it is also critical in achieving universal access targets for reproductive health and HIV prevention, treatment, care and support. This program

can radically reduce the risk of HIV and other STIs, and unintended pregnancies (UNESCO, 2009a).

No infection and prevention of unplanned pregnancy method: Non-infectious because they cannot be spread from one person to another. So there is no virus, bacteria or pathogen (Study.com, 2018a). While people choose the birth control method that suits them best to prevent pregnancy, using condoms (either in by itself or in tandem with another contraceptive method) is the only way to prevent both pregnancy and STIs (SRHweek, 2018).

To develop the questionnaire based on 4 previous studies as detailed below

1. Based on a study by Petrick, the tool consists of 15 questions and mentions the student's actual knowledge of sexual health and safe sex knowledge topics, in particular three questions are asked about knowledge of safe sex. It asked questions about how a woman can get pregnant, types of birth control, and sexually transmitted diseases. Almost all of the questions on the survey were multiple choices. This study was approved by the Institutional Review Board (IRB) at the University of Colorado, Boulder; the Health Outreach for Latin America Foundation; and the Medical General of Chacraseca which is appointed by Nicaragua's Ministry of Health (MINSA) (Petrick, 2016).

2. This was followed by the study by Acharya, the tool questionnaire consisted of 52 questions and the questionnaire determined information about pupils' knowledge and understanding of sexual health and safe sex knowledge topics, in particular four questions asked about a knowledge of safe sex. It asked about what condom use was for and the best way to prevent unsafe sex. The questionnaire items were developed and distributed to sexual health experts for content validity. The remaining questionnaire was examined in a 5 point Likert scale (Acharya, Thomas, & Cann, 2016).

3. Based on a survey by the UNFPA, which assessed Comprehensive Sexual Education (CSE) guidelines in the Lao PDR. The questionnaire tool of the survey

consisted of 60 questions addressing skill, awareness are related to the topic of safe sex, in particular two questions asking about knowledge of safe sex. It asked how to prevent STIs and AIDS, and attitudes among students. Some of the questions in the survey were multiple choices and some questions were answered by marking the alternatives " Yes", "No" or "Don't Know" (UNFPA, 2017b).

4. Based on a study by Chukwu**, t**he questionnaire tool consisted five parts including knowledge of safe sex. The questionnaire had a total of 26 questions and two questions mentioned about knowledge of safe sex, such as how to prevent pregnancies, STIs and AIDS. The questionnaire comprised of about 26 items including both open and close-ended questions. Some parts of the questionnaire consisted of 4-point Likert Scales (Chukwu et al., 2017).

The concept of measurement for knowledge of STIs

Sexually transmitted diseases are diseases caused by more than 30 different bacteria, viruses and parasites, spread through person-to person sexual contact and the most common conditions are gonorrhea, chlamydia, syphilis, trichomoniasis, chancroid, genital herpes, genital warts, the human immunodeficiency virus (HIV) infection and the hepatitis B infection (WHO, 2019b).

Name or type of STIs: STIs are spread predominantly by sexual contact, including vaginal, anal and oral sex. More than 30 different bacteria, viruses and parasites are known to be transmitted through sexual contact. Eight of these pathogens are linked to the greatest incidence of sexually transmitted disease of these eight infections, four are currently curable: syphilis, gonorrhoea, chlamydia and trichomoniasis. The other four are viral infections and are incurable: hepatitis B, herpes simplex virus (HSV or herpes), HIV, and human papillomavirus (HPV)(WHO, 2016).

Cause of STIs: Sexually transmitted diseases are generally acquired by sexual contact. The organisms that cause sexually transmitted diseases may pass from

person to person in blood, semen, or vaginal and other bodily fluids (Mayoclinic, 2017).

Routes of STIs: There must be an exchange of body fluids in order to transmit most STIs such as gonorrhea, chlamydia, syphilis, trichomoniasis, HIV, and hepatitis. Others like genital warts, herpes, scabies, and pubic lice can be transmitted by skin-to-skin contact and still others are not necessarily transmitted through sexual contact (Health, 2016).

Symptoms of STIs: Sexually transmitted infections can have a range of signs and symptoms, including no symptoms. That's why they may go unnoticed until complications occur or a partner is diagnosed (Mayoclinic, 2017).

Types of prevention for STIs: To prevent getting a sexually transmitted infection, always avoid sex with anyone who has genital sores, a rash, discharge, or other symptoms such as itching in the groingarea. Also use latex condoms every time you have sex, and get a vaccination for hepatitis B. There is a series of three shots for hepatitis. Furthermore, get tested for HIV, and consider that not having sex is the only sure way to prevent STDs (WebMD, 2018).

Developing the questionnaire based on previous studies as detailed below

1. **Based on a study by Svensson,** the questionnaire tool consisted of 55 points with 15 questions referring to the students' actual knowledge of sexual health topics. The questions categorized the name or type of STIs; causes of STIs, routes of STIs, symptoms of STIs and questions 1, 6 & 7 were answered by marking the alternatives "Yes", "No" or "Don't Know". Whereas for the remaining questions, the participants were given several correct and incorrect alternatives and asked to mark an "X" for their answers. In questions 1 through to 8 the participants received one point for every correct answer, making it possible to add up every participant's correct answers on knowledge. A questionnaire, which was developed by Dr. Pranee Lundberg based on an earlier study of HIV/AIDS in Pakistan and also the experiences of Ms. Thu Trieu, a Vietnamese midwifery lecturer at the University of

Medicine and Pharmacy in Ho Chi Minh City, was used for this study (Akhtar, Luby, Rahbar, & Azam, 2001; Svensson & Waern, 2013).

2. **Based on studies by Petrick, Svenkerud and the UNFPA,** the questionnaire tool was developed for the prevention of STIs. Almost all of the questions on the survey were multiple choices (Isachsen & Svenkerud, 2011; Petrick, 2016; Svensson & Waern, 2013; UNFPA, 2017b).

Measurement of knowledge about safe sex and STIs

Knowledge is often defined as a belief that is true and justified. This definition has led to its measurement by methods that rely solely on the correctness of answers. A correct or incorrect answer is interpreted to mean simply that a person knows or does not know something (Hunt, 2003). To define the scores gathered in this study the design was based on previous studies listed below:

1. Based on a study by Hendeana**,** knowledge was measured by 15 positive questions and 5 negative questions. Three answer choices (true, false, and do not know) were provided for each question. They were given a point for one correct answer and no point for 'do not know' and incorrect answers. The total score was obtained by summing the points from each question with a maximum total score of 20. The total score of knowledge questions had a normal distribution, so this study used the mean (=9.12) as an indicator to categorize level knowledge, good knowledge (total score>9.12) and poor knowledge (total score<9.12). The knowledge questions were reliable (Cronbach's alpha=0.745) (Hendrana et al., 2015).

2. In a study performed by Megersa, knowledge was measured by one for each right answer given while wrong or uncertain answers were scored with a zero. Total knowledge scores ranged from 0-43. Knowledge scores from 0 to 19.23 were considered as poor knowledge, while knowledge scores more than 19.23 was considered as having good knowledge regarding STIs (Megersa et al., 2017).

3. A study implemented by Sjöqvist showed that knowledge was measured from a questionnaire that had five multiple-choice questions regarding knowledge. The questions had both right and wrong choices with a maximum score of 26 right answers. The students could choose several answers to these multiple-choice questions and the number of right and wrong answers was counted. Out of a maximum of 26 correct answers the mean score among the students was only 9.49 and none of the students answered all of the questions correctly (Sjöqvist & Göthlin, 2011).
4. A study conducted by Amu and Adegun showed that in determining the level of knowledge of each respondent about STIs, a 17-point scale developed by the researchers was used. The questionnaire scored question 9 with four stems on names of STIs known; question 10 with seven stems on knowledge of modes of STIs transmission, and question 11 with six stems on knowledge about symptoms of STIs. Therefore, the total points obtainable by a respondent were 17. Each correct response was scored one mark and a non-response or wrong response was scored a zero mark. Those who scored six points or less (≤6) were considered as having poor knowledge; those who scored 7-12 were considered as having fair knowledge, while those who scored 13-17 were considered as having good knowledge (Amu & Adegun, 2015).

1.2 The consequences of unsafe sex and STIs

Epidemiologic surveillance data showed that adolescents under the age of 20 years have higher rates of unintended pregnancies and STIs and HIV/AIDs (Hamilton, Martin, & Ventura, 2009).

Each year, about 15 million girls are married before the age of 18 years, and 90% of births to girls aged 15 to 19 years occur within marriage (WHO, 2019a). Every day in developing countries, 20,000 girls under the age of 18 give birth. This amounts to 7.3 million births a year, however the number of adolescent pregnancies is much higher (UNFPA, 2017a).

When a girl becomes pregnant, her life changes radically. Her education may end and her job prospects often diminish. She becomes more vulnerable to poverty and exclusion, and her health often suffers. Complications from pregnancy and childbirth are the leading cause of death among adolescent girls (UNFPA, 2017a). Besides this, adolescent pregnancy remains a major contributor to maternal and child mortality, and to intergenerational cycles of ill-health and poverty (WHO, 2019a).

Sexually transmitted infections are a major global cause of acute illness, infertility, long term disability and death, with severe medical and psychological consequences for millions of men, women and infants (Organization, 2001). In general, STIs among adolescents in particular, are of paramount concern to all people who work on improving the health status of populations because worldwide the highest reported rates of STIs, up to 60% of new infections are found among people between 15 and 24 years and half of all people living with HIV globally are in this age group (Dehne, Riedner, Berer, & Organization, 2005).

Sexually transmitted infections represent a considerable public health issue in both women and men. Now STIs is growing both in developed and developing countries due to economic, sociological and demographic factors (De Waure et al., 2015). Sexually transmitted infections can have serious consequences beyond the immediate impact of the infection itself and are spread predominantly by sexual contact, including vaginal, anal and oral sex. Some STIs can also be spread through non-sexual means such as via blood or blood products. Many STIs including chlamydia, gonorrhoea, hepatitis B, HIV, and syphilis can also be transmitted from mother to child during pregnancy and childbirth. Sexually transmitted infections like herpes and syphilis can increase the risk of HIV acquisition three-fold or more. Mother-to-child transmission of STIs can result in stillbirth, neonatal death, low-birth-weight and birth, sepsis, pneumonia, neonatal conjunctivitis, and congenital deformities. The human papilloma virus (HPV) infection can lead to cervical cancer, while gonorrhoea and chlamydia are major causes of pelvic inflammatory disease (PID) and infertility in women (WHO, 2016). Thus, the increasing

incidence and prevalence of STIs/HIV among adolescents presents a serious challenge to their health and well-being (World Health Organization, 2004).

1.3 Sources of knowledge about safe sex and STIs

STIs prevention and the way to avoid unsafe sex are introduced in the school curricula through sexual education and health classes. This is so students learn about human development and sexual health as one component of their overall health course, and to help students use facts and knowledge to make healthy choices and connections to their everyday lives (Global News, 2017). Sex education at school is very important for children and adolescents (Ramiro & Matos, 2008) because sex education programs have been taught to children in schools worldwide and they are being promoted as a means of prevention for unwanted pregnancy, coercive or abusive sexual activity, and STIs, including HIV/AIDS (UNESCO, 2009b). A previous study found that parents considered sexual education the backbone in efforts to prevent and control different diseases and problems like HIV/AIDS, unwanted pregnancies, sexual abuse, abortions, sexual harassment, love related problems, conflict management, and family planning problems (Fentahun, Assefa, Alemseged, & Ambaw, 2012). Sex education is described as education about human sexual anatomy, sexual reproduction, sexual intercourse, reproductive health, emotional relations, reproductive rights and responsibilities, abstinence, birth control, STIs and how to avoid them (Fentahun et al., 2012). It is very significant to educate young people regarding safe sex and contraceptives so that they can safeguard themselves from STIs by practicing safe sex (McManus & Dhar, 2008).

To reduce the sexual reproductive health (SRH) problems in Laos, the Ministry of Education and Sports introduced the life skills curriculum into high schools in 2003 by incorporating modules on HIV and AIDS, STIs and reproductive health into core curricula subjects such as natural science, and biology (Sychareun, 2017; UNICEF, 2011). Comprehensive and age appropriate sex education offers young people the opportunity to explore their emotions, feelings, and personal values.

Also, they can gain knowledge about STIs and learn about their reproductive biology. It is well-established that school-based sex education has the potential to prevent unwanted pregnancies and to promote positive sexual health at the individual level (Acharya et al., 2016).

However, in the Lao PDR, the current education system is weak, particularly in rural areas, where girls are more likely than boys to drop out of school early. Based on the latest Population and Housing Census (2015), 91,662 girls aged 6-16 years have dropped out of school because there is a tendency towards early marriage and having children at a younger age. Moreover, adolescents are put a risk of sexually transmitted infections and HIV/AIDS (UNFPA, 2017b) and Lao adolescents have an inadequate capacity to make informed, responsible judgments and reasonable decisions regarding their sexual health and behavior (Vongxay, 2018).

Even though many adolescents receive a school-based education, adolescents commonly seek more detailed information (Heisler, 2005), but there are many social and cultural factors affecting the sexual knowledge of adolescents such as the role of parents, friends and the school environment (Al Quaiz, Kazi, & Al Muneef, 2013). The source of the respondent's knowledge regarding safe-sex practices is often taken directly from television, the Internet, health care providers, parents, friends, sex partners, classmates, teachers, and other mediums (Wagner III, 2011). More than 80% of adolescents aged 15 to 19 years received formal instruction about sexual health information for birth control and STIs/HIV. In addition, messages were received by children and adolescents multiple times throughout the week from the media, religious organizations, schools, family members, peers, caregivers, and partners, although the quality of the information varied. It has been demonstrated that sexuality education interventions can prevent or reduce the risk of adolescent pregnancy, HIV and STIs for children and adolescents with and without chronic health conditions and disabilities (Breuner, Mattson, Child, & Health, 2016).

1.4 Situation for knowledge about safe sex among adolescents

Knowledge of safe sex is very important for adolescents because it helps them to avoid unwanted pregnancies, STIs infections and HIV/AIDS (Dummies, 2018). Many studies found that unsafe sex ranked second among the top ten risk factors to health in terms of the burden of disease they cause. HIV/AIDS is the main reason as to why unsafe sex ranks so high. Since its discovery in the early 1980s HIV/AIDS has killed over 32 million people worldwide (WHO, 2018c) (UNAIDS, 2019). Every year, almost one million teenage girls become pregnant and many of these pregnancies are unintended and unwanted (Shaw, 2009). Thus knowledge of safe sex is a guide for adolescents to understand how to prevent complications and to know what happens in sex before engaging in it (Dummies, 2018).

Several studies showed that adolescents with low schooling become sexually active at a younger age and that this young population demonstrated an inadequate knowledge of contraceptive methods (Martins et al., 2006). Therefore, adolescents need to have adequate information about family planning to improve their knowledge to prevent unplanned pregnancies and STIs infection, and also they need to adjust their behavior (Queiroz, 2000).

Based on a study in Laos, the most mentioned contributor of teenage pregnancies was a lack of information or no access to sexual education. One respondent illustrated the problem: “When the teenager wants to prevent pregnancy, they do not know how to prevent it”. Even when they want or do not want to get pregnant, they have no knowledge about contraceptives. They do not know how to prevent becoming pregnant and they do not know how to use contraceptives, so it results in teenage pregnancies and the final affect is teenage girls dropping out of school. The main problem behind pregnant teenagers dropping out of school is that pregnancy and marriage during schooling are against the rules. This causes a lack of future opportunities for girls if they have a pregnancy during their teenage years because they drop out of school and cannot easily continue to pursue their future

dream. This point showed that the problem is the lack of sexual and reproductive health literacy (SRHL) (Vongxay, 2017b).

In a study performed in India, it was found that awareness about sexual health remained patchy, and misconceptions and misunderstanding were common amongst the adolescents. For example many young people believed that women cannot just become pregnant during their sexual debut and the symptoms of infection at this time would subside on their own. They were other misunderstandings such as pregnancy can occur through physical contact such as embracing/hugging. This was reflected when only 21% of respondents could correctly answer the question, "Whether first act of sex can cause pregnancy?", while only 6.6% correctly answered "Can sex during menstruation cause pregnancy?" Besides this, when the respondents were asked about the concept of safe sex, it was found that only 17.1 % could explain that safe-sex means prevention of unwanted pregnancies and also STIs, while only 20% were aware about the dual benefits of youths having the correct knowledge and using condoms. Thus only 34% had a theoretical knowledge on either of its uses (Kumar & Tiwari, 2003).

A study in Brazil revealed that a knowledge of contraceptive methods was low in both public and private school students, 25.7% and 40.8% respectively (Martins et al., 2006). Another study found that an inadequate knowledge of contraceptive methods existed among adolescents aged less than 14 years (48.3%) and this grew to 55% at the age of 15 and 92% at the age of 19. However, the use of contraceptive methods has not been directly associated to one's knowledge, suggesting other intervening elements affect this use such as age at first sexual intercourse, time interval for sexual initiation, access to contraceptive methods, steady sexual partner, partner's objection to the use of contraceptive methods, a desire to get pregnant and poor communication between parents and their children concerning sexual issues (Queiroz, 2000).

Another aspect observed in India was a lack of knowledge about the risk of transmission of infections. The findings of this study indicated a lack of good awareness about the modes of HIV transmission and prevention among adolescent

girls. For example, more than one third of students in the study had no accurate understanding about the signs and symptoms of STIs other than HIV/AIDS. Thirty percent of respondents believed that HIV/AIDS could be cured, 49% felt that condoms should not be available to youths, 41% were confused about whether the contraceptive pill could protect against HIV infection and 32% thought it should only be taken by married women. Moreover only 13% of adolescents knew that multiple sex partners increased the risk of HIV infection, thus indicating that there is an immense need to implement gender-based sex education regarding STIs, safe sex options and contraceptives in schools in India (McManus & Dhar, 2008). This discrepancy could be due to the difference in the educational background of the participants, given that 59% of the respondents said that what influenced their choice of safe sex was prevention of pregnancy and avoidance of STIs (Chukwu et al., 2017).

1.5 Situation regarding a knowledge of STIs

An awareness and knowledge of sexually transmitted infections is important in order to prevent transmission and promote early treatment, especially in developing countries. The reason is the management of STIs in developing countries relies on a syndromic approach. This means that in order to be diagnosed with and be treated for a STIs there have to be symptoms of an infection. Many people infected with STIs, especially women, often have no visible symptoms and they fail to seek medical care. Women are also at the highest risk of complications following non-treated infections. It is thus important that women of a reproductive age have a good knowledge of STIs and they must be aware of different infections and their symptoms, since recognition of these is important to prompt care seeking. Besides this, they need to know which infections can be treated and that some if untreated might result in serious complications. They also need to know that there are infections without symptoms and that there are ways they can protect themselves from them. Hopefully, a good knowledge of all this can reduce risky behaviors and subsequently reduce transmission (Isachsen & Svenkerud, 2011).

A study in India on verifying the knowledge and attitudes of adolescent girls showed that students had no true understanding about the signs and symptoms of STIs other than HIV/AIDS. Hence, the majority of respondents (71%) had no knowledge of the effects of genital herpes infections, and two-fifths (43% n = 107) and (28% n = 71) did not know the consequences of acquiring syphilis and were unaware that gonorrhoea was a STIs. In addition, 33% did not consider ulcers in the genital area and pain during urination as signs of infection. Moreover, 22% of the girls did not know a vaginal discharge was an important sign of STIs in women. Almost half of the respondents (49%) felt that condoms should not be available to youths. More than a third (41%) of the girls were confused about when to use the contraceptive pill and if it could protect against HIV infection. Around a third of the respondents (32%) thought the contraceptive pill was not suitable for youths and should only be taken by married women (McManus & Dhar, 2008).

Based on a similar research study in Nigeria, it showed that adolescents had a fair knowledge of sexually transmitted diseases with 66% of the respondents having heard of STDs before. In addition, 91% knew STDs could be contracted from a healthy looking person. The respondents revealed that 51% had had sexual intercourse and 58% also revealed a knowledge of how STDs can be prevented by the use of condoms. Almost half of the teenagers (45%) demonstrated knowledge of the signs and symptoms of STDs. As for the sources from where the respondents had heard or received information about STDs, 57% was from school, 46% from home, 36% from hospitals and 29% from the radio, the Internet or newspapers/magazines. More than half (53%) of the Nigerian adolescents said that they understood STDs very well, but 10% revealed they did not understand STDs (Oluyemi, Yinusa, Abdullateef, Sunday, & Kehinde, 2015).

Another research study in West Java, Indonesia, showed that more than half of the respondents (56.5%) had a poor knowledge about STIs. Positive and negative attitudes towards STIs were relatively even, coming at 53.2% and 46.8% respectively. The most mentioned choices of sources for information about STIs included teachers (66.5%), television/radio (45.3%), friends (37.8%), newspapers/

magazines (21.2%), mothers (16.2%), siblings (7.2), and fathers (6.5%) (Hendrana et al., 2015).

In a study performed in Indonesia which investigated the knowledge and attitudes of senior high school students towards STIs, it was found that there was a poor knowledge of STIs with more than half of the respondents (56%) both males and females aged between 15 and 19 years not knowing about STIs. Meanwhile 60.1% knew that having multiple sexual partners was a risk factor for STIs. Only 39% of the students knew that bacteria were not the sole cause of STIs. The majority of respondents (78.1%) knew that AIDS was caused by HIV. A large percentage (61.9%) also knew about the transmission of STIs from mother to fetus. There was a strong awareness (79.9%) of the transmission of STIs through the sharing of syringe needles (Hendrana et al., 2015).

1.6 Factors associated with knowledge of safe sex and STIs

This part introduces the summary of existing studies about the knowledge of safe sex and STIs. Since the effect of socio-demographic factors on knowledge of safe sex and STIs has been widely discussed, previous studies have been conducted. These research studies provide an insightful understanding of many analytical findings. Thus, this set of information will be adapted to utilize methodologies and analytical frameworks for this study. In particular, some socio-demographic variables are used in this study, especially age, sex, family, school, peer relations, media, and religion. They are described in detail as follows:

1.6.1 Individual level

- **Age**

Age is one factor which has been associated with knowledge of safe sex and STIs. Most of the surveyed populations had their first encounter with information regarding contraception and STIs/STDs when they were around 12-15 years old (Nguyen, 2017).

The WHO defines adolescence as the period of life between 10 and 19 years of age. Based on a study in Turkey, early and middle adolescents are less likely to

have a detailed knowledge compared to others regarding the use of preventive methods when engaging in sexual intimacy and are more likely to deny symptoms of infection (Kaptanoğlu, Süer, Diktaş, & Hinçal, 2013). Another study in Philadelphia found that early adolescents had lower scores than middle and late adolescents. Late adolescents performed better on a total knowledge score than did the middle adolescents about STIs/STDs knowledge (Clark, Jackson, & Allen-Taylor, 2002).

- **Sex**

Sex is another factor shown to affect sources of knowledge. Previous studies have shown that individual males had a lower knowledge than females. In particular**,** a study performed in Vietnam among male and female students found that when compared, female students knew about other diseases and could identify all the correct causes of STDs. They also knew that abdominal pain was a symptom of STDs better than male students (Sjöqvist & Göthlin, 2011). With regard to a knowledge of birth control focusing on contraception use, women show a better understanding and have more knowledge than men (Nguyen, 2017).

Based on a study in Malaysia of university students, when comparing a higher level of knowledge about STIs it was observed that females had a better knowledge than males (53.0% vs 44.3%; prevalence ratio (PR) = 0.836, 95% CI = 0.710–0.984) (Folasayo et al., 2017).

1.6.2 Interpersonal level

1.6.2.1 Family

Parents are considered to be vital in transmitting information about sexual issues and sexually related values to their children. This normally takes place when their children start to undergo body changes, which are indicative that the child has reached puberty. At this point, parents know that their children are now maturing and developing the potential to either become pregnant or make someone else pregnant. It is hoped they instruct their children to avoid early teenage pregnancy and HIV/AIDS (Seloilwe, Dithole, St Lawrence, & Magowe, 2015). Additionally some teens want their parents' guidance so as to get knowledge and information

from their parents rather than other sources such as health centers, classes, hospitals, media or friends (Hacker, Amare, Strunk, & Horst, 2000). In particular, female students are more likely to discuss reproductive health matters relating to how to avoid unsafe sex with their parents. This is because there is normally a parental focus on abstinence and pregnancy avoidance for females (Kumi-Kyereme, Awusabo-Asare, Biddlecom, & Tanle, 2007).

A study in southern Ethiopia investigated secondary school students' communication with their parents. More than half (59.3%) of the respondents reported that they had discussed contraceptive methods, while a larger percentage (67%) had discussed STDs/HIV/AIDS. Half of the respondents (50.4%) had considered discussing about sexual intercourse with their parents. Finally, 55.5% of respondents claimed to have discussed unwanted pregnancies with family members (Fanta, Lemma, Sagaro, & Meskele, 2016). Therefore, when parents communicate about sex, pregnancy, STIs/AIDS, and birth control with their adolescents it is less likely that these adolescents will be engaged in risky sexual behavior and they will more likely delay their first sexual interaction (Guilamo-Ramos et al., 2011; Holman, 2014). By participating in these verbal exchanges parents can be instrumental in preventing their children from engaging in sexual activities that put them at risk of contracting STIs including HIV and AIDS, as well as other complications such as teenage pregnancy (Seloilwe et al., 2015). For example, teens that reportedly had a healthy discussion with parents in the last year about sex, birth control and the dangers of STDs were two times more likely to have a knowledge of using condoms for protect against unsafe sex than teens who did not talk to their parents as often (Weinman, Small, Buzi, & Smith, 2008). A study performed in Nigeria with medical college students showed that 34% had discussed with their parents/guardians about safe sex and were able to refer to ways they could avoid STIs and unwanted pregnancies (Chukwu et al., 2017).

Based on the findings of other studies, it was found that mothers are more likely to be the sex educators regarding the provision of information on topics like STIs/STDs, HIV infection, and birth control/condoms with their children. Mothers

tended to evaluate themselves as better information providers than fathers (Dutra, Miller, & Forehand, 1999; Feldman & A. Rosenthal, 2000). For participants who had discussed with their mothers about unwanted pregnancy, 82.8% of them knew about at least one contraceptive method that was used to prevent unwanted pregnancies such as condoms and abstinence (Ayalew, Mengistie, & Semahegn, 2014).

1.6.2.2 School/Teacher

- Knowledge of teachers about safe sex and STIs

Many adolescents also got their basic sexual knowledge from school-based sex education programs during or before entering middle school. The main goals in many of these school-based sex education programs was to support knowledge and abstinence among adolescents, delay the initiation of first sexual intercourse, to reduce the number of sexual partners, and increase an awareness of condoms or other forms of birth control use to avoid unsafe sex (Manlove, Fish, & Moore, 2015). For example, a study in Laos found that most (96%) students reported sexual education in school was very important because they learnt and received information to support their knowledge of how to speak out against unsafe sex. It was shown that 74% of students had learnt about puberty, 60% about STIs and 52% about contraception and family planning (UNFPA, 2017b). A lot of research has found that curriculum-based sex education including STIs/HIV programs to be moderately associated with decreasing adolescents' risky sexual behaviors, e.g. unprotected sex (Holman, 2014). A study in northern Nigeria shown that 56% of the respondents knew of ways that partners could avoid having a pregnancy, specifically 57% of the males and 55% of the females knew of ways through which pregnancy could be prevented. Further analysis revealed that an awareness of the possibility of pregnancy at first coitus had a significant relationship with the school type (Adeokun, Ricketts, Ajuwon, & Ladipo, 2009).

The teacher is another factor shown to affect the sources of knowledge, with teachers and schools playing an increasing role in disseminating information about knowledge of safe sex and STIs. This is a result of sexuality education which is

being progressively incorporated into school curriculums (Amu & Adegun, 2015). In many countries, teenagers recognize teachers as the most credible and trustworthy source of information about sexuality and also the first choice of person to deliver sexual education for a young person. So it is significant to take into account teachers' views and attitudes in the sexual education program development and then its implementation in schools (Mkumbo, 2012). About 46% of Lao students stated a preference for seeking information about sexual and reproductive health through consultations and learning with teachers in school (UNFPA, 2017b). For adolescents in the United States, 55% of girls and 43% of boys receive sexual health education from teachers in school focusing on birth control. In addition, 59% of girls and 66% of boys receive sexual health education from teachers about STIs/HIV (Donaldson, Lindberg, Ellen, & Marcell, 2013).

1.6.2.3 Peers

Adolescents also learn to communicate about sexual issues through conversations with their friends. Friends become increasingly important sources of information and serve as critical social references for adolescents as they develop (Widman, Choukas-Bradley, Helms, Golin, & Prinstein, 2014). Hence the main source for adolescents receiving knowledge about sexual education such as contraception and STIs/STDs comes from communication with their friends as compared to other sources (media, religion, parents) (Bleakley, Hennessy, Fishbein, & Jordan, 2009; Heisler, 2005; Holman, 2014). A study in western Ethiopia found that half of the students discussed contraceptive methods and 4.1% talked about unwanted pregnancies with their peers. This enabled them to know about at least one contraceptive method that was used to prevent unwanted pregnancies. Furthermore, 47.7% knew about condoms and a smaller percentage (37.1%) was familiar with abstinence (37.1%). The students mainly reported they knew contraceptive methods used to avoid unwanted pregnancies. More than half (54.1%) of them discussed with their peers about HIV/AIDS and this helped students know about common STIs, including HIV/AIDS followed by gonorrhea (Ayalew et al., 2014).

Another study in Nigeria revealed that the majority of the respondents got their information on safe sex through friends as opposed to parents. It was noted that 60% of the respondents had heard about safe sex first through friends whereas only 34% of students had had a discussion with their parents/guardian about safe sex/sex education (Chukwu et al., 2017).

1.6.2.4 Mass media

The mass media plays a key role in shaping a society's way of thinking and disposition to issues. It also affects the disposition and attitude of policymakers to issues including reproductive health issues (Ugboaja, Oguejiofor, Oranu, & Igwegbe, 2018). Mass media is another important dimension in young people's lives that may take on special significance during adolescence, in particular for risky sexual behavior (Lou et al., 2012). This is because some girls are not used to teachers, as a source of information and it was not possible to talk with their parents about sex and STIs. It is important to educate adolescents about safe sex and contraceptives for their health, so that they can safeguard themselves from STIs by practicing safe sex or monogamy (McManus & Dhar, 2008). In one study, mass media played an important role in improving contraceptive use among Nigerian women because they could obtain knowledge from reading newspapers, listening to the radio or by watching television even if it was only once a week. An increase in frequency for media exposure resulted in an improvement in the odds in favor of contraceptive use among the women (Ugboaja et al., 2018). Another study in Nigeria found that the major sources of information for supporting a knowledge of STIs were from the radio and television (68.7%) and newspapers (44.9%) (Amu & Adegun, 2015).

In the absence of effective, comprehensive sex education at home or in schools, television and other media have become the leading sex educators of children and adolescents today. For example, prime-time television programs have helped to promote responsible and healthy sexual behavior by adults and adolescents. This in turn has resulted in a more significant percentage of wanted and well-spaced pregnancies, with improvements in the health and well-being of many children and

their families (Bar-on et al., 2001). In sub-Saharan Africa, the expansion of media has provided a significant opportunity to address HIV/AIDS-related knowledge and preventive behaviors (Jung, Arya, & Viswanath, 2013). A study in India showed that the main sources of information available to respondents about HIV/AIDS, other STIs and safe sex were the mass media (72%), print media (65%), and the Internet (52%) (McManus & Dhar, 2008). It was also discovered from a study in Indonesia that the most common sources of information regarding STIs were from audio-visual media, and the print media too (Hendrana et al., 2015).

- Religion

Religious groups may influence people's knowledge of safe sex and STIs if they control access to contraception information, which can help adolescents, protect them from unsafe sex. For example, a study in Nepal found that 85% of Buddhists and Christians using modern contraception had a significant association with knowledge of safe sex and STIs. Hence, religious values guided and allowed to them know how to protect against unintended pregnancy and STIs at a higher frequency when compared to Hindus (Tamang, Raynes-Greenow, McGeechan, & Black, 2017). Based on a study in Nicaragua, where Catholicism dominates popular culture, almost half of the students reported that their religion approved of birth control to protect against unintended pregnancy, despite church rules which opposed this standpoint (Petrick, 2016).

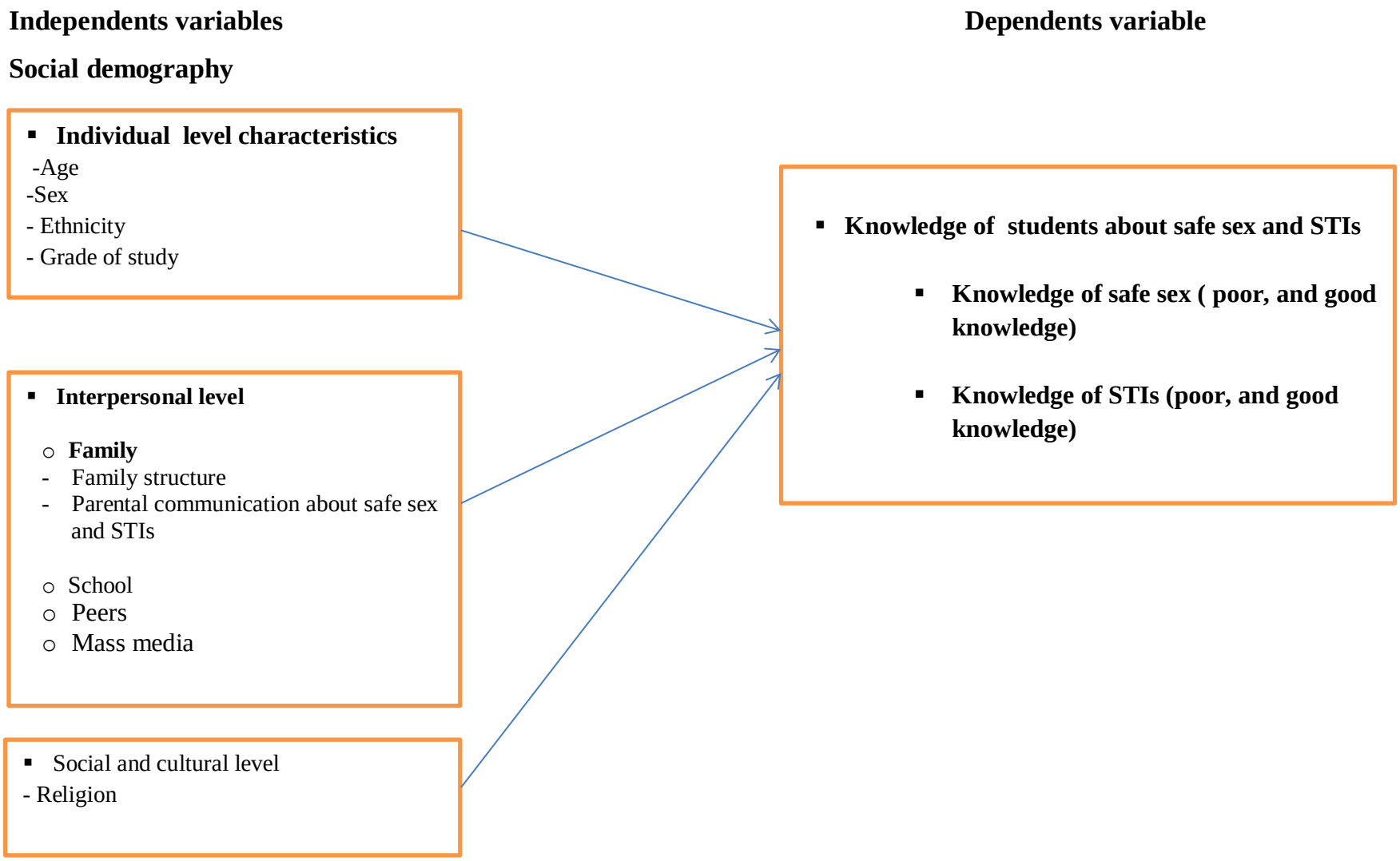
Moreover, many religious organizations in the United States encouraged adolescents to abstain from premarital sex, masturbation, and pornography (Regnerus, 2005). They correlated with more conservative sexual attitudes, such as a later sexual debut, and a lower number of sexual partners (Holman, 2014; Thornton & Camburn, 1989). It was also found that religious adolescents talked explicitly about how their sexual attitudes and behaviors were directly related to their religious beliefs hence the necessity to abstain from sex until marriage (Afifi, Joseph, & Aldeis, 2008; Holman, 2014). The previous study also found that parents commonly used church attendance for studies as ways to passively socialize their child's attitudes or values rather than through direct communication (Holman,

2014). However, many kinds of research have found differences such as more religious mothers are less likely to talk to their children about safe sex than less religious mothers. While another study found that more religious mothers were more likely to speak with their children than less religious mothers. These differences may depend on the items examined. The common topics regularly discussed with their children were contraception or sexual health (Teitelman, Ratcliffe, & Cederbaum, 2008).

1.7 Theoretical conceptual framework:

This study used some parts of the Knowledge-Attitude-Practice (KAP) model theory such as "K" which was based on the review of literature. The conceptual framework of this study included the three groups of factors that generally influence the knowledge of safe sex and STIs among adolescents namely: individual characteristics, interpersonal level characteristics (i.e., family related factors, school related factors, peer factors, and media factors), and social and cultural factors (religion). These factors were used for the period of research to reflect on the students' knowledge of safe sex and STIs (Isachsen & Svenkerud, 2011; Nguyen, 2017; Petrick, 2016; Sjöqvist & Göthlin, 2011; UNFPA, 2017b).

1.8 Conceptual framework of knowledge for safe sex and STIs in Vientiane High School



Chapter 2

SUBJECTS AND METHODS

2.1 Subjects

- **Study population:**

The target populations of this study were high school students in Vientiane High School, Vientiane Capital, Lao P.D.R.

- **Inclusion criteria**

Students who were studying in grades 10 to 12 in Vientiane High School during the 2019 academic year were considered to be eligible participants for this study.

- **Exclusion Criteria**

Students were unwilling and/or unable to provide informed consent and students who were absent from school at the time of data collection.

2.2 Setting and duration

Study site:

Vientiane is the Lao PDR's capital, located in the central belt of the country. It covers nine districts with a population density of 209 people per square kilometer. The population density of Vientiane is eight times higher than that of the whole country on average (Lao Statistics Bureau, 2015). Statistical data shows that Vientiane Capital has a better socio-economic status (SES) than other parts of the country (LSB, 2017). The data also showed Vientiane Capital has the best education and literacy indicators, with only 2.4% of the population reporting never attending school compared to 13.1% at the national level (LSB, 2015). In Vientiane Capital, there are 52 high schools, 40 lower secondary schools and 11 upper secondary schools.

The study was conducted at Vientiane High School, which is located in an urban district called Chanthabuly. The school is the capital's biggest high school and is known as one of the outstanding high schools in Laos. This school has four separate types of

classrooms namely general classroom, talent classroom, bilingual classroom and ICT classroom (online teaching through the Internet). The total number of students for the academic year 2018/2019 was 3,227 students. Of those students, 1861 were females from grade 6 to 12. The numbers of students who were studying in grades 10 to 12 was about 1,507; of those, 896 students were female.

The data collection time for this study was two months, i.e. from January to February, 2019.

2.3 Study design

The design of this study was analytical cross-sectional, using the quantitative research method.

2.4 Sample size

- The sample population of the study was students who were studying in high school from grades 10 to 12 at Vientiane High School. The total number of students from grades 10 to 12 was 1507. The sample size was estimated and calculated by using the following formula:
- Formula for sample size calculation

The sample size was calculated using the formula below:

$$n = \frac{N Z^2_{\frac{\alpha}{2}} p(1-p)}{e^2(N-1) + Z^2_{\frac{\alpha}{2}} p(1-p)}$$

- N: Population size (1507 people)

- $Z_{alpha/2}$ = level of confidence according to the standard normal distribution (for level of confidence of 95%,z= 1.96)

- p: expected proportion in population. In this study, p is the expected proportion of students having a good knowledge on safe sex and STIs. There was no reference proportion from previous studies, so we used p=50% or 0.5 to get the biggest sample size.

- e: tolerated margin of error = 0.05

10% = non response rate

$$n = \frac{1507x3.8416x0.5(1-0.5)}{0.0025(1507-1)+3.8416x0.5(1-0.5)}$$

$$n = \frac{1447,3228}{4,7254} = 306$$

$\Rightarrow n = 306$

To ensure the validity of the findings and to avoid dropout subjects, we increased the attrition rate by 10 %

⟶ Sample size N = 306 + 10 % = 337people.

So, the total sample size was 337 participants

2.5 Sampling method

The study used stratified sampling with the stratum being a grade. So, there were three grades, in accordance with grades 10, 11, and 12 in the high school. The proportion of students for each grade respectively was 21%, 38%, and 41%. The total sample size of this study was proportionally distributed into each grade. As a result, grade 10 needed 71 participants, grade 11 needed 128 participants, and grade 12 needed 138 participants.

Stage 1: Select classes:

On average, each class has about 36 or 38 students, with the sample size of about 1507, for each grade we needed to select nine of the grade 10 classes, 16 of the grade 11 classes, and 16 of the grade 12 classes. From 41 classes in the school, we randomly selected 10 classes for the study.

Stage 2: Select study participants:

Finally, student participants in each classroom were selected by a systematic random sampling technique (Figure2.1). Table 2.1 shows the proportion of students and classrooms, which were selected from each grade level.

Figure 2.1 Flow chart of sampling procedures in Vientiane High School

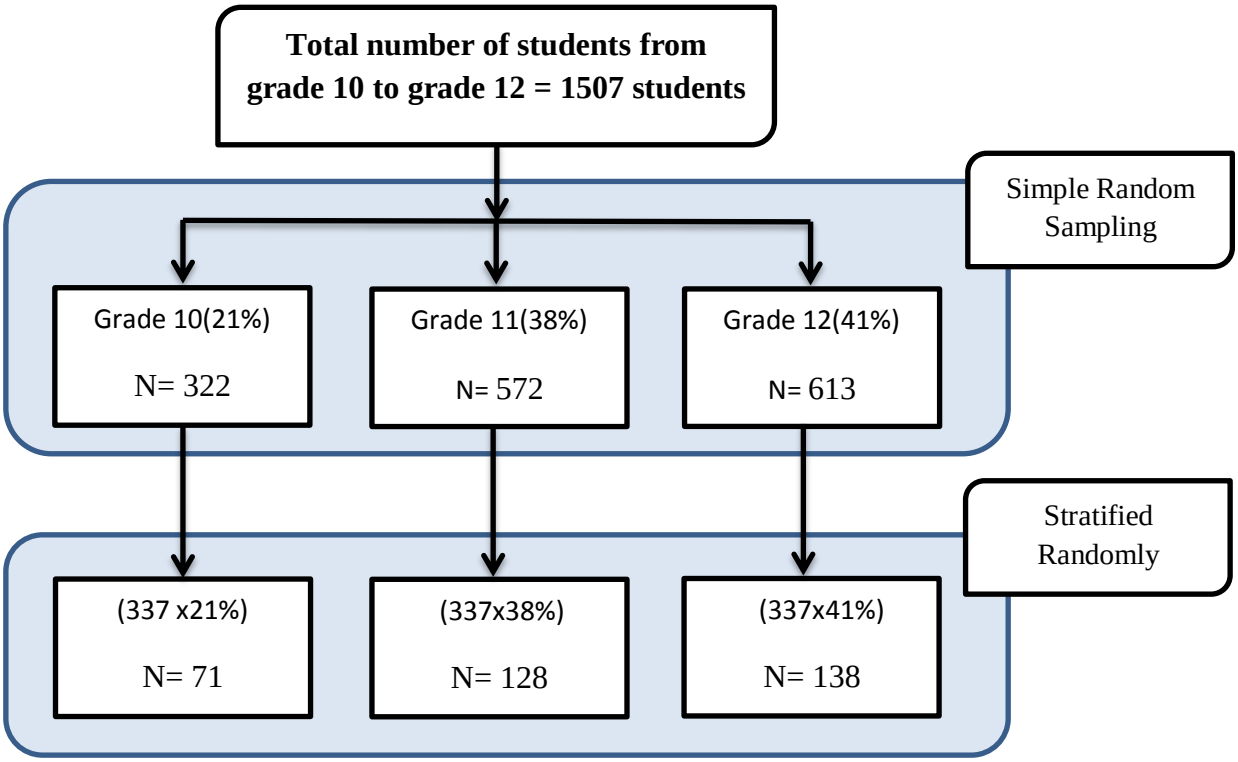


Table 2.1 The proportion of students and classrooms which were selected from each grade level

No.	Grade level	Number of students /class rooms	Students needed	Estimate of students /class room	Number of classrooms to be selected
1	Grade 10	322/9	71	36/1	2
2	Grade 11	572/16	128	36/1	4
3	Grade 12	613/16	138	38/1	4

2.6 Data collection method

This study used a questionnaire for data collection (Self-Administered Questionnaire).

A self-administrated structured questionnaire contained questions on socio-demographic characteristics, a knowledge on safe sex and STIs, and information about related factors such as school, family, peer and religious attributes.

The questionnaire was self-administered since it was important that gathering data instruments were not influenced by the researchers' opinions. The self-administered questionnaire was convenient and not time consuming since both the researchers and the respondents did not have to deal with interview appointments. Besides that, it encouraged freedoms of thought, as the respondents were given enough time and space to think of answers on their own, and at their own pace with no pressure. Furthermore, the questionnaire was associated with a low cost in its distribution. Therefore, the researchers did not have to worry about costly presentations and they were able to distribute the questionnaires to a larger number of participants. The only drawback was the self-administrated questionnaire lacked detail. This was because the responses were fixed, thus there was less scope for respondents to supply answers which reflected their true feelings on certain topics.

The process of data collection

- The questions and variables included in the questionnaire were prepared based on various related studies found in the literature review.
- The questionnaire was prepared in the English language at the beginning and then translated into Lao, after that it was pretested with 30 respondents in a non-study school before data collection.
- During the data collection, the investigators explained to the respondents the research objectives and methods, and obtained their informed consent before filling the self-administered questionnaires. A parental consent form was received in addition to the participant's consent.

- All questionnaires were checked for completeness and consistency during the fieldwork after each interview.

Research instrument to adapt questionnaire

The questionnaires were divided into six parts as follows:

Part 1: Individual level characteristics

This part contained four questions including information about the participant's individual level characteristics relating to 'age, gender, ethnicity, and grade of study'.

Part 2: Family structure

The questionnaire gave information about the participant's interpersonal level, which focused on the 'family structure'. This part contained two questions about living arrangements and family size.

Part 3: Knowledge of safe sex

The questionnaires were validated with a new set of questions for measuring knowledge of safe sex after consulting previous research studies that gauged levels of understanding for safe sex (Acharya et al., 2016; Chukwu et al., 2017; Petrick, 2016; UNFPA, 2017b). This part consisted of 13 items to understand or know about the ways how to prevent infection, especially reducing new HIV infections, AIDS, STIs/STDs, and to know how to prevent unwanted or unintended pregnancies". For the score based indicator of knowledge, each respondent was given a score based on the number of correct responses provided and ranked from 0-13 points.

Part 4: Knowledge of STIs

The questionnaires were validated using a new set of questions for measuring knowledge of STIs after consulting previous research studies that gauged levels of knowledge for STIs (Isachsen & Svenkerud, 2011; Petrick, 2016; Svensson & Waern, 2013; UNFPA, 2017b). This part consisted of 33 items to understand or know about the names or types of STIs, causes of STIs, routes of STIs, symptoms of STIs and types of prevention for STIs, as well as the symptoms and complications of STDs. For the score

based indicator of knowledge, each respondent was given a score based on the number of correct responses provided and ranked from 0-33 points.

Part 5: Interpersonal level:

Part five focused on the interpersonal level such as family communication, school related factors, peer related factors, and mass media related factors.

- **Communication within families**

This part contained eight questions (Holman, 2014; UNFPA, 2017b) about the information communicated concerning knowledge safe sex and STIs. These questions measured answers using categories, which were, classified as "Never", "Rarely", "Sometimes", and "Often" during their lifetime. This part also asked which family members like to talk with one another about safe sex knowledge and STIs.

- **School related factors**

This part contained five questions (Petrick, 2016; UNFPA, 2017b). The questionnaire gave information about students attending school, sexual education topics, time allocated to study and providing adequate sexual education in school.

- **Communication with Peers**

This part contained seven questions (Holman, 2014) about information communicated relating to a knowledge of safe sex and STIs. These questions measured answers using categories, which were, classified as "Never", "Rarely", "Sometimes", and "Often" during their lifetime. This part also asked which friends liked to talk with fellow students about safe sex knowledge and STIs.

- **Mass media related factors**

The questionnaire for the sources of knowledge for safe sex and STIs was divided into two parts and each part contained seven questions using multiple choice answers to categorize answers with yes (marked as 1), or no (marked as 0). These questions touched topics such as where students get information about family planning and where they get information about STIs including HIV/AIDS from mass media. The questions included

the following sources: magazines, films/television, newspapers, radio, and social media (Facebook, Twitter and You-tube) (Petrick, 2016).

Part 6: Social and cultural factors "Religious factors".

This part contained five questions. The questionnaire contained information about the participant's religious factors such as their religious belief, the importance of religion, attendance at religious services and their religion's level of acceptance for sexual intercourse before marriage and the use of birth control (Petrick, 2016).

2.7 Variables

There were three groups of independent variables included in this study: Individual level characteristics (age, sex, ethnicity, grade of study), interpersonal level (family structure, parental communication, school, peers, mass media), and social and cultural level (religion) and two dependents variables where were a knowledge of safe sex and STIs (see Table 1 Annex 2).

2.8 Definitions, measurements and questionnaire concept

The definitions for variables in the study

A knowledge of safe sex meant that "students understood and knew types of methods to prevent the risk of HIV infections, AIDS, and STIs/STDs, and they knew how to prevent unwanted or unintended pregnancies".

Knowledge of STIs meant that students knew and were able to classify types of STIs, causes of STIs, and routes of STIs. In addition, they knew the signs and symptoms of STIs, and the means of prevention for them.

- **Measurement of knowledge about safe sex**

Every correct answer for the 13 questions received a 1 point score (Svensson & Waern, 2013).

- **In determining the level of knowledge for each respondent about safe sex , the response of the questionnaire items 1, 2, 4, 5, 7, 8, 9,10,11,12 and 13 was scored as follows:**

"Yes"	=	1 point
"No"	=	0 points
"Don't Know or Unsure"	=	0 points

The response of the questionnaire items 3 and 6 was scored as follows:

"Yes"	=	0 points
"No"	=	1 point
"Unsure"	=	0 points

The knowledge of safe sex was measured by 11 positive questions and two negative questions. Three answer choices (Yes, No, and Don't Know or Unsure) were provided for each question. They were given one point for correct answers and no points for "Don't Know or Unsure" and incorrect answers. The total score of knowledge questions had a normal distribution, so this study used the mean as an indicator to categorize levels of knowledge, good knowledge ≥ mean and poor knowledge < mean (Hendrana et al., 2015; Megersa et al., 2017; Sjöqvist & Göthlin, 2011).

The personal knowledge scales of the questionnaire were tested for Kuder-Richarson 20 values (KR-20) before data collection in a sample of 30 respondents in a non-study high school. A rule-of-thumb commonly applied in practice is that 0.7 is an acceptable value. The Kuder-Richarson 20 value (KR-20) was 0.7777 for the knowledge of safe sex.

Measurements of knowledge of STIs

The section for a knowledge of STIs had 33 questions and each question received a one point score for every correct answer (Svensson & Waern, 2013).

- **Determining the level of knowledge about STIs**

The response of the questionnaire items 1,3,4,5, 7,8,9,10,11,15,16,17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 and 31 was scored as follows:

"Yes"	=	1 point
"No"	=	0 points

"Don't Know = 0 points

The response of the questionnaire items 2, 6, 14, 12, 13, 18, 19, 32 and 33 of each respondent was scored as follows:

"Yes" = 0 points

"No" = 1 point

"Unsure" = 0 points

The knowledge of STIs was measured by using 24 positive questions and nine negative questions. There were three answer choices (Yes, No, and Don't Know or Unsure) provided for each question. They were given one point for correct answers and no points for "Don't Know or Unsure" and incorrect answers. The total score of knowledge questions had a normal distribution, so this study used the mean as an indicator to categorize levels of knowledge, good knowledge ≥ mean and poor knowledge < mean (Hendrana et al., 2015; Megersa et al., 2017; Sjöqvist & Göthlin, 2011).

- The personal knowledge scales of the questionnaire were tested for Kuder-Richarson 20 values (KR-20) before data collection in a sample of 30 respondents in a non-study high school. A rule-of-thumb commonly applied in practice is that 0.7 is an acceptable value. The Kuder-Richarson 20 value (KR-20) was 0.9309 for the knowledge of STIs.

2.9 Statistical analysis

Data was checked for completeness and consistency before its entry. EpiData was used to enter the data and Stata 13.0 was used to analyses it. Descriptive statistics were applied to analyze the frequency and percentage of the independent and outcome variables. Tests of significance using univariate and multivariate logistic regression were performed to calculate the odds ratio and this was used to assess the presence of association between independent and outcome variables. A 95% confident interval was used for estimating the precision of the odds ratio (a large confidence interval indicates a low level of precision for an odds ratio, whereas a small confident interval indicates a

higher of precision for an odds ratio), and the respective variables with significant associations. A value of $p < 0.05$ was considered statistically significant (Megersa et al., 2017).

2.10 Ethical approval

I obtained ethics approval for the study from the Human Research Ethics Committee of the Hanoi University of Public Health, (Approval Number: 018-464/DD.YTCC dated December 12, 2018; Appendix 8) for the quantitative surveys. The study was approved by the Ethical Review Board of the University of Health Sciences (Approval Number: 103/18, Vientiane Capital, dated December 12, 2018; Appendix 7). The principal of the target school also approved execution of the surveys with the students.

Verbal consent was obtained from the father/mother/guardian of each participant prior to study with the approval of the National Ethics Committee for Health Research due to the sensitive topic and adolescent age of the respondents. The research objectives, procedures and potential risks were informed to each respondent before the interview. Before examining and filling out the questionnaire participants were informed about confidentiality agreements that were used to ensure the privacy of participants. Hence each participant had the right to end their participation in the research project at any time if they felt uncomfortable and those respondents whose was information collected was kept strictly confidential. According to the protection of confidentiality for participants, when conducting the data, the interviewer told the participant not to write their name on the question papers. Each interviewee only wrote a code number to distinguish their participation. Participation in this study was voluntary and informed consent was obtained from the participants.

Chapter 3

RESULTS

Table 2.2 Socio-demographic background of students

Variables	Number (n=337)	Percentage (%)
Age (Years) Mean and SD=16.47 ±1.088, Median=16, Min=14, Max=20		
14-16 years old	172	51.0
17-20 years old	162	48.9
Sex		
Female	224	66.4
Male	113	33.5
Ethnicity		
Lao	283	83.9
Hmong	20	5.9
Khmu	2	0.5
Tai	29	8.6
Other	3	0.8
Grade of study		
Grade 10	71	21.0
Grade 11	128	27.9
Grade 12	138	40.9
Family structure		
Living with		
Parents	259	76.8
Single mother	27	8.0
Single father	8	2.3
Single mother and step father	4	1.1
Single father and step mother	2	0.5
Brother/Sister	4	1.1
Cousin	18	5.3
Housemate in dormitory/rented house	15	4.4
People in family. Mean and SD=4.95 ± 1.55, Median=5, Min=2,Max=13		
2-5	254	75.3
>5	83	24.6

3.1 Socio-demographic characteristics of participants

There were 337 students from Graded 10 to 12 at Vientiane High School enrolled in this study. The participants were aged between 14 and 20 years and the mean age was

16 (SD= 1.09). With regard to gender, two thirds (66.4%) of the participants were female. The vast majority of the participants were ethnic Lao (83.9%), followed by a sizeable minority of ethnic Tai (8.6%). More than three quarters of participants lived with their parents. However, a significant portion (8%) of students lived with their mother only. Three quarters of the participants came from families with no more than five people (Table 3.1).

Table 2.3 Students' knowledge of safe sex

No.	*Variables*	Male (n=113)		Female (n=224)		Total (n=337)	
		N	%	N	%	N	%
1	It is better to have only one sex partner for a sexual relationship	72	63.7	156	69.6	228	67.6
2	A condom should be used correctly and consistently for a safe sex purpose	98	86.7	186	83.0	284	84.2
3	A condom cannot prevent STIs/HIV infection	65	57.5	95	42.4	160	47.4
4	Have had sexual intercourse with only one partner without HIV	48	42.4	103	45.9	151	44.8
5	Prevention of AIDS is no sex with risky persons	76	67.2	161	71.8	237	70.3
6	Sex during menstrual cycle cannot protect from pregnancy	29	25.6	52	23.2	81	24.0
7	Even first time sexual intercourse can cause pregnancy	88	77.8	169	75.4	257	76.2
8	Safe sex (i.e. sex which is free from the risk of unwanted pregnancy and STD/AIDS)	48	42.4	99	44.2	147	43.6
9	Condoms can help prevent pregnancy	95	84.0	137	61.1	232	68.8
10	Birth control pill can help prevent pregnancy	61	53.9	123	54.9	184	54.6
11	Birth control injection can help prevent pregnancy	45	39.8	119	53.1	164	48.6
12	Abstinence can help prevent pregnancy	79	69.9	167	74.5	246	73.0
13	Intrauterine Device (IUD) can help prevent pregnancy	50	44.2	104	46.4	154	45.7

Note: Presented only yes answer

3.2 Knowledge of participants about safe sex

The knowledge about safe sex of participants was shown in Table 3.2. The vast majority of participants knew that correct and consistent condom use resulted in safer sex. More than three quarters of the students knew that a first time sexual intercourse event could cause pregnancy. A slightly smaller percentage (73.0%) knew that abstinence can help prevent pregnancy. Less than a quarter of the participants answered correctly about falling pregnant from sex during the regular menstrual cycle.

Table 2.4 Level of knowledge about safe sex

Level of knowledge (score)	Number (n=337)	Percentage (%)
Poor knowledge (≤ mean)	170	50.4
Good knowledge (>mean)	167	49.5

Mean =7.49 and SD ±2.438, Median=7, Min=0,Max=13

3.3 The knowledge level for safe sex

With regard to the 13 questions for knowledge of safe sex, Table 3.3 generated a mean score of 7.49 SD ± 2.438. Thus knowledge of safe sex was categorized into two groups. Just over half of the participants had a poor knowledge of safe sex.

Table 2.5 Knowledge of students about STIs

No.	Variables	Male (N=113)		Female (N=224)		**Total** (n=337)	
		N	%	N	%	N	%
	Types of STIs						
1	Syphilis	45	39.8	101	45.0	146	43.3
2	Influenza	84	74.3	178	79.4	262	77.7
3	Gonorrhea	78	69.0	164	73.2	242	71.8
4	Chlamydia	51	45.1	103	45.9	154	45.7
5	Human Papillomavirus	36	31.8	62	27.6	98	29.0
6	Meningitis	64	56.2	139	62.0	203	60.2
7	HIV/AIDS	103	91.1	215	95.9	318	94.3
8	Herpes	25	22.1	40	17.8	65	19.2
	Causes of STIs						
9	Bacteria	42	37.1	76	33.9	118	35.0
10	Virus	56	49.5	80	35.7	136	40.3
11	Fungus	15	13.2	17	7.5	32	9.5
12	Bad hygiene of woman	17	15.0	63	28.1	80	23.7
13	Bad hygiene of man	19	16.8	49	21.8	68	20.1
14	Using unclean water	58	51.3	140	62.5	198	58.7
	Route of STIs						
15	Sexual intercourse	97	85.8	199	88.8	296	87.8
16	Blood transfusion	75	66.3	154	68.7	229	67.9
17	Sharing needle	86	76.1	185	82.5	271	80.4
18	Sharing clothes, things	88	77.8	188	83.9	276	81.9
19	Sharing foods	85	75.2	184	82.1	269	79.8
20	Mother to child	72	63.7	172	76.7	244	72.4
	Signs and symptoms of STIs						
21	Abdominal pain	19	16.8	27	12.0	46	13.6
22	Discharge from penis/ vulva	47	41.5	80	35.7	127	37.6
23	Itching in genital area	40	35.4	75	33.4	115	34.1
24	Burning pain on urination	30	26.5	42	18.7	72	21.3
25	Pain during intercourse	26	23.0	44	19.6	70	20.7

No.	Variables	Male (N=113)		Female (N=224)		**Total** (n=337)	
		N	%	N	%	N	%
26	Loss of weight	41	36.2	84	37.5	125	37.0
27	Weakness	63	55.7	120	53.5	183	54.3
	The way of prevention STIs						
28	Consistent condom use	93	82.3	180	80.3	273	81.0
29	Monogamy	80	70.8	179	79.9	259	76.8
30	Get tested before marriage/ before starting new relationships	102	90.2	209	93.3	311	92.2
31	Condoms	94	83.1	154	68.7	284	73.5
32	Birth control pills offer excellent protection	47	41.5	87	38.8	134	39.7
33	Once you have had an STI and have been cured, you can't get it again	50	44.2	113	50.4	163	48.3

Note: Presented only yes answer

3.4 The knowledge of participants about knowledge of STIs

Table 3.4 presents the knowledge of participants about STIs. The overwhelming majority of participants correctly identified that HIV/AID is a sexually transmitted infection. More than three quarters of the students correctly noted that influenza is not sexually transmitted. However, less than a third knew the Human papilloma virus is a STIs. More than half were aware that unclean water was not a cause of STIs. It was alarming that just over a third of the participants knew that viruses caused STIs. A clear majority knew that sexual intercourse and shared needle use were routes for the exchange of STIs. A bare majority of the students regarded weakness is a sign or symptom of STIs. More worrisome was that just over a third of respondents knew a discharge from the penis/vulva was a sign or symptom of infection. With regarding to the prevention of STIs, most participants knew to get tested before marriage or starting a new relationship. Finally a large majority was aware that the consistent use of condoms was a safe way of preventing STIs.

Table 2.6 Level of knowledge among students about STIs

Level of knowledge (score)	Number (N=337)	Percentage (%)
Poor knowledge (≤ mean)	162	48.0
Good knowledge (> mean)	175	51.9
Mean =17.30 and SD ± 5.095, Median=18, Min=0,Max=29		

3.5 The knowledge level of STIs

After referring to 33 questions about knowledge of STIs, table 3.5 generated a mean knowledge of STIs score of 17.30 SD ± 5.095 and the knowledge of STIs was categorized into two groups. It was found that a slight majority of the participants had a good knowledge of STIs.

Table 2.7 Communication about knowledge of safe sex and STIs between students and family members/peers during their school life

Communication item	Communication with family members				Communication with peers			
	School Life (N=337)				School Life (N=337)			
	Never	Rarely (1-2 times)	Sometimes (3-5 times)	Often (6 -more times)	Never	Rarely (1-2 times)	Sometimes (3-5 times)	Often (6 –more times)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
1.Talked about condom use when having sexual intercourse	271 (80.4)	41 (12.1)	18 (5.3)	7 (2.0)	129 (38.2)	95 (28.1)	70 (20.7)	43 (12.7)
2.Talked about taking the contraception pill when having sexual intercourse	274 (81.3)	46 (13.6)	13 (3.8)	4 (1.1)	167 (49.5)	111 (32.9)	34 (10.0)	25 (7.4)
3.Talked about avoiding multiple sex partners	252 (74.7)	47 (13.9)	19 (5.6)	19 (5.6)	149 (44.2)	80 (23.7)	62 (18.4)	46 (13.6)
4.Talked about family planning	261 (77.4)	52 (15.4)	17 (5.0)	7 (2.0)	178 (52.8)	99 (29.3)	37 (10.9)	23 (6.8)
5.Talked about STIs including HIV/AIDs	209 (62.0)	83 (24.6)	31 (9.2)	14 (4.1)	109 (32.3)	117 (34.7)	79 (23.4)	32 (9.5)
6.Talked about changes during puberty	108 (32.0)	95 (28.1)	82 (24.3)	52 (15.4)	57 (16.9)	96 (28.4)	96 (28.4)	88 (26.1)
7. Discussed not having sex before marriage	185 (54.9)	61 (18.1)	39 (11.5)	52 (15.4)				
8.Talked about how to use condoms and protect yourself from becoming pregnant	297 (88.1)	29 (8.6)	5 (1.4)	6 (1.7)	139 (41.2)	99 (29.3)	53 (15.7)	46 (13.6)

3.6 Communication about a knowledge of safe sex and STIs between students and family members/peers

Table 3.6 illustrates the content for communication about knowledge of safe sex and STIs between high school students with their families and peers. The answers ranged from "Never", "Rarely", “Sometimes", and "Often", in their school life. Around a quarter of the respondents communicated with relatives and peers about changes during puberty 3-5 times during their school life. About a third of students preferred to talk with peers about STIs, including HIV/AIDS about 1-2 times as compared to only a quarter with their families. In addition, about one third of students never discussed changes during puberty with family members, whereas the vast majority did discussed physical changes with their peer. An overwhelming majority of participants never talked with relatives about condom use and avoiding pregnancy. However, almost two thirds of the students were confident to discuss condoms with their peers. Nevertheless, a bare majority of participants never talked with their peers about family planning.

With regard to communication with different family members about a knowledge of safe sex and STIs, the largest number of respondents preferred discussing with their mothers, followed by their parents in tandem and separately with their fathers (Annex 2, Table 1).

Almost three quarters of participants liked to communicate with close girlfriends, while more than a third discussed matters with boyfriends, less than a third with general friends, and a minor percentage with a girlfriends or a boyfriend (Annex 2, Table 2).

Table 2.8 School factors related to sexual education

School factor	Number (n= 337)	Percent (%)
Attending school		
Yes	324	96.1
No	13	3.8
Topics related to Sexual education		
Family planning	249	73.8
STIs including HIV/AIDS	303	89.9
Changes during puberty	306	90.8
The sexual health subject integrated		
Biology	335	99.4
Geography	34	10.0
Social Science	206	61.1
Global study	244	72.4
Hours approximately covering SRH per week		
Do not remember	178	52.8
1 hour	32	9.5
2 hours	114	33.8
More than 2 hours	13	3.8
Provide adequate information about SRH		
Comprehensive	31	9.2
More than adequate	109	32.3
Medium	154	45.7
Insufficient	29	8.6
Bare minimum	14	4.1

3.7 Sexual education in the school

Nearly all of the students that the responded (96.1%) attended school regularly, and had attended what are the sexual education topics, a vast majority of participants taken the changes during puberty topic closely, followed by STIs including HIV/AIDs. Students said that sexual education was most commonly integrated in biology lesion. Almost three quarter mentioned that sexual education was included in the Global study, and a small percentage also covered sexual education in geography classes. For the hours taught per week for sexual health education at school, one third of students reported learning for about 2 hours per week, while just fewer than 10% studied for one hour per week and less than 5% reported more than 2 hours per week. However, it was surprising that more than half of the students reported that they did not remember how many hours per week they learnt about sexual health education. Less than half of the participants said that the school had provided medium standard information, followed by a third of the respondents who considered the information adequate (Table 3.7).

Table 2.9 Mass media sources of family planning and STIs/HIV/AIDS information

Sources of information from mass media	Sources of information for family planning from mass media		Sources of information for STIs including HIV/AIDS from mass media	
	Number (N=337)	Percentage (%)	Number (N=337)	Percentage (%)
Magazine	180	53.4	197	58.4
Films/television	266	78.9	287	85.1
Newspapers	120	35.6	128	37.9
Radio	110	32.6	116	34.4
Facebook	285	84.5	286	84.8
Twitter	117	34.7	114	33.8
YouTube	235	69.7	226	67.0

3.8 Mass media sources of information on family planning and STIs/HIV/AIDS

Table 3.8 presents the sources of information for family planning and STIs including HIV/AIDs. The primary source of knowledge about family planning cited by the respondents was Facebook, followed by films/television and YouTube. All these sources enjoyed usage by more than two thirds of the students. However, the main source of information for STIs including HIV/AIDs was film and television rather than online sources. Nevertheless, the difference between these sources was marginal.

Table 2.10 Religious factors

Religious factors	Number (N=337)	Percentage (%)
Religion		
Buddhism	313	92.8
Other	24	7.1
Importance of religion		
Unimportant	72	21.0
Important	266	78.9
Attend religious services		
Never	163	48.3
Active participant	174	51.6
Religion accepts sexual intercourse before marriage		
No	275	81.6
Yes	62	18.4
Religion accepts birth control		
No	241	71.5
Yes	96	28.4

3.9 Religious factors

Table 3.9 illustrates the religion of the participants. The vast majority of students believe in Buddhism and more than three quarters said that religion was important for them. More than half of them liked to attend religious services. A large

majority of the participants stated that their religion did not accept having sexual intercourse before marriage, and almost three quarters reported that there faith did not approve of using birth control.

Table 2.11 Univariate logistic regression analysis associated with demographic and family structures linked with student knowledge of safe sex and STIs

Variables		Knowledge of safe sex						Knowledge of STIs					
		Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value
Demographic Factors													
Age	14-16	81 (47.0)	91(52.9)	**1**				76 (44.1)	96 (55.8)	**1**			
	17-20	89 (53.9)	76 (46.0)	0.7	0.4	1.1	0.209	86 (52.1)	79 (47.8)	0.7	0.4	1.1	0.14
Sex	Female	53 (46.9)	60 (53.1)	**1**				107 (47.7)	117 (52.2)	**1**			
	Male	117 (52.2)	107 (47.7)	1.2	0.7	1.9	0.357	55 (48.6)	58 (51.3)	0.9	0.6	1.5	0.875
Ethnicity	Lao	137 (48.4)	146 (51.5)	**1**				138 (48.7)	145 (51.2)	**1**			
	Other	33 (61.1)	21 (38.8)	0.5	0.3	1	0.09	24 (44.4)	30 (55.5)	1.1	0.6	2.1	0.561
	Grade10	35 (49.3)	36 (50.7)	1				24 (33.8)	47 (66.2)	1			
Grade	Grade11	54 (42.1)	74 (57.8)	1.3	0.7	2.3	0.335	60 (46.8)	68 (53.1)	0.5	0.3	1.0	0.075
	Grade12	81 (58.7)	57 (41.3)	0.6	0.3	1.2	0.196	78 (56.5)	60 (43.4)	0.3	0.2	0.7	0.002*
Family Factors													
Live with													
	With parent (s)	159 (53)	141 (47)	1				149 (49.6)	151 (50.3)	1			
	With other (s)	11 (29.7)	26 (70.2)	2.6	1.2	5.5	**0.010***	13 (35.1)	24 (64.8)	1.8	0.8	3.7	0.099

Univariate analysis of factors associated with knowledge of safe sex and STIs using regression analysis

3.10 Association between demographic characteristics and family factors with knowledge of safe sex and STIs

In the univariate logistic regression analysis none of the socio-demographic factors was associated with knowledge of safe sex (P-value>0.05). However, for family factors those living with others were identified to be associated with knowledge of safe sex. The students who lived with others were more than two times more likely to have a good knowledge about safe sex than those living with parents (COR=2.6, 95%CI=1.2-5.5). In addition, the results of univariate logistic regression analysis showed that the grade level was significantly associated with knowledge of STIs (P-value<0.05). The students in Grade 12 were more likely to have less knowledge about STIs than those who studied in Grade 11 and Grade 10 (Table 3.10).

Table 2.12 Association between communication of knowledge about safe sex and STIs with family members and peers with knowledge of safe sex and STIs

Variables		Knowledge of safe sex						Knowledge of STIs					
		Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value
Communication Factors													
Family member	Never	42 (57.5)	31(42.4)	1				44 (60.2)	29 (39.7)	1			
	Experience	128 (48.4)	136 (51.5)	1.4	0.8	2.4	0.173	118 (44.7)	146 (55.3)	1.8	1.1	3.1	**0.020***
Peers													
	Never	17 (65.3)	9 (34.6)	1				20 (76.9)	6 (23)	1			
	Experience	153 (49.2)	158 (50.8)	1.9	0.8	4.5	0.109	142 (45.6)	169 (54.3)	3.9	1.5	10.1	**0.004***

3.11 Association between the communication of knowledge about safe sex and STIs with families and peers

The univariate logistic regression analysis showed that participants who had discussed with family member and peers were significantly associated with knowledge of STIs. Therefore, the students who discussed their knowledge of STIs with family member were nearly two times more knowledgeable about STIs than those who never discussed these topics with relatives (COR=1.8, 95% CI=1.1-3.1). Likewise, respondents who have discussed their knowledge of STIs with peers were nearly four times more knowledgeable about STIs (COR=3.9, 95% CI=1.5-10.1). In addition, the results of univariate logistic regression analysis showed that participants who had discussed about knowledge of safe sex with family member and peers were not significantly associated with knowledge of safe sex (P-value>0.05) (Table 3.11).

Table 2.13 Univariate logistic regression analysis of school factors associated with knowledge of safe sex and STIs

Variables	Knowledge of Safe Sex						Knowledge of STIs					
	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value
School Factors												
Topics have Studies Related to: Sex Education and Family Planning												
No	54 (61.3)	34 (38.6)	1				55 (62.5)	33 (37.5)	1			
Yes	116 (46.5)	133 (53.4)	1.8	1.1	2.9	**0.018***	107 (42.9)	142 (57)	2.2	1.3	3.6	**0.002***
STIs including HIV/AIDS												
No	22 (64.7)	12 (35.2)	1				28 (82.3)	6 (17.6)	1			
Yes	148 (48.8)	155 (51.1)	1.9	0.9	4	0.084	134 (44.2)	169(55.7)	5.8	2.3	14.6	**0.000***
Changes During Puberty												
No	21 (67.7)	10 (32.2)	1				25 (80.6)	6 (19.3)	1			
Yes	149 (48.6)	157 (51.3)	2.2	1	4.8	**0.048***	137 (44.7)	169 (55.2)	5.1	2	12.9	**0.000***

3.12 Association between school factors with knowledge of safe sex and STIs

Table 3.12 presents the results of univariate analysis for which the school factors related to sexual education were significantly associated with a student's knowledge of safe sex (P-value<0.05). The participants who had learnt about family planning were nearly two times more likely to have knowledge of safe sex than who had not (COR=1.8, 95%CI=1.1-2.9). Likewise, respondents whose had studied about changes during puberty were more than two times likely to have a knowledge of safe sex than who had not (COR=2.2, 95%CI=1-4.8).

The results of univariate analysis presented in Table 3.12 revealed that the school factors drawn from sexual education were significantly associated with knowledge of STIs (P-value<0.05). The participants who had learnt family planning were more than two times more likely to have knowledge of STIs than who had not (COR=2.2, 95%CI=1.3-3.6). Similarly, participants who had studied STIs including HIV/AIDS were almost six more likely to have knowledge of STIs than who had not (COR=5.8, 95%CI=2.3-14.6). Finally, those participants who had studied changes during puberty were more than five times more likely to have a knowledge of STIs than those who had not (COR=5.1, 95%CI=2-12.9).

Table 2.14 Univariate logistic regression analysis of resource factors from mass media associated with students' knowledge of safe sex and STIs

Variable	Knowledge of Safe Sex						Knowledge of STIs					
	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value
Religious Factors												
Religion accepts having sexual intercourse before marriage												
< =1 Source	24 (53.3)	21 (46.67)	1				26 (57.7)	19 (42.2)	1			
>1 Source	146 (50)	146 (50)	1.1	0.6	2.1	0.678	136 (46.5)	156 (53.4)	1.5	0.8	2.9	0.164
Religion accepts the use of birth control												
< =1 Source	20 (62.5)	12 (37.5)	1				20 (62.5)	12 (37.5)	1			
>1 Source	150 (49.1)	155 (50.8)	1.7	0.8	3.6	0.156	142 (46.5)	163 (53.4)	1.9	0.9	4	0.091

3.13 Association between accessibility to information resources from the mass media and a knowledge of safe sex and STIs

Table 3.13 shows the results of the univariate analysis of the information source factors drawn from mass media with knowledge of safe sex and STIs. The accessibility to sources of information was not significantly associated with knowledge of safe sex and STIs (P> 0.05).

Table 2.15 Univariate logistic regression analysis of religious factors associated with knowledge of safe sex and STIs

Variable	Knowledge of safe sex						Knowledge of STIs					
	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value	Low knowledge N (%)	Good Knowledge N (%)	COR	95%CI Lower	95%CI Upper	P-Value
Religion Factors												
Religion is acceptable to have sexual intercourse before marriage												
No	142 (51.6)	133 (48.3)	1				134 (48.7)	141 (51.2)	1			
Yes	28 (45.1)	34 (54.8)	1.2	0.7	2.2	0.358	28 (45.1)	34 (54.8)	1.5	0.6	2.0	0.612
Religion is acceptable to use birth control												
No	132 (54.7)	109 (45.2)	1				121 (50.2)	120 (49.7)	`1			
Yes	38 (39.5)	58 (60.4)	1.8	1.1	2.9	**0.012***	41 (42.7)	55 (57.2)	1.3	0.8	2.1	0.215

3.14 Association between religious factors associated with knowledge of safe sex and STIs

Table 3.14 illustrates the univariate logistic regression analysis of religious factors associated with knowledge of safe sex and STIs. The religious factors associated with adolescent knowledge of safe sex was a religion that accepted the use birth of control whose believers were nearly two times more likely to have knowledge of safe sex than who did not (COR=1.8, 95%CI=1.1-2.9).

Table 2.16 Multivariate logistic regression analysis of the factors associated with knowledge of safe sex and STIs

Variables	Knowledge						
	Crude			Adjusted			
	COR	95%CI		AOR	95%CI		P-value
		Lower	Upper		Lower	Upper	
Knowledge of safe sex							
Live with							
Parent				1			
Other	2.6	1.2	5.5	2.5	1.1	5.3	**0.017***
Studied topic about family planing							
No	1			1			
Yes	1.8	1.1	2.9	1.7	1.0	2.9	**0.035***
Religion accepts use of birth control							
No	1			1			
Yes	1.8	1.1	2.9	1.7	1.0	2.9	**0.025***
Knowledge of STIs							
Grade							
Grade10	1			1			
Grade11	0.5	0.3	1.0	0.4	0.2	0.8	**0.009***
Grade12	0.3	0.2	0.7	0.3	0.1	0.6	**0.002***
Studied t**opic about family planing**							
No	1						
Yes	2.2	1.3	3.6	1.8	1.0	3.1	**0.033***
Studied topic about STIs including HIV/AIDS							
No	1			1			
Yes	5.8	2.3	14.6	5.1	1.9	13.5	**0.001***

3.15 Multivariate logistic regression analysis of factors associated with students' knowledge of safe sex and STIs

An attempt to identify the best model for knowledge of safe sex and STIs was presented in Table 3.15 which involved a selection of independent variables to be included in the multivariate logistic regression model in combination with the results of the univariate analysis. The independent variables had to be significantly correlated with the dependent variables with a P-value<0.05 included in the multivariable analysis in order to control the confounding variables. A backward stepwise was performed to determine the association between factors and a knowledge of safe sex and STIs. Independent variables associated (P-value<0.05) with knowledge of safe sex and STIs (model 1: Low knowledge of safe sex and good knowledge of safe sex and model 2: Low knowledge of STIs and good knowledge of STIs) into the multivariate logistic regression analysis. Multivariate logistic regression analysis was performed to calculate the adjusted odds ratio (AOR) with a corresponding 95% confidence interval using Stata. A backward stepwise selection was applied with the level of significance for variables to remain in the final model set at <0.05. A p-value<0.05 was considered statistically significant. The multivariate logistic regression model on a knowledge of safe sex showed that the significant factors for a knowledge of safe sex were students living with other people (AOR=2.5, 95%CI=1.1 -5.3), students who had studied about family planning (AOR=1.7, 95%CI=1-2.9) and students whose religion accepted the use of birth control (AOR=1.7, 95%CI=1.0-2.9). Also, the multivariate logistic regression model on a knowledge of STIs showed that the significant factors for a knowledge of STIs were students in Grade 12 (AOR=0.3, 95%CI=0.1 -0.6) and Grade 11 (AOR=0.4, 95%CI=0.2-0.8), students who had studied about family planning (AOR=1.8, 95%CI=1.0-3.1) and students who had studied about STIs including HIV/AIDS (AOR=5.1, 95%CI=1.9-13.5) were significantly associated with a knowledge of STIs.

Chapter 4
DISCUSSION

Knowledge of safe sex and STIs

This was the premier study on knowledge of safe sex and STIs among high school students in Vientiane Capital. This study reported on degree of awareness regarding safe sex and STIs as well as contributing factors among students at Vientiane High School**.**

The majority of respondents knew about safe sex, particularly the correct and consistent use of condoms for safer sex purposes. The students knew condoms were one of the family planning methods, which could dramatically reduce the risk of most STIs and unintended pregnancies during sexual intercourse. This indicated that the students had a good fundamental awareness of the issue. Similar findings were made by Hendrana who found in Indonesia half of the participants knew that condom use prevented STIs (Hendrana et al., 2015). Another study in Sweden found that 76% of the students knew that condoms could prevent HIV infection (Höglund, Tydén, Hannerfors, & Larsson, 2009). A separate study in Laos found that respondents who had a higher knowledge of SRH also had significantly higher SRH literacy scores. The research revealed that adolescents considered condoms to be generally the safest and the best contraceptive method was sterilization, which seems quite startling due to its absolute nature (Vongxay et al., 2019).

It was common knowledge that the adolescents knew about HIV/AIDS. This study found that a large percentage of adolescent knew only about HIV/AIDS but very little for other STIs such as gonorrhea, chlamydia and syphilis. This may due to the specificity of the name of specific or the use of technical words. Besides that, HIV/AIDS has been frequently mentioned in school lessons. A similar study in Indonesia found more than half of the respondents did not know that gonorrhea and syphilis were types of STIs. The researchers claimed a knowledge of STIs was not maintained due to the repetitive nature of information given in rote learning situations, in which respondents just forget information which has only been given once (Hendrana et al., 2015). This finding was

similar to many other studies, for example in Ho Chi Minh the vast majority of participants were aware that HIV/AIDS was a sexually transmitted infection (Sjöqvist & Göthlin, 2011). In another study in Germany, virtually all students knew of HIV/AIDS (Samkange-Zeeb, Mikolajczyk, & Zeeb, 2013), while in Sweden, an overwhelming majority were aware of HIV/AIDS (Höglund et al., 2009). When asked to recognize some of the common causes of STIs, half of the respondents knew using unclean water was not a cause of STIs and nearly half of the participants know that viruses were a cause of STIs compared to the study in Vietnam by Annabel knew higher than (Sjöqvist & Göthlin, 2011). Most participants knew that sexual intercourse was a route of STIs, similar to previous studies in Vietnam (Sjöqvist & Göthlin, 2011), and in Nigeria (Amu & Adegun, 2015; Oluyemi et al., 2015), (Oluyemi et al., 2015). For the signs and symptom of STIs, just over half of the participants answered that weakness was a sign and symptom of STIs. However, when compared with a previous study in Ho Chi Minh City the majority of them knew itching in the genital area was a sign and symptom of STIs (Sjöqvist & Göthlin, 2011). Regarding the ways of preventing STIs, almost all the participants knew to get a test before marriage/or starting a new relationship, followed by consistent condom use as ways of guarding against infection. When compared to previous studies in Indonesia and Nigeria, the majority of adolescents knew consistent condom use as a way of preventing STIs, (Megersa et al., 2017; Oluyemi et al., 2015).

Overall, the results of this study showed about half of the participants had a poor knowledge of safe sex. Likewise, the knowledge of adolescents about STIs was low, as nearly half of them had a poor awareness. In other words, the knowledge of participants about safe sex and STIs is lacking. There are several reasons relating to this low awareness among students. It could arise because of the educational environment, and socio-cultural factors. Although information about sexual education is given in high school through its integration into different subjects, teachers are not comfortable to teach it. The information given is not detailed enough such noted in other research in Migori which showed most teachers felt uncomfortable with explaining the finer details of sex and there were no sexual education syllabi available at pedagogical institutions. Teachers

also stated that they were able to teach certain sexuality topics, however, these were not included in the curriculum and there was not enough time in the academic year to add more. Some teachers indicated a lack of training, resources or management plans/policies for teaching sexuality education (OKECH, 2013). Moreover this knowledge gap may be caused by a lack of communication with their family members and peers. In particular, most of the participants never discussed about STIs, and using condoms to protect themselves with their relatives. Furthermore, there is a lack of communication with peers about family planning such as how to take the contraceptive pill before engaging in sexual intercourse. In addition, although most of students responded that they had attended school frequently and studied the relevant sexual education topics, they reported that the school had provided them with only a modest amount of information, which was clearly inadequate. Regarding previous studies, these highlighted that the frequency of parent-child discussions about sex, pregnancy, STIs/AIDS, and birth control can engage their adolescents to avoid the risks of sexual behavior and delay their first sexual interaction (Booth-Butterfield & Sidelinger, 1998; Guilamo-Ramos et al., 2011; Guzmán et al., 2003; Holman, 2014; Huebner & Howell, 2003).

Factors associated with knowledge of safe sex and STIs

Factors associated with knowledge of safe sex

Living arrangements with others can be a factor affecting a person's knowledge of safe sex. For knowledge of safe sex, respondents had a significant association if they lived with others because some parents or some children were not comfortable and confident about how to start communicating with one another about sexual matters. In addition, children or parents do not make time to communicate about sex, while students living away from their parents can chat about sex without a feeling of trepidation. Other research presented additional reasons such as parents thinking adolescents were still too young to discuss these matters, parents assuming others had discussed issues of puberty with them already, but the reality was these parents did not want touch on the issues of sex and its consequences. Sometimes parents just do not know where to start or how to begin such a conversation. If they think their teenage child will fall pregnant, or get STIs

or HIV the parents will discuss sex with the adolescent. However, these family meetings are often just threats or riot acts issued by the parents rather than opportunities for open and informed communication (Seloilwe et al., 2015). Comparative research studies found useful differences. In Tanzania, participants who lived with their parents were more likely have a knowledge of safe sex than those live who did not. More than three quarters of the respondents who lived with both parents were aware of the effects of early pregnancies and could identify the causes of STIs from unsafe sex. For participants who lived separately from their parents just over five percent were aware of the consequences of early pregnancies and an even smaller percentage could identify unsafe sex as the cause of STIs (Kaale & Muhanga, 2017).

School factors have an important effect on the knowledge of safe sex since schools are generally the source of knowledge about safe sex. Participants who had learnt about family planning were more likely to have a better knowledge of safe sex than those who had did not because these participants understood about different contraceptive methods and means to protect themselves from unintended or unplanned pregnancies. The general public also favors providing substantive instruction, which will reduce risky sexual behavior among adolescents. The vast majority of adolescents and teachers approved of lessons about AIDS and more than four fifths supported teaching contraceptive methods and safe sex practices (Firestone, 1994). A clear majority stated that they knew about pregnancy prevention methods. A knowledge about pregnancy prevention was observed to have a significant relationship with school types (Adeokun et al., 2009).

Religion was found to be an important factor affecting the uptake of knowledge about safe sex. The results of this study were similar to a study in Nicaragua where almost half of the respondents reported that their religion approved of birth control use (Petrick, 2016). Other researchers found that in America, the majority of Catholics interviewed said birth control was morally acceptable. More than half of Catholics in a Gallup survey said they sympathized with the views of religious leaders on the contraception-healthcare coverage debate (Newport, 2012). On the other hand, in Philippines many conservative, Catholic, local government chiefs have already opted not to continue providing modern

contraceptive methods and have banned single people and adolescents from accessing public family planning services or receiving family planning information from local government health workers (Ruiz Austria, 2004).

Factors associated with knowledge of STIs

This study showed that respondents who were in Grade 12 were more likely to have less knowledge about STIs than those in Grades 10 and 11. The difference between the three grades could be that the lessons about STIs including the HIV/AIDS topic were new and interesting in the lower grades but by the senior year of school students were focused only on their main subjects in preparation for the final exams to graduate from high school. Another reason that the Grade 12 students do not remember some lessons about STIs is the rote learning that took place in Grades 10 and 11. In comparison, a previous study in Germany found that participants in Grade 12 had more knowledge about STIs than students in grades below them (Samkange-Zeeb et al., 2013). This difference could be due the context in which the lessons about STIs for Grade 12 student were taught. In the Lao education system the delivery of knowledge is normally one-way and usually lacking adequate resources, whereas in Germany classrooms are well equipped and teachers are comfortable with two-way discussions and student led activities.

This study has shown that participants who learnt about family planning and studied about STIs including HIV/AIDS were more likely to have a knowledge of STIs than those who did not. Many adolescents also received basic sexual knowledge from school-based sex education programs during or before entering the middle school. The main goal of the school-based sex education programs was to increase abstinence among adolescents, delay the initiation of first sexual intercourse, reduce the number of sexual partners, and increase condom or other forms of birth control use. Some research has found curriculum-based sex education and STIs/HIV programs to be moderately associated with a decrease in adolescents' risky sexual behaviors (e.g., unprotected sex) (Holman, 2014; Kirby & Laris, 2009).

Peer communication: The current study demonstrated that peer communication was not associated with knowledge of safe sex and STIs (P-value>0.05). This may be due to the students' lack of confidence or a feeling of shyness when talking about sex issues and how to protect themselves when having sexual intercourse. Nevertheless, peer communication is essential for supporting a knowledge of safe sex and STIs even though many adolescents receive school-based education (Heisler, 2005). Adolescents commonly seek more detailed information or stories about sex from their peers and they also reported receiving more sexual information from their friends compared to other sources such as the media, religious gatherings and conversations with parents (Bleakley et al., 2009; Heisler, 2005; Holman, 2014). A research study in northeast Ethiopia found that more than four fifths of adolescents who had communicated about sexual and reproductive issues, preferred to discuss with their peers rather than their parents. In addition, a clear majority of the respondents reported that they primarily had discussions about contraceptive methods with their friends, followed by teachers and mothers. Beside this, the adolescents reported discussing a number of sex related topics with friends or peers, thus supporting the importance of peers. It seems that students feel more comfortable and at ease to discuss sex with friends or peers as compared to parents (Cherie, 2018).

The knowledge score measurements

There were many different measurements used for scoring knowledge such as some researchers measured poor, average and good levels of knowledge by means of a score plus/minus the standard deviation (Isachsen & Svenkerud, 2011), while others employed a mean or range score to classify poor and good knowledge standards (Hendrana et al., 2015; Megersa et al., 2017; Sjöqvist & Göthlin, 2011). For this study the outcome variables for both levels of knowledge for safe sex and STIs were classified into two categories (Low knowledge and good knowledge; a moderate level was excluded) and a mean was used as an indicator to categorize knowledge levels. Hence good knowledge ≥ mean and poor knowledge < mean. We have found that the frequency of those respondents who had a good knowledge to be very low. In addition, if we had set

the levels into three categories, it would have been hard to assess the association between independent variables and dependent variables. Therefore, moderate knowledge and good knowledge are merged together.

Limitations and bias

This was bias in the selection of Vientiane High School for the study because it is not representative of all the high schools in Laos which have a great deal of diversity ranging from the small to the big. Vientiane High School is the biggest secondary school in the country. Hence data from this study cannot be generalized for high schools throughout the country. Due to the nature of the cross-sectional study design, the causes and effects could not be explored extensively.

This study involved self-reporting and as a result this could not ensure that the students were truthful with all their answers given. Essentially, with a topic as sensitive as sexuality, most people are wary of being completely honest for fear of criticism or ignorance. While one might assume that the students were honest because the survey was submitted voluntarily and completed in privacy in their own time, this cannot be determined through the data available.

There were also some information biases due to the structure and delivery of the self-administered questionnaire such as the low response rate or not all questions being completed because respondents were given freedom to answer at their own pace. Hence they may have chosen to submit the questionnaire at a later time, or not send it back at all. The other issue was the difference in understanding questions. Different people think differently, so some might not have interpreted the questions the way the researchers anticipated them to do. Some answers were relevant, while others not related to the topic at all. There might have been some issues regarding the clarity or tone of language in the questionnaire which may have caused confusion for some respondents, since they had no immediate support to clarify certain questions.

CONCLUSION

The study was able to conclude that high school adolescents at Vientiane High School had a general awareness of knowledge regarding safe sex and STIs since less than half of the surveyed students scored at a good level for their knowledge of safe sex and only half of them recorded a good level for their knowledge of STIs. These results showed that a lot of misconceptions existed or students did not have an accurate understanding of safe sex, and the pertinent information regarding the symptoms, routes of transmission and the ways of preventing STIs. This study has shown the association between knowledge of safe sex and STIs with various socio-demographic factors such as school-based studies for family planning and STIs, religious values and, lifestyle choices have a significant impact on the retention and depth of knowledge.

RECOMMENDATIONS

1. There is an essential need for comprehensive sexuality education, particularly by adding more relevant content about family planning and STIs to subjects about safe sex for each grade in high schools support the knowledge of adolescents.
2. Peer to peer teaching should be encouraged among the students when covering sexuality education units. Active two-way discussions in the classroom about STIs and family planning should be encouraged by the school managers/administrators.
3. Health providers should distribute more information to assist sexual health education at the club or youth center level where teenagers congregate as well as inside schools.
4. Religious media should demonstrate a reasonable level of tolerance such as accepting means of avoiding unsafe sex for adolescents rather than demonizing the use of contraception.
5. Future research should include other schools in rural and urban areas and incorporate other research methods such as intervention research study and qualitative study (focus groups, in-depth interviews).

REFERENCES

Acharya, D. R., Thomas, M., & Cann, R. (2016). Validation of a questionnaire to measure sexual health knowledge and understanding (Sexual Health Questionnaire) in Nepalese secondary school: A psychometric process. *Journal of education and health promotion, 5*.

Adeokun, L., Ricketts, O., Ajuwon, A., & Ladipo, O. (2009). Sexual and reproductive health knowledge, behaviour and education needs of in-school adolescents in northern Nigeria. *African Journal of Reproductive Health, 13*(4).

Afifi, T. D., Joseph, A., & Aldeis, D. (2008). Why can't we just talk about it? An observational study of parents' and adolescents' conversations about sex. *Journal of Adolescent Research, 23*(6), 689-721.

Akhtar, S., Luby, S., Rahbar, M., & Azam, I. (2001). HIV/AIDS knowledge, attitudes and beliefs based prediction models for practices in prison inmates, Sindh, Pakistan. *Southeast Asian journal of tropical medicine and public health, 32*(2), 351-361.

Al Quaiz, A. M., Kazi, A., & Al Muneef, M. (2013). Determinants of sexual health knowledge in adolescent girls in schools of Riyadh-Saudi Arabia: a cross sectional study. *BMC women's health, 13*(1), 19.

American Sexual Health Association. (2016). STDs/STIs.

Amu, E., & Adegun, P. (2015). Awareness and knowledge of sexually transmitted infections among secondary school adolescents in Ado Ekiti, South Western Nigeria. *Journal of sexually transmitted diseases, 2015*.

Atheism. (2018). What is religion? Retrieved from http://atheisme.free.fr/Religion/What-is-religion-1.htm

Ayalew, M., Mengistie, B., & Semahegn, A. (2014). Adolescent-parent communication on sexual and reproductive health issues among high school students in Dire Dawa, Eastern Ethiopia: a cross sectional study. *Reproductive health, 11*(1), 77.

Bar-on, M. E., Broughton, D. D., Buttross, S., Corrigan, S., Gedissman, A., de Rivas, M. R., . . . Wilcox, B. L. (2001). Sexuality, contraception, and the media. *Pediatrics, 107*(1), 191-194.

Bleakley, A., Hennessy, M., Fishbein, M., & Jordan, A. (2009). How sources of sexual information relate to adolescents' beliefs about sex. *American journal of health behavior, 33*(1), 37-48.

Booth-Butterfield, M., & Sidelinger, R. (1998). The influence of family communication on the college-aged child: Openness, attitudes and actions about sex and alcohol. *Communication Quarterly, 46*(3), 295-308.

Breuner, C. C., Mattson, G., Child, C. o. P. A. o., & Health, F. (2016). Sexuality education for children and adolescents. *Pediatrics, 138*(2), e20161348.

Cherie, N. (2018). Parent-Adolescent Communication about Sexual and Reproductive ealth and Associated Factors mong reparatory School Students in aiyk Town, North East Ethiopia.

Chukwu, E. O., Iornengen, E. M., Fiase, T. M., Chia, T., Haruna, H., & Hamina, D. (2017). Knowledge and practice of safe sex among students of College of Medical Sciences, University of Maiduguri, Borno State, Nigeria. *Journal of Research in Nursing and Midwifery, 6*(1), 16-24.

Clark, L. R., Jackson, M., & Allen-Taylor, L. (2002). Adolescent knowledge about sexually transmitted diseases. *Sexually transmitted diseases, 29*(8), 436-443.

De Waure, C., Mannocci, A., Cadeddu, C., Gualano, M. R., Chiaradia, G., Vincitorio, D., . . . Boccia, A. (2015). Knowledge, attitudes and behaviour about Sexually Transmitted Infections: a survey among Italian university female students. *Epidemiology Biostatistics and Public Health, 12*(2), 1-11.

Dehne, K. L., Riedner, G., Berer, M., & Organization, W. H. (2005). Sexually transmitted infections among adolescents: the need for adequate health services.

Department of Health and Health Sevices, S. G. o. V. (2018). Better Health Channel - Safe Sex. Retrieved from https://www.betterhealth.vic.gov.au/health/healthyliving/safe-sex

Donaldson, A. A., Lindberg, L. D., Ellen, J. M., & Marcell, A. V. (2013). Receipt of sexual health information from parents, teachers, and healthcare providers by sexually experienced US adolescents. *Journal of Adolescent Health, 53*(2), 235-240.

Dummies. (2018). Why safe sex is important. Retrieved from https://www.dummies.com/relationships/sex/dealing-with-a-lack-of-sexual-desire-in-women/

Dutra, R., Miller, K. S., & Forehand, R. (1999). The process and content of sexual communication with adolescents in two-parent families: Associations with sexual risk-taking behavior. *AIDS and Behavior, 3*(1), 59-66.

Education, F. C. f. H. (2018). Sexuality Education in the WHO European Region

EWEC. (2017). Technical Guidance for Prioritizing Adolescent Health by Every Woman Every Child.

Fanta, M., Lemma, S., Sagaro, G. G., & Meskele, M. (2016). Factors associated with adolescent–parent communication of reproductive health issues among high school and preparatory students in Boditi town, Southern Ethiopia: a cross-sectional study. *Patient Intelligence, 8*, 57.

Feldman, S. S., & A. Rosenthal, D. (2000). The effect of communication characteristics on family members' perceptions of parents as sex educators. *Journal of Research on adolescence, 10*(2), 119-150.

Femke Albers, D. R. E., Viengnakhone VONGXAY (2017). SEXUAL AND REPRODUCTIVE HEALTH AMONG ADOLESCENTS IN LAO PDR Knowledge, behaviour and SRHR-literacy.

Fentahun, N., Assefa, T., Alemseged, F., & Ambaw, F. (2012). Parents' perception, students' and teachers' attitude towards school sex education. *Ethiopian journal of health sciences, 22*(2).

Firestone, W. A. (1994). The content and context of sexuality education: An exploratory study in one state. *Family Planning Perspectives, 26*, 125-125.

Folasayo, A., Oluwasegun, A., Samsudin, S., Saudi, S., Osman, M., & Hamat, R. (2017). Assessing the knowledge level, attitudes, risky behaviors and preventive practices on sexually transmitted diseases among university students as future healthcare providers in the central zone of Malaysia: a cross-sectional study. *International journal of environmental research and public health, 14*(2), 159.

Girlshealth. (2015). What are STDs and STIs? Retrieved from https://www.girlshealth.gov/body/sti/index.html

Global News (Producer). (2017). Canadian teens need to be more aware of STIs — and it starts with sex ed. Retrieved from https://globalnews.ca/news/3806635/sti-rates-teens-canada/

Guilamo-Ramos, V., Bouris, A., Jaccard, J., Gonzalez, B., McCoy, W., & Aranda, D. (2011). A parent-based intervention to reduce sexual risk behavior in early adolescence: Building alliances between physicians, social workers, and parents. *Journal of Adolescent Health, 48*(2), 159-163.

Guzmán, B. L., Schlehofer-Sutton, M. M., Villanueva, C. M., Stritto, M. E. D., Casad, B. J., & Feria, A. (2003). Let's talk about sex: How comfortable discussions about sex impact teen sexual behavior. *Journal of Health Communication, 8*(6), 583-598.

Hacker, K. A., Amare, Y., Strunk, N., & Horst, L. (2000). Listening to youth: teen perspectives on pregnancy prevention. *Journal of Adolescent Health, 26*(4), 279-288.

Hamilton, B. E., Martin, J. A., & Ventura, S. J. (2009). Births: Preliminary data for 2007. *National vital statistics reports, 57*(12), 1-23.

Health, O. f. S. (2016). Transmission of STIs. Retrieved from https://www.optionsforsexualhealth.org/sexual-health/sexually-transmitted-infections/transmission

Heisler, J. M. (2005). Family communication about sex: Parents and college-aged offspring recall discussion topics, satisfaction, and parental involvement. *The Journal of Family Communication, 5*(4), 295-312.

Hendrana, A. R. A., Mutyara, K., & Rowawi, R. (2015). Knowledge and Attitude of Senior High School Students in Jatinangor towards Sexually Transmitted Infections in 2013. *Althea Medical Journal, 2*(4), 568-574.

Höglund, A. T., Tydén, T., Hannerfors, A. K., & Larsson, M. (2009). Knowledge of human papillomavirus and attitudes to vaccination among Swedish high school students. *International journal of STD & AIDS, 20*(2), 102-107.

Holman, A. J. (2014). How adolescents perceive their parents' communication about sex: Toward reducing adolescent sexual risk.

Huebner, A. J., & Howell, L. W. (2003). Examining the relationship between adolescent sexual risk-taking and perceptions of monitoring, communication, and parenting styles. *Journal of Adolescent Health*, *33*(2), 71-78.

Hunt, D. P. (2003). The concept of knowledge and how to measure it. *Journal of intellectual capital, 4*(1), 100-113.

Isachsen, K., & Svenkerud, B. A. (2011). *Knowledge of sexually transmitted infections among women attending primary health care clinics in Moshi, Tanzania.*

Jung, M., Arya, M., & Viswanath, K. (2013). Effect of media use on HIV/AIDS-related knowledge and condom use in Sub-Saharan Africa: a cross-sectional study. *PLOS ONE, 8*(7), e68359.

Kaale, G., & Muhanga, M. (2017). Sexual health knowledge among secondary school students in Morogoro, Tanzania: half full or full empty. *International Journal of Health, 5*(2), 120-125.

Kaptanoğlu, A. F., Süer, K., Diktaş, H., & Hinçal, E. (2013). Knowledge, attitudes and behaviour towards sexually transmitted diseases in Turkish Cypriot adolescents. *Cent Eur J Public Health, 21*(1), 54-58.

Kirby, D., & Laris, B. (2009). Effective curriculum-based sex and STD/HIV education programs for adolescents. *Child Development Perspectives, 3*(1), 21-29.

Kotchick, B. A., Shaffer, A., Miller, K. S., & Forehand, R. (2001). Adolescent sexual risk behavior: A multi-system perspective. *Clinical psychology review, 21*(4), 493-519.

Kumar, A., & Tiwari, V. (2003). Knowledge, Attitude and Behaviour towards Pre-marital Sex: A study among Youths from Two city-slums in India. *Journal of Health and Population, 26*(4), 126-134.121.

Kumi-Kyereme, A., Awusabo-Asare, K., Biddlecom, A., & Tanle, A. (2007). Influence of social connectedness, communication and monitoring on adolescent sexual activity in Ghana. *African Journal of Reproductive Health, 11*(1), 133.

Lan, P. T., Lundborg, C. S., Mogren, I., Phuc, H. D., & Chuc, N. T. K. (2009). Lack of knowledge about sexually transmitted infections among women in North rural Vietnam. *BMC infectious diseases, 9*(1), 85.

Leeds. (2018). Sexually Transmitted Infections (STIs). Retrieved from http://healthunit.org/health-information/sexual-health/sexually-transmitted-infections/

Lou, C., Cheng, Y., Gao, E., Zuo, X., Emerson, M. R., & Zabin, L. S. (2012). Media's contribution to sexual knowledge, attitudes, and behaviors for adolescents and young adults in three Asian cities. *Journal of Adolescent Health, 50*(3), S26-S36.

Manlove, J., Fish, H., & Moore, K. A. (2015). Programs to improve adolescent sexual and reproductive health in the US: a review of the evidence. *Adolescent health, medicine and therapeutics, 6*, 47.

Martins, L. B. M., Costa-Paiva, L., Osis, M. J. D., Sousa, M. H. d., Pinto Neto, A. M., & Tadini, V. (2006). Knowledge of contraceptive methods among adolescent students. *Revista de saude publica, 40*(1), 57-64.

Mayoclinic. (2017). Sexually transmitted diseases (STDs). Retrieved from https://www.mayoclinic.org/diseases-conditions/sexually-transmitted-diseases-stds/symptoms-causes/syc-20351240

McManus, A., & Dhar, L. (2008). Study of knowledge, perception and attitude of adolescent girls towards STIs/HIV, safer sex and sex education:(a cross sectional survey of urban adolescent school girls in South Delhi, India). *BMC women's health, 8*(1), 12.

Megersa, N., Ahmed, S., Gutema, B., Teshome, G., Melketsedik, Z., & Tariku, E. (2017). Knowledge, attitude and preventive practices towards sexually transmitted infection among preparatory school students of Arsi Negelle town. *Journal of AIDS and Clinical Research, 8*(12).

Mkumbo, K. A. (2012). Teachers' attitudes towards and comfort about teaching school-based sexuality education in urban and rural Tanzania. *Glob J Health Sci, 4*(4), 149-158. doi:10.5539/gjhs.v4n4p149

MOH & Lao Statistics Bureau, M. U., UNFPA. (2018). *Lao social indicator survey II 2017 (Lsis)*.

MWIA. (2002). Strengthening Health System Responses to Gender-based Violence in Eastern Europe and Central Asia. Retrieved from http://www.health-genderviolence.org/training-programme-for-health-care-providers/facts-on-gbv/defining-gender-and-gender-equality/19

Newport, F. (2012). Americans, including Catholics, say birth control is morally OK. *Gallup Politics*.

Nguyen, T. T. (2017). Knowledge of contraception and sexually transmitted diseases (STDs) among 18-24 years old Vietnamese university students. 36.

OKECH, O. M. (2013). FACTORS INFLUENCING IMPLEMENTATION OF REPRODUCTIVE HEALTH EDUCATION IN PUBLIC SECONDARY SCHOOLS IN URIRI DISTRICT, MIGORI COUNTY.

Oluyemi, J. A., Yinusa, M. A., Abdullateef, R., Sunday, A., & Kehinde, K. (2015). Knowledge of sexually transmitted diseases among secondary school adolescents in Asa local government area of Kwara State Nigeria. *African Sociological Review/Revue Africaine de Sociologie, 19*(1), 63-76.

Organization, W. H. (2001). *Global prevalence and incidence of selected curable sexually transmitted infections: overview and estimates*. Retrieved from

Petrick, H. (2016). Social and Cultural Factors that Influence the Knowledge, Attitudes, and Safe Sexual Practices of Rural Nicaraguan Teenagers.

Progress, G. A. R. (2014). LAO PDR COUNTRY PROGRESS REPORT.

Queiroz, M. S. (2000). O itinerário rumo às medicinas alternativas: uma análise em representações sociais de profissionais da saúde. *Cadernos de Saúde Pública, 16*, 363-375.

Ramiro, L., & Matos, M. G. d. (2008). Perceptions of Portuguese teachers about sex education. *Revista de saude publica, 42*(4), 684-692.

Regnerus, M. D. (2005). Talking about sex: Religion and patterns of parent–child communication about sex and contraception. *The Sociological Quarterly, 46*(1), 79-105.

Ruiz Austria, C. S. (2004). The church, the state and women's bodies in the context of religious fundamentalism in the Philippines. *Reproductive Health Matters, 12*(24), 96-103.

Samkange-Zeeb, F., Mikolajczyk, R. T., & Zeeb, H. (2013). Awareness and knowledge of sexually transmitted diseases among secondary school students in two German cities. *Journal of community health, 38*(2), 293-300.

Seloilwe, E., Dithole, K., St Lawrence, J., & Magowe, M. (2015). Parent and youth communication patterns on HIV and AIDS, STIs and sexual matters: Opportunities and challenges.

Senior, P. A., & Bhopal, R. (1994). Ethnicity as a variable in epidemiological research. *BMJ, 309*(6950), 327-330.

Shaw, D. (2009). Access to sexual and reproductive health for young people: bridging the disconnect between rights and reality. *International Journal of Gynecology & Obstetrics, 106*(2), 132-136.

Sjöqvist, A., & Göthlin, S. (2011). Knowledge, attitudes and beliefs about sexually transmitted diseases among Vietnamese students at a vocational school in Ho Chi Minh City.

SRHweek. (2018). PREVENTING PREGNANCY – CONTRACEPTION AND SAFER SEX METHODS. Retrieved from http://www.srhweek.ca/caring-for-yourself/pregnancy/preventing-pregnancy-contraception-and-safer-sex-methods/

Study.com. (2018a). Non-Infectious Diseases: Definition & Examples.

Study.com. (2018b). What Is Mass Media? - Definition, Types, Influence & Examples. Retrieved from https://study.com/academy/lesson/what-is-mass-media-definition-types-influence-examples.html

Svensson, L., & Waern, S. (2013). Knowledge of and attitudes to sexually transmitted diseases among Thai university students.

Sychareun, V. (2017). *Lao PDR comprehensive sexuality education : the way forward* Retrieved from

Sychareun, V., Phengsavanh, A., Hansana, V., Chaleunvong, K., Kounnavong, S., Sawhney, M., & Durham, J. (2013). Predictors of premarital sexual activity among unmarried youth in Vientiane, Lao PDR: The role of parent–youth interactions and peer influence. *Global Public Health, 8*(8), 958-975. doi:10.1080/17441692.2013.830755

Tamang, L., Raynes-Greenow, C., McGeechan, K., & Black, K. (2017). Factors associated with contraceptive use among sexually active Nepalese youths in the Kathmandu Valley. *Contraception and reproductive medicine, 2*(1), 13.

Teitelman, A. M., Ratcliffe, S. J., & Cederbaum, J. A. (2008). Parent—adolescent communication about sexual pressure, maternal norms about relationship power, and STI/HIV protective behaviors of minority urban girls. *Journal of the American Psychiatric Nurses Association, 14*(1), 50-60.

Thornton, A., & Camburn, D. (1989). Religious participation and adolescent sexual behavior and attitudes. *Journal of Marriage and the Family*, 641-653.

Titiloye, M. A., & Ajuwon, A. J. (2017). Knowledge and quality of adolescents reproductive health communication between parents and their adolescents children in Ibadan, Nigeria. *Journal of public health in Africa, 8*(1).

Tripathi, A. (2018). What is friendship? What is a friend? Retrieved from https://www.quora.com/What-is-friendship-What-is-a-friend

Ugboaja, J. O., Oguejiofor, C. B., Oranu, E. O., & Igwegbe, A. O. (2018). Assessing the influence of mass media on contraceptive use in Nigeria: A secondary analysis of 2013 Nigerian national demographic and health survey. *The Nigerian Journal of General Practice, 16*(2), 39.

UNAIDS. (2019). Global HIV & AIDS statistics — 2019 fact sheet. Retrieved from https://www.unaids.org/en/resources/fact-sheet

UNESCO. (2009a). International Technical Guidance on Sexuality Education.

UNESCO. (2009b). International technical guidance on sexuality education: An evidence-informed approach for schools, teachers and health educators. *Volume I and II*.

UNFPA. (2015). Lao PDR Adolescent and Youth Situation Analysis Report. Retrieved from https://lao.unfpa.org/en/news/lao-pdr-adolescent-and-youth-situation-analysis-report

UNFPA. (2016). Sexual & reproductive health. Retrieved from https://www.unfpa.org/sexual-reproductive-health

UNFPA. (2017a). Adolescent pregnancy. Retrieved from https://www.unfpa.org/adolescent-pregnancy

UNFPA. (2017b). *Comprehensive sexuality education in Lao PDR . Assessment of the implementation of the teacher guidebook* Retrieved from

UNICEF. (2011). sexual reproductive health

Visalli, G., Picerno, I., Vita, G., Spataro, P., & Bertuccio, M. (2014). Knowledge of sexually transmitted infections among younger subjects of the city of Messina (Sicily). *Journal of preventive medicine and hygiene, 55*(1), 17.

Vongxay, V. (2017a). Sexual and reproductive health among adolescents in Lao PDR.

Vongxay, V. (2017b). Understanding teenage pregnancy in Lao PDR A call for action

Vongxay, V. (2018). *Options to Reduce Teenage Pregnancy in Laos*. Retrieved from

Vongxay, V., Albers, F., Thongmixay, S., Thongsombath, M., Broerse, J. E., Sychareun, V., & Essink, D. R. (2019). Sexual and reproductive health literacy of school adolescents in Lao PDR. *PLOS ONE, 14*(1), e0209675.

Wagner III, W. E. (2011). Source of Safe Sex Knowledge and Sexual Behavior Among University Students. *Californian Journal of Health Promotion, 9*(1).

WebMD. (2018). Understanding Sexually Transmitted Disease Prevention. Retrieved from https://www.webmd.com/sex-relationships/understanding-stds-prevention

Weinman, M. L., Small, E., Buzi, R. S., & Smith, P. B. (2008). Risk factors, parental communication, self and peers' beliefs as predictors of condom use among female adolescents attending family planning clinics. *Child and Adolescent Social Work Journal, 25*(3), 157.

WHO. (2008). Health of Adolescents in Lao People's Democratic Republic.

WHO. (2016). Sexually transmitted infections (STIs). Retrieved from http://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis)

WHO. (2018a). Adolescent pregnancy. Retrieved from http://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy

WHO. (2018b). Preventing early pregnancy through appropriate legal, social and economic measures. Retrieved from http://www.who.int/reproductivehealth/topics/adolescence/laws/en/

WHO. (2018c). The Risks of Unsafe Sex and AIDS: The World Health Organization's Response. Retrieved from http://www.who.int/whr/media_centre/factsheet1/en/

WHO. (2018d). Sexually Transmitted Infections among adolescents

The need for adequate health services. Retrieved from http://www.who.int/maternal_child_adolescent/documents/9241562889/en/

WHO. (2019a). Adolescent pregnancy. Retrieved from https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy

WHO. (2019b). Sexually transmitted infections (STIs).

Widman, L., Choukas-Bradley, S., Helms, S. W., Golin, C. E., & Prinstein, M. J. (2014). Sexual communication between early adolescents and their dating partners, parents, and best friends. *The Journal of Sex Research, 51*(7), 731-741.

William C. Shiel Jr., M., FACP, FACR. (2017). Medical Definition of Sexually transmitted disease. Retrieved from https://www.medicinenet.com/script/main/art.asp?articlekey=5472

World Health Organization, G. (2004). Sexually Transmitted Infections.

Annex 1:

Questionnaire

Knowledge of safe sex and STIs among students in Vientiane High School

ID form: _____

Date: _____

Please answer the following questions. Please fill in the blank or mark a check sign **"√"** into the box x "☐" that you chose

Code	No.	Question	Response
A	***Part 1.Individual level characteristics***		
A1	1	What is your age?	Age (years): ……..
A2	2	What is your gender? "Tick one box only"	☐ 0.Female
			☐ 1.Male
A3	3	What is your ethnicity? 'Tick one box only"	☐1.Lao
			☐2.Hmong
			☐3 Khamu
			☐4. Tai
			☐5. Other (Please specify ……..)
A4	4	What is your grade of study? "Tick one box only"	☐1.Grade 10
			☐2.Grade 11
			☐3.Grade 12
B	***Part 2 Family structure***		
B1	1	Whom do you live with? ***''Tick one box only''***	☐1.Parents
			☐2.Single mother
			☐3.Single father
			☐4.Single mother and step father
			☐5. Single father and step mother
			☐6. Others (please specify).....
B2	2	How many people are in your	……people

		family?	
C	***Part 3. Knowledge of safe sex. For each question please ''Tick one box only''***		
C1	1	It is better to have only one sex partner for a sexual relationship	☐1.Yes ☐2.No ☐3.Unsure
C2	2	Condoms are used correctly and consistently for safe sex purposes	☐1.Yes ☐2.No ☐3.Unsure
C3	3	Condoms cannot prevent STIs/HIV infection	☐1.Yes ☐2.No ☐3.Unsure
C4	4	Have sexual intercourse with only one partner without HIV	☐1.Yes ☐2.No ☐3.Unsure
C5	5	Prevention of AIDS means having no sex with risky persons	☐1.Yes ☐2.No ☐3.Unsure
C6	6	Sex during the menstrual cycle cannot protect against pregnancy	☐1.Yes ☐2.No ☐3.Unsure
C7	7	Even first time sexual intercourse can cause pregnancy	☐1.Yes ☐2.No ☐3.Unsure
C8	8	Safe sex (i.e. sex which is free from the risk of unwanted pregnancy and STD/AIDS)	☐1.Yes ☐2.No ☐3.Unsure
C9	9	Condoms can help prevent pregnancy	☐1.Yes ☐2.No ☐3.Unsure

C10	10	The birth control pill can help prevent pregnancy	☐1.Yes
			☐2.No
			☐3.Unsure
C11	11	The birth control injection can help prevent pregnancy	☐1.Yes
			☐2.No
			☐3.Unsure
C12	12	Abstinence can prevent pregnancy	☐1.Yes
			☐2.No
			☐3.Unsure
C13	13	The Intrauterine Device (IUD) can help prevent pregnancy	☐1.Yes
			☐2.No
			☐3.Unsure
D	***Part4. Knowledge of Sexually Transmitted Infections (STIs). For each question please "Tick one box only"***		
D1	1	Syphilis is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D2	2	Influenza is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D3	3	Gonorrhea is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D4	4	Chlamydia is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D5	5	The Human Papillomavirus is sexually a transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know

D6	6	Meningitis is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D7	7	HIV/AIDS is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D8	8	Herpes is a sexually transmitted infection?	☐1.Yes
			☐2.No
			☐3.Don't know
D9	9	Bacteria are a cause of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D10	10	Viruses are a cause of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D11	11	Fungi are a cause of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D12	12	A woman's bad hygiene is a cause of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D13	13	A man's bad hygiene is a cause of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D14	14	Using unclean water is a cause of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D15	15	Sexual intercourse is a route of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know

D16	16	Blood transfusions are a route of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D17	17	Sharing needles is a route of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D18	18	Sharing clothes and personal belongingsis a route of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D19	19	Sharing food is a route of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D20	20	Mother to child feeding? Is a route of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D21	21	Abdominal pain is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D22	22	A discharge from the penis/ vulva is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D23	23	Itching in the genital area is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D24	24	A burning pain during urination is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D25	25	Pain during intercourse is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know

D26	26	Loss of weight is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D27	27	Weakness is a sign and symptom of sexually transmitted infections?	☐1.Yes
			☐2.No
			☐3.Don't know
D28	28	Consistent condom use is a way of preventing STIs	☐1.Yes
			☐2.No
			☐3.Don't know
D29	29	Monogamy is a way of preventing STIs	☐1.Yes
			☐2.No
			☐3.Don't know
D30	30	Getting tested before marriage/ before starting new relationships is a way of preventing STIs	☐1.Yes
			☐2.No
			☐3.Don't know
D31	31	Condoms can help prevent the spread of STIs.	☐1.Yes
			☐2.No
			☐3.Don't know
D32	32	Birth control pills offer excellent protection from STIs	☐1.Yes
			☐2.No
			☐3.Don't know
D33	33	Once you have had an STI and have been cured, you cannot get it again	☐1.Yes
			☐2.No
			☐3.Don't know

E	***Part 5 Interpersonal level***		
	Part 5.1 Family communication. For each question please "Tick one box only"		
E1	1	In your life, how often have you and your family talked about condom use when having sexual intercourse?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
E2	2	In your life, how often have you and your family talked about taking the contraception pill when having sexual intercourse?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
E3	3	In your life, how often have you and your family talked about avoiding multiple sex partners?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
E4	4	In your life, how often have you and your family talked about family planning?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
E5	5	In your life, how often have you and your family talked about STIs including HIV/AIDs?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
E6	6	In your life, how often have you and your family talked about changes during puberty?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
E7	7	In your life, have you ever discussed not having sex before marriage with your family?	□ 0 Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)

E8	8	In your life, how often have you and your family talked about how to use condoms and protecting yourself from becoming pregnant?	□ 0 Never	
			□ 1. Rarely (1-2 times)	
			□ 2. Sometimes (3-5 times)	
			□ 3. Often (6 -more times)	
E9	9	*During questions E1-E8 Which family member talked to you? Click " Yes" if that person is the one who talked with you most and click " "No" if that person never talked with you*		
		9.1. Parents	□ 1. Yes	□ 0. No
		9.2. Mother	□ 1. Yes	□ 0. No
		9.3. Father	□ 1. Yes	□ 0. No
		9.4. Brother	□ 1. Yes	□ 0. No
		9.5. Sister	□ 1. Yes	□ 0. No
		9.6. Other (Please specify……)	□ 1. Yes	□ 0. No
F	***5.2 School related factors***			
F1	1	Do you attend school regularly? ***''Tick one box only''***	□ 1. Yes	
			□ 2. No	
			□ 3. Sometimes	
F2	2	*What about the subjects in which sexual health education is included? Click " Yes" if you have already studied this subject and click "No" if you have not.*		
		2.1 Family planning	□ 1. Yes	□ 0. No
		2.2 STIs including HIV/AIDS	□ 1. Yes	□ 0. No
		2.3 Changes during puberty	□ 1. Yes	□ 0. No
F3	3	*What about the subjects in which sexual health education is included? Click " Yes" if you have already studied this subject and click "No" if you have not.*		
		3.1Biology	□ 1. Yes	□ 0. No
		3.2 Geography	□ 1. Yes	□ 0. No
		3.3 Social Studies	□ 1. Yes	□ 0. No

		3.4 Global Studies	□ 1. Yes □ 0. No
		3.5. Other (Please specify……)	□ 1. Yes □ 0. No
F4	4	How many hours approximately were spent covering sexual health education per week? ***''Tick one box only''***	□ 0. Do not remember □ 1. 1 hour □ 2. 2 hours □ 3. More than 2 hours
F5	5	Does sexual health education provide adequate information about sexual and reproductive health? ***''Tick one box only''***	□1. A rich supply of information □ 2. More than adequate □ 3. Adequate □ 4. Barely adequate □ 5. Certainly not adequate
G	***5.3 Peer related factors For each question please 'Tick one box only''***		
G1	1	In your life, how often have you and your friends talked about condom use when having sexual intercourse?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
G2	2	In your life, how often have you and your friends talked about taking the contraception pill when having sexual intercourse?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
G3	3	In your life, how often have you and your friends talked about avoiding having multiple sex partners?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
G4	4	In your life, how often have you and your friends talked about family planning?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)

G5	5	In your life, how often have you and your friends talked about STIs including HIV/AIDs?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
G6	6	In your life, how often have you and your friends talked about changes during puberty?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
G7	7	In your life, how often have you and your friends talked about how to use condoms and protecting yourself from becoming pregnant?	□ 0. Never □ 1. Rarely (1-2 times) □ 2. Sometimes (3-5 times) □ 3. Often (6 -more times)
G8	8	*During questions G1-G7 which friends talked to you about sexual reproductive health? Click " Yes" if that person is the one who talked with you most , and click " "No" if you never talked to that person .*	
		8.1 General friends	□ 1. Yes □ 0. No
		8.2 Close female friends	□ 1. Yes □ 0. No
		8.3 Close male friends	□ 1. Yes □ 0. No
		8.4Girlfriend / Boyfriend	□ 1. Yes □ 0. No
H	***5.4 Mass media related factors***		
H1	1	*Where do you get information about family planning? Click " Yes" if that source is your favorite, and click "No" if you dislike that source.*	
		1.1 Magazines	□ 1. Yes □ 0. No
		1.2 Films/television	□ 1. Yes □ 0. No
		1.3 Newspapers	□ 1. Yes □ 0. No

		1.4 Radio	□ 1. Yes	□ 0. No
		1.5 Facebook	□ 1. Yes	□ 0. No
		1.6 Twitter	□ 1. Yes	□ 0. No
		1.7 YouTube	□ 1. Yes	□ 0. No
H2	2	*Where do you get information about STIs including HIV/AIDS? Click " Yes" if that source is your favorite, and click" No" if you dislike that source.*		
		2.1 Magazines	□ 1. Yes	□ 0. No
		2.2 Films/television	□ 1. Yes	□ 0. No
		2.3 Newspapers	□ 1. Yes	□ 0. No
		2.4 Radio	□ 1. Yes	□ 0. No
		2.5 Facebook	□ 1. Yes	□ 0. No
		2.6 Twitter	□ 1. Yes	□ 0. No
		2.7 YouTube	□ 1. Yes	□ 0. No
I	***Part 6: Social and cultural factors. For each question please 'Tick one box only"***			
	Religious factors			
I1	1	What is your religious belief?	□ 1. Buddhism	
			□ 2. Animism	
			□ 3. Islam	
			□ 4. Christianity	
			□ 5. Taoism	
			□ 6. Other (please specify…….)	
I2	2	How important is religion in your life? *(1=Notimportant and 5=Very Important)*	□ 1. Not important	
			□ 2. Nominal importance	
			□ 3. Moderate	

			□ 4. Important
			□ 5. Very important
I3	3	How often do you attend religious services (such as going to temple ceremonies or attending basi-soukhwan ceremonies)?	□ 0. Never
			□ 1. Every day
			□ 2. At least once per week
			□ 3. At least once per month
			□ 4. At least once per year
I4	4	Does your religion accept having sexual intercourse before marriage?	□ 1. Yes
			□ 2. No
			□ 3. I do not know
I5	5	Does your religion accept using birth control?	□ 1. Yes
			□ 2. No
			□ 3. I do not know

Thank you very much for your time and sharing

If you have any questions to this study, please do not hesitate to contact to the principal investigator: Mrs. Khonesavanh Inthavong at 020 23300606

Annex2: Tables

Table 1. Detail of the measurements for independent and dependent variables

No.	Variable	Definition	Type of category and measure	Data collection method
Independent variable				
▪ *Individual level characteristics*				
1	Age	Year of birth of participants	Continuous variable …….. Years old	Self-Administered Questionnaires
2	Sex	Based on the WHO sex refers to the socially constructed roles, behaviors, activities and attributes that a given society considers appropriate for men and women (MWIA, 2002)	Bivariate 1= male 2= female	Self-Administered Questionnaires
3	Ethnicity	Ethnicity is derived from a Greek word meaning a people or tribe. The concept of ethnicity is neither simple nor precise, but it implies one or more of the following: shared origins or social background; shared culture and traditions that are distinctive, maintained between generations, and lead to a sense of identity and group; and a common language or religious tradition(Senior & Bhopal, 1994)	Categorical variable 1= Lao 2= Hmong 3= Khmu 4= Tai 5. Other	Self-Administered Questionnaires
4	Level of study/Grade	Level of study refers to the grade of the class which a student attends.	Ordinal variable 1= Grade 10 2= Grade 11 3= Grade 12	Self-Administered Questionnaires

No.	Variable	Definition	Type of category and measure	Data collection method
	▪ ***Interpersonal level***			
	▪ *Family related factors*			
1	Family structure	Each person in a household may belong to only one family. A family includes: either a couple (married or not) and, if applicable, its children; or a person without a spouse and his/her children (single parent family).	Categorical variable 1=Parents 2= Single mother 3= Single father 4= Single mother and step-father 5= Single father and step-mother 6=Other	Self-Administered Questionnaires
2	Family communication on safe sex	Parent–adolescent communication about sexual pressure Parent–adolescent communication was defined as mothers' and fathers' verbal conveyance of information about sexual pressure (Teitelman et al., 2008).	Categorical variable 1=Yes 2=No	Self-Administered Questionnaires
	▪ *School related factors*			
1	Teacher/SE in school	Teacher "means any licensed employee of a school district who has direct responsibility for instruction, coordination of educational programs. Sexuality education is presently not part of the school curriculum, but the government is in the process of introducing healthy lifestyle education, which is provisionally planned to include some sexuality education topics (Education, 2018)	Categorical variable 1= Yes 2= No	Self-Administered Questionnaires
▪ *Peer related factors*				

No.	Variable	Definition	Type of category and measure	Data collection method
1	*Peer/friend communication with friend*	A friend is someone who can be trusted, believed in and looked up to, anytime (Tripathi, 2018)	Categorical variable 1=Yes 2=No	Self-Administered Questionnaires
Media related factors				
1	Mass Media	Mass media means technology that is intended to reach a mass audience. It is the primary means of communication used to reach the vast majority of the general public. The most common platforms for mass media are newspapers, magazines, radio, television, and the Internet. The general public typically relies on the mass media to provide information regarding political issues, social issues, entertainment, and news in pop culture(Study.com, 2018b).	Categorical variable 1=Yes 2=No	Self-Administered Questionnaires
▪ *Social and cultural factors*				
1	Religion	Religion is the set of beliefs, feelings, dogmas and practices that define the relations between a human being and a sacred doctrine or divinity. A given religion is defined by specific elements of a community of believers: dogmas, sacred books, rites, worship, sacraments, moral prescriptions, interdicts, and organization. The majority of religions have developed starting from a revelation based on the exemplary history of a nation, of a prophet or a wise man/woman who taught an ideal of life (Atheism, 2018).	Categorical variable 1=Buddhism 2= Animism 3= Islam 4=Christianity 5=Taoism 6= None or Other (Specify ...	Self-Administered Questionnaires
Dependent variable:				

No.	Variable	Definition	Type of category and measure	Data collection method
	▪			
1	Knowledge of safe sex	Know the ways how to prevent infections and unplanned pregnancies	Categorical variable 13 items measuring a knowledge of safe sex: each item was rated using the options (1= Yes; 2=No; 3= Don't Know/Unsure)	Self-Administered Questionnaires
2	Knowledge of STIs	Identifies or knows the name or type of STIs, cause of STIs, routes of transmission for STIs , symptoms of STIs and types of prevention for STIs	33 items measuring a knowledge of STIs: each item was rated on using the options (1= Yes; 2=No; 3= Don't Know/Unsure)	Self-Administered Questionnaires

Table 2: Communication with different family members about a knowledge of safe sex and STIs

Family member communication	Number (N=337)	Percentage (%)
Parents	119	35.3
Mother	196	58.1
Father	103	30.5
Brother	56	16.6
Sister	90	26.7
Other	11	3.2

Table 3: Communication with different types of friends about safe sex and STIs

Communication with friends	Number (N=337)	Percentage (%)
General friends	102	30.2
Close female friends	248	73.5
Close male friends	142	42.1
Girlfriend/Boyfriend	42	12.4

Annex 3:

Adolescent Consent Form

Title: Knowledge of safe sex and STIs among students in Vientiane High School, Vientiane Capital

My name is Khonesavnh Inthavong from the University of Health Sciences. I am conducting a research study entitled "Student knowledge of safe sex and STIs among high schools in Vientiane Capital 2019". I am asking you to take part in this research because I am trying to learn more about the knowledge of high school students regarding safe sex and STIs. It will take you about 20 minutes to participate. You can stop participating at any time if you feel uncomfortable. No one will be upset with you if you do not want to participate. There will be no punishment nor any negative consequences if you refuse to participate. Your information will be kept confidential and apart from those who are present in the discussion with you, your information will be known to the researcher alone.

If you do not want to participate in this study, please do not sign this consent form. You can indicate that the questions contained in the research study are to your satisfaction below, before signing your approval for the informed consent.

You may ask me any question about this study. You can call me at any time on 020-23300606.

☐Yes, I do agree

☐No, I do not agree

Researcher's Name: _____Researcher's Signature: _____

Date: _____

Student's Signature/ Thumbprint: _____ Date: _____

Annex 4:

Parental/Legal Guardian Consent Form

Title of study: Knowledge of safe sex and STIs among students in Vientiane High School, Vientiane Capital

Dear Parents/Guardians

My name is Khonesavnh Inthavong from the University of Health Sciences. I am conducting a research study entitled "Student knowledge of safe sex and STIs among high schools in Vientiane Capital 2019". I am interested in gaining your child's permission to participate in a research study that I am organizing. The purpose of my work is to learn more about the knowledge of high school students with reference to safe sex and STIs. It will take your child about 20 minutes to participate. Your child can stop participating at any time if he/she feels uncomfortable. No one will be upset with your child if he/she does not want to participate. There will be no punishment nor any negative consequences for your child if he/she refuses to participate. Your child's information will be kept confidential and apart from those who are present in the discussion with your child, your child's information will be known to the researcher alone.

If you do not want your child to participate in this study, please do not sign this consent form. You can indicate that the questions contained in the research study are to your satisfaction below, before signing your approval for the informed consent.

You may ask me any question about this study. You can call me at any time on 020-23300606.

☐Yes, I do agree

☐No, I do not agree

Researcher's Name: _____Researcher's Signature: _____

Date: _____

Annex 5:

Lao ethical approval

Lao's People Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of Health
University of Health Sciences
Ethic Committee

No: 103 /18

Tel: 021 245820

Vientiane, Date 12 / 12 / 18

Ethical Clearance

- According to the Ethic Committee's declaration of the University of Health Sciences Number: 3809/UHS.15, dated 1 Sep, 2015.
- According to the letter of request for Ethical Clearance of Ms Khonesavanh Inthavong, Master of Public Health, faculty of Public Health, University of Health Sciences. for research entitled: **« Knowledge on safe sex and STIs among students in Vientiane high schiil, Vientiane Capital »**

The Ethic Committee of the University of Health Sciences approved the research proposal of this study before it is initiated. This study is committed in compliance with local requirements, to confirm that it is without the physical and psychological harm of the participants as well as the ethical issues for health research. However, we believed that this study/project will contribute to a great importance of health promotion; it will also be a direct and indirect participants' beneficial and to be a crucial database in the further research of the University of Health Sciences and Health sectors in the country.

Hence, the Ethic Committee of the University of Health Sciences sincerely agreed to approve in term of ethical clearance for this study/project.

President of the
University of Health Sciences

President of the
Ethical research committee

Annex 6:

Vietnamese ethical approval

MINISTRY OF HEALTH
HANOI UNIVERSITY OF PUBLIC HEALTH

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom - Happiness

No.:464/2018/YTCC-HD3
Subject: Ethical Approval

Hanoi, December 12th, 2018

DECISION
On Ethical approval for research involving human subject participation
THE CHAIR OF THE ETHICAL REVIEW BOARD FOR BIOMEDICAL RESEARCH
HANOI UNIVERSITY OF PUBLIC HEALTH

- Based on Decision No. 560/QĐ-ĐHYTCC by the Dean of Hanoi School of Public Health on Establishment of The Institutional Ethical Review Board of Hanoi School of Public Health; 16 May 2016;
- Based on decision No. 651/QĐ-ĐHYTCC by the Dean of Hanoi School of Public Health on the Issuing Regulation of the Institutional Ethical Review Board of Hanoi School of Public Health; 26 June 2015;
- Based on the minutes of meeting to review ethics application No. **018-464/DD-YTCC** dated December 12th, 2018,

DECIDED:

Article 1. Grant ethical approval for ethnographic study project:
- Project Title: **Knowledge on safe sex on safe sex and STIs among students in Vientiane high school, LAO PDR**
- Principal Investigator: **Khonesavanh Inthavong,** Hanoi University of Public Health
- Supervisors: Dr. Le Thi Hai Ha – Hanoi University of Public Health
  Dr.Vanhphanom Sychareun
- Project time: from 10/2018 to 05/2019
- Data collection time: from 12/2018 to 01/2019
- Review type: Expedited review

Article 2. This decision is effective from **12/12/2018** to **30/05/2019**

Article 3. Principal Investigator has to send progress report once each year and a final report upon the study completion to the Institutional Ethical Review Board of Hanoi University of Public Health (IRB of HUPH).

Article 4. Principle Investigator should notify (IRB of HUPH) immediately of any adverse effects arising from this study (e.g. unexpected adverse outcomes, unexpected community/subject risk factors or complaints, etc.). Active research projects are subject to random audit by the IRB of HUPH.

CHAIR OF HUPH IRB
(Signature and full name)

Ha Van Nhu

SECRETARY
(Signature and full name)

Nguyen Thi Minh Thanh

Annex 7: Thesis comment

HANOI UNIVERSITY OF PUBLIC HEALTH

THESIS COMMENT FORM OF MASTER PROGRAM

(For reviewer of thesis defence committee – Master Program)

Thesis topic: Knowledge of safe sex and STIs among students at Vientiane high school, Vientiane Capital

Thesis code: *(Written on the right corner of thesis cover page)*

Hanoi, Date 20th May, 2019

1. Thesis topic has correct orientation and specialized codes (Master of public health applied science orientation/ Master of public health applied research orientation)

Yes..

Student should have carefully proved reading for spelling and grammar for the thesis.

2. Thesis title:

1. Comments: The thesis is on track and inline with Master of public health - applied science track

2. Which part need to be edited, (if any): …….

Need to add time of the study: 2019

3. Research summary:

1. Comments: Summary reflect shortly the contents of the thesis.
   Recommendation about large need school based sexual education is not so related to the conclusion

2. Which part need to be edited, (if any): …….

Add abstract of the thesis.

4. Introduction:

1. Comments: ……..

Introduction is too long, it should be only 1 – 1.5 page

Check STIs: sexual transmitted infections (not transmissible)

If study want to investigate the effectiveness of life skill curriculum since 2003, the study should have another design, if not, you can withdraw paragraph 2 in page 2

2. Which part need to be edited, (if any): ……

5. Research Objectives:

1. Comments:

Objectives need to be SMART with year 2019

2. Which part need to be edited, (if any): ……

6. Literature review:

- Student have read and referred to good references, however this Chapter needs some revisions:
- Structure: you should move 1.3 Consequences of unsafe sex right after 1.1 Definition, and then source of knowledge …
- Contents need to be matched with the headings:
  - Do not have a norm/standard of what should be knowledge on safe sex and STIs, so that you can develop content of your questionnaire
  - 1.2 Source of knowledge on safe sex etc: you need to mention about different types of source for example: school program, television, peer etc. The content now is just mention about how sexual education is important
  - 1.3. Consequences of unsafe sex and STIs: the content now just mentions about diseases, but not other issues: pregnancy, social consequences
  - 1.4. title should be "situation of Knowledge/Awareness on safe sex among adolescents" and you should remove some paragraphs which are not relevant such as behaviour
  - 1.5 Situation of knowledge on STIs among adolescents
  - Page 13 paragraph 2: content not match with title (Sex)
  - 1.6.2: do not see how family, teacher, peer and mass media, religions are associated with knowledge of adolescents

- You need to clarify watching, consumption and exposure clearly

2. Which part need to be edited, (if any): …….

As above…

7. Subjects and research methods:

1. Comments: (i) Subjects are suitable to objectives; (ii) Sample size and sample selection are appropriate and feasible; (iii) Variables/contents are suitable to objectives, orientation and specialized codes; (iv) Data collection is clear, feasible and appropriate with research content; (v) Data analysis and research ethic are written clearly and appropriately; (vi) Other comments (if any):

   - Sample size: expected proportion of WHAT?
   - 2.7 definitions should be moved to Literature review
   - Why you can have score of 7.4, 17.3? in page 28 and 29
   - 2.8 definitions in table 2.2 are too long, should be moved to literature review for development of questionnaire
   - Ethics: need to be more specific on how student keep data confidential. Decision number from HUPH and UHS should be stated in 2.10

2. Which part need to be edited, (if any): ……..

As above……

8. Research results:

1. Comments: (i) Research results are suitable with objectives, orientation and specialized codes; (ii) Research result is presented clearly and followed by objectives; (iii) Using data analysis appropriately and ensuring confidence of these methods; and other comments (if any): ……

   - 3.6 – 3.12 are not belong to objective 1 or 2, those can be parts of objective 2 but in short form

2. Which part need to be edited, (if any): ……

As above

9. Discussion:

1. Comments: (i) Structure/Content of this part are suitable to objective and research results; (ii) Reference citation is correct: ……

Good discussion

2. Which part need to be edited, (if any): ……

…As above…...

10. Conclusion:

1. Comments: (The main research result are given in this part and suitable to objectives)

Should have 2 separate conclusions

Not include recommendation in this Chapter…

2. Which part need to be edited, (if any): ……..

As above

11. Recommendations

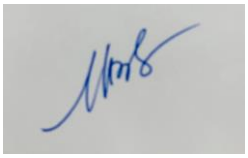
1. Comments: The recommendation is given appropriately and based on research results: Recommendations are not based on research results: 1, 2, 3, 4, 5

2. Which part need to be edited, (if any): ……

12. FINAL CONCLUSION: (NEED TO BE CLEARLY STATE):

[ ] Approval [x] Approval with some conditions [ ] Reject

Reviewer



Nguyên Ngọc Bich

HANOI UNIVERSITY OF PUBLIC HEALTH

THESIS COMMENT FORM OF MASTER PROGRAM

(For reviewer of thesis defence committee – Master Program)

Thesis topic: THESIS TITLE

Knowledge of safe sex and STIs among students at Vientiane high school, Vientiane Capital

CODE: MPH1730062

……, Date.....Month.....year 2019

13. Thesis topic has correct orientation and specialized codes (Master of public health applied science orientation/ Master of public health applied research orientation)

Yes

……..…

14. Thesis topic:

1. Comments

   Fine

……

……

2. Which part need to be edited, (if any): …….

……

……

15. Research summary:

1. Comments:

- Good but the results are difficult to understand: e.g. fist sentence (what does but mean) and the associations, what do they mean. I think it is mainly an issue of English, but please adapt. Further, the conclusions and results do not seem to match clearly (in depth is lacking?? What about the predictors).

……

……

……

2. Which part need to be edited, (if any):

- make results in the abstract understandable. More to the point

……

……

……

16. Introduction:

1. Comments:

- apart from the English it is fine. Would have liked to see already some of the potential factors explained in the intro. But this is done thereafter

2. Which part need to be edited, (if any):

English editing ……

……

17. Research Objectives:

1. Comments:

Well done

……

……

2. Which part need to be edited, (if any): …….

……

……

18. Literature review:

1. Comments: (structure and content of literature review are coherent with objectives and research topic, use updated reference and citation correctly, and other comments (if any):

- The review is coherent with the objective, but long. Citation is done correctly.
- The most important part – on factors – is largely structured according to the socio-ecological model. Please make this explicit in the text
- The methodological explanations under theoretical model need to be moved to methodology part

2. Which part need to be edited, (if any): …….

……

……

……

19. Subjects and research methods:

1. Comments: (i) Subjects are suitable to objectives; (ii) Sample size and sample selection are appropriate and feasible; (iii) Variables/contents are suitable to objectives, orientation and specialized codes; (iv) Data collection is clear, feasible and appropriate with research content; (v) Data analysis and research ethic are written clearly and appropriately; (vi) Other comments (if any):

- The methods are well described
- Please make explicit the questionnaire used (based on what existing questions) and what was done to ensure validity
- Why did you make the choice for having the cut-of point of low/high knowledge at the middle. Why not make it contionus, or more scales.

2. Which part need to be edited, (if any): ……..

……

……

20. Research results:

1. Comments: (i) Research results are suitable with objectives, orientation and specialized codes; (ii) Research result is presented clearly and followed by objectives; (iii) Using data analysis appropriately and ensuring confidence of these methods; and other comments (if any):

- the results are too much. You provide all information. You can better focus on what is really important

- for knowledge you don't find any realtions. Perhaps this is partly due to dichtonomising the findings, high and low knowledge. Especially as most are around the cut-off poing as the mean is 1.30 and SD 5.095 **17.30 ± 5.095: in other words you are comparing means that are perhaps similar.**

2. Which part need to be edited, (if any):

- write more concise, choose what is important

- don't have text on pages in landscape

……..

……..

21. Discussion:

1. Comments: (i) Structure/Content of this part are suitable to objective and research results; (ii) Reference citation is correct:

Okay, this is ok

But it feels that in your result the most important factor was ‘discussing with peers’ in your discussion you pay more attention to the school? Why>? I would argue that stimulate peer to peer discussion would be the most important recommendation/ conclusion……

……

2. Which part need to be edited, (if any):

Discuss the peer to peer more……

……...

……....

22. Conclusion:

1. Comments: (The main research result are given in this part and suitable to objectives)

I think the statements on ‘in depth knowledge’ are rather odd. Did you measure in-depth? And what does in-dpeth mean? Do your questions actually say something about in-dpeth, and then when would you consider it in depth (how many right answers are needed?) Or would you rather say, that many have insufficient/low knowledge

3. Which part need to be edited, (if any):

……

……

23. Recommendations

1. Comments: The recommendation is given appropriately and based on research results:
2. Which part need to be edited, (if any):

- More attention to peer/peer

- Be more specific what do stakeholders need to do and when. The recommendations are vague now
- Is there need for more research or not? And what kind of research (intervetnions research, what works)

24. FINAL CONCLUSION: (NEED TO BE CLEARLY STATE):

[x] Approval [ ] Approval with some conditions [ ] Reject

I read the thesis with great interest. My congratulations to the author. The argument is build up well and the study solid. The topic is of imporatnceThe most important issues are:

- English editing is needed for publication
- The cut-off points for statistical analysis are not well supported and alternatives can be used, or should at least be discussed
- Maybe I miss-read, but the strongest predictors seem to be discussions with peers. This is hardly discussed/recommended. Please emphasise this more.

(Notes: Please do not WRITE your name because this is a hidden comment round)

Reviewer

Dr. Dirk Essink

Annex 8: Minutes of explanation

MINISTRY OF HEALTH

HANOI UNIVERSITY OF PUBLIC HEALTH

FORM

MINUTES OF EXPLANATION

AFTER THESIS/PROPOSAL DEFENCE

Full name: Ms. Khonesavanh Inthavon. MPH 1

Thesis title: Knowledge of safe sex and STIs among students at Vientiane High School, Vientiane Capital, 2019

TT	Comments *(List all comments followed by outline/dissertation/thesis/thematic structure)*	Student's explanations detail *(Clearly state how, which part, page that student edits. if students disagree, reasons should be indicated)*
1	Orientation and specialized codes	
	……	
2	Thesis topic	
	….	
3	Abstract	
	….	
4	Introduction	
	…	
5	Objectives	
	…	
6	Review of Literature/Theoretical framework	

	• Interpret study finding comparing with the knowledge and more explanation / Comparing the finding with others references and our stud. • Literature review some content did not match with title 1.6.1 -1.6.2	• I add more other research for Measurement of knowledge on safe sex and STIs. Page 10-11 • Some sentence I cut and some paragraph I add more for each factor to associated with knowledge of adolescents with title 1.6.1 -1.6.2. Page 20-25
7	Objects and research methods	
	• Method How to put the score via which references/Cut of point is need to revised • Move table variable in annex (page 34 move to annex) • Ethical approval: Please put decision number from HUPH and UHS	I revise how to put the score and which reference how to measurement of knowledge on safe sex and STIs. Page 37-38 • I move Variables table from page 36 to annex2 table 1. Page 84-86 • I put approval number decision from HUPH and UHS. Page 38
8	Study results	
	• Need to look back with the measurement of low and high score/ More interpretation from the result step by step from the simple one. Making two group of analysis what kind of knowledge that need to analyses. • Result need to revised more clear and group variable together	• Revised sentence for the measurement which based on mean score for measurement of level knowledge on safe sex and STIs. Page 43 to page 44 • The group variable such as Age I change the group age from 14-17 and 18-10 to 14 -16 Years old and 17-20 which based on mean age. Page 39. - Select some necessary variable associate to outcome variable in Univariate analysis Page 51, 54,56,57 -The final model (Multivariate logistic analysis) associated with knowledge of

		safe sex and STIs some point change after devise new group age based on mean age to analysis in Univariate and Multivariate such as - For the knowledge of safe sex (95%CI and P-value change some number) Page 58 - For the knowledge of STIs have only 3 factors associate with STIs such as Grade, Topic study about family planing, Topic study about STIs including HIV/AIDS. Page 58
9	Discuss	
	• Discussion: discuss on literature and compare with her study / Discussion about the score of means and analyse. Comparing the finding with others references and our study	• I discuss on literature and compare with my study about the knowledge score measurement. Page 63-64 • Based on guideline I move limitation from mythology part to discussion part. Page 65-66
10	Conclusions	
	• Conclusion exclude the recommendation based on objective	• I cut some point were not related on objective. Page 67
11	Recommendations	
	• Recommendation: based on the evidence	• I cut some point were not related on objective. Page 68
12	References	
	…	
13	Questionnaire	
	…	

14	Other comments	
	• Abbreviation order	I revise by alphabet abcd. Page IV

Notes:

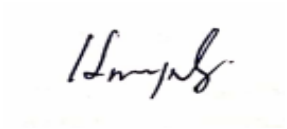
- Use lines to separate each comments and explanations. Comments and equivalent explanations stay at the same row.
- Explanations should be written by following thesis structure (if any). Students do not mention the examiners' name

Day month year 2019

Student

(Sign and full name)

Ms. Khonesavanh INTHAVONG

1st supervisor	**2nd supervisor**	**Supporting lecture (if any)**
(Sign and full name)	*(Sign and full name)*	*(Sign and full name`)*
		
Dr.Vanphanom Sychareun	Dr.Le Thi Kim Anh	

Examiners' comments *(if any)*:

……..

Day month year

On behalf of the committee

(Sign and full name)

Dr. Sengchanh KOUNNAVONG