YANGON UNIVERSITY OF ECONOMICS

DEPARTMENT OF STATISTICS

Ph.D. PROGRAMME

DETERMINANTS OF CERVICAL CANCER AWARENESS, KNOWLEDGE AND PREVENTIVE PRACTICE AMONG WOMEN IN TAUNGOO

YIN YIN WINT

OCTOBER, 2019

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DETERMINANTS OF CERVICAL CANCER AWARENESS, KNOWLEDGE AND PREVENTIVE PRACTICE AMONG WOMEN IN TAUNGOO

Submitted in Partial Fulfillment of the Requirement for the Degree of Doctor of Philosophy (Ph.D.) of the Department of Statistics, Yangon University of Economics

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This is to certify that this dissertation entitled "**Determinants of Cervical Cancer Awareness, Knowledge and Preventive Practice among Women in Taungoo**" submitted as the requirement for the Degree of Philosophy (Ph.D.) has been accepted by the Board of Examiners.

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I hereby certify that the contents of this dissertation are wholly my own work unless otherwise referenced or acknowledged. Information from sources is referenced with original comments and ideas from the writer herself.

Yin Yin Wint

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ABSTRACT

Cervical cancer is the second most common cancer among women worldwide but the first most common cancer among 15-44 years women in Myanmar. This study aims to investigate the factors affecting on awareness, knowledge and preventive practice of cervical cancer among women in Taungoo. Two stage sampling technique and logistic regression analysis were applied to explore the significant factors of awareness, knowledge and preventive practice on cervical cancer. It was found that the number of children, education level and cancer history are the influencing factors of awareness of cervical cancer. It was observed that women's age, education level, occupation and monthly family income are significant predictors of knowledge about signs and symptoms of cervical cancer. In the analysis of risk factors knowledge, women's age, number of children, education level, occupation and having health personnel in family member are significant factors. Moreover, women's age, marital status, education level, occupation, monthly family income and type of cancer history are the determinants of the knowledge concerns with cervical cancer prevention, vaccination, screening and treatment methods. The binary logistic regression analysis shows that woman's age, monthly family income and having cervical cancer history either herself or in her surroundings are the influencing factors of cervical cancer vaccination. However, only women's education level and cervical cancer history are statistically associated with practice on screening of cervical cancer. This study also found that women with higher knowledge and women who got information about cervical cancer from health personnel are more likely to take preventive practice of cervical cancer than others.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ASEAN	The Association of Southeast Asian Nations
BC	Before Christ
CBOs	Community Based Organizations
CCPC	Cervical Cancer Prevention and Control
CDC	Centers for Disease Control and Prevention
CIN	Cervical Intraepithelial Neoplasia
DES	Diethylstilbestrol
DNA	Deoxyribonucleic Acid
GLOBOCAN	Global Cancer Incidence, Mortality and Prevalence
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
HSIL	High-grade Squamous Intraepithelial Lesion
IARC	International Agency for Research on Cancer
ICC	Invasive Cervical Carcinoma
ICO	International Cancer Organization
INGOs	International Non-government Organizations
IUD	Intrauterine Device
MDG	Millennium Development Goals
MMWCA	Myanmar Maternal and Child Welfare Association
MOHS	Ministry of Health and Sports
NCDP	National Comprehensive Development Plan
NGOs	Non-government Organizations
OCs	Oral Contraceptives
PAP SMEAR	Papanicolaou Smear Test
PATH	Program for Appropriate Technology in Health
SIL	Squamous Intraepithelial Lesion
UICC	Union for International Cancer Control
UNJDB	UN Joint Global Program
USD	United States Dollar
USPSTF	US Preventive Services Task Force

VIA	Visual Inspection of the Cervix with Acetic Acid
VILI	Visual Inspection with Lugol's Iodine
WHO	World Health Organization
WHP	Women's Health Program
WHRU	Women's Health Research Unit

CHAPTER 1
INTRODUCTION

1.1 Rationale of the Study

The Constitution of the World Health Organization (WHO) defines health as “a state of complete physical, mental and social well-being not merely the absence of disease or infirmity". Health and well-being are resources that enable individuals to thrive and reach their full potential. Poor health results in high rate of absenteeism and turnover, industrial discontent and indiscipline, poor performance, low productivity and more accidents (Sartorius, 2006). Today, as the developing world is going through rapid societal and economic changes, the shifts toward lifestyles of typical of industrialized countries lead to a rising burden of cancers. Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. Over 100 types of cancers affect humans. It is also a leading cause of disease worldwide, with an estimated 18.1 million new cancer cases and 9.6 million deaths in 2018. About 1 in 6 deaths is due to cancer (IARC, 2018). By the projections based on the GLOBOCAN, 2012 there will be a substantive increase of 19.3 million new cancer cases per year by 2025, due to growth and aging of the global population. About 20% of males and 17% of females will get cancer while 13% of males and 9% of females will die from it (WHO, 2013). Therefore, cancer is a worldwide public health problem nowadays.

Cancer afflicts all communities worldwide. It has a severe impact on individuals and communities. Not only does it lead to disability and death, its treatment costs and associated loss of income can quickly undermine family finances. There are five main types of cancer that affect women's reproductive system, namely cervix, ovary, uterus, vagina and vulva. Of these, the most common one is cervical cancer. Predisposing factors for cervical cancer include early age at first sexual intercourse, multiple sexual partners, a husband who has had intercourse with multiple women, smoking and in women who are immune suppressed (American Cancer Society, 2017). Very few countries have functioning, cancer registries and record-keeping are minimal or non-existent. Some of the figures quoted in the literature are hospital-based, which represent a small fraction of women dying from cervical cancer, as most women cannot access hospital care and die at home.

The burden of cervical cancer is distributed unequally between developed and developing countries. Globally, every two minutes, at least one woman dies from cervical cancer. It is common among women in the reproductive age of 15 to 49 years. It is the fourth most common cancer among women worldwide, with an estimated 569,847 new cases of cervical cancer and 311,365 deaths from cervical cancer in 2018. WHO estimates there will be 443,000 deaths per year by 2030, an increase of 67%.

According to the data from the Yangon Cancer Registry (1993-2000), the three most common cancers for women are cervix (Ca cervix), breast (Ca breast) and lung (Ca lung) in Myanmar. Cervical cancer ranks as the 2nd most frequent cancer among women and the 1st most frequent cancer among women between 15 and 44 years of age. Myanmar has a population of 20.19 million women aged 15 years and older who are at risk of developing cervical cancer. Current estimates indicate that every year 5286 women are diagnosed with cervical cancer and 2998 die from the disease (ICO/IARC, 2017).

According to the 2011 Action Study (ASEAN costs in Oncology) cervical cancer affects married women more than single women and most patients are aged between 40 and 60. According to the latest WHO data published in 2017 cervical cancer deaths in Myanmar reached 3,027 which was 77% of the total death. The age adjusted death rate is 12.11 per 100,000 of population ranked Myanmar as 70 in the world. The main cause of cervical cancer is infection with the genital Human Papilloma virus [*papillomavirus*] or HPV. If it can be found in the early stages, it is easier to have medical treatment. It is a serious burden on the reproductive health of women, despite the fact that it is preventable. The easiest way to prevent cervical cancer is screening. Screening and treatment tools that can significantly reduce premature illness and death from cervical cancer are currently available. However they do not reach most of the women living in the developing world. Many countries are lack of knowledge about cervical cancer with outdated policies and guidelines so that they need training for clinicians to adopt new technologies, as they lack tertiary care for advanced cases (PSI, 2018). Too often, women are not even aware of cervical cancer as a potential health risk.

The impact of cervical cancer has nowadays become a major public health problem, especially in developing countries because cervical cancer incidence is mostly found in poor socio-economic status of women and the effect of cancer is

suffered not only by the patients but also by the family members of their financial, social and many other cases. The biggest impacts of cervical cancer are in poverty, education, and gender equity. Cervical cancer has significant economic costs over the short- and long-term. Family members may lose work opportunities and can incur overwhelming medical costs while caring for women with cancer. Reduction in family income resulting from the cancer of a working-age adult can force remaining family members to prioritize immediate needs (food and shelter) over investment in human capital (e.g. education).

Early detection and diagnosis can greatly increase the chances for successful treatment. But lack of awareness and deep-seated stigma associated with the disease also poses significant barriers to access. Awareness of the possible warning signs of these cancers among the general public is a necessity for prevention of cervical cancer. In some countries, traditional cultural attitudes towards modesty could be prevented women at risk from seeking early treatment for a deadly disease. One factor in late detection is the reluctance of women to violate traditional attitudes of shame and embarrassment about one's body, as well as a lack of awareness about the disease and how to prevent it. There is a need to widely publicize women about the negative consequences of not having cervical cancer screening. Awareness raising campaign and health education sessions has become important in reducing the negative barriers among women.

Cervical cancer is curable if detected and treated at an early stage. In developing countries, cervical cancers are often diagnosed only at very late stages due to the poor or even lack of better screening and treatment methods (WHO, 2002). Primary prevention of cervical cancer aims at reducing the incidence of cervical cancer by controlling the causes and risk factors. The preventive measures include screening and treatment of premalignant cervical lesion. The most common screening methods are Papanicolaou Smear test (PAP) and Visual Inspection of the Cervix with Acetic Acid (VIA) test. For the prevention methods to be fully utilized, women need to be aware of the availability of the methods and to have knowledge of the disease and prevention methods. They will enhance the uptake of the vaccination and screening and reduction of morbidities and mortalities resulting from cervical cancer (Tapera, R. et al., 2017). This study aims to find out how knowledgeable these women are and what their attitude, awareness, vaccination and screening practice for cervical cancer, which are the keys factors for the prevention of cervical cancer.

1.2 Objectives of the Study

The objectives of the study are:

(i) to assess the condition of cervical cancer awareness, knowledge and practice on vaccination and screening among women and

(ii) to explore the determinants of awareness, knowledge and practice on vaccination and screening of cervical cancer among women.

1.3 Method of Study

A cross-sectional study was used to identify the determinants of awareness, knowledge and practice on vaccination and screening of cervical cancer among women in Taungoo. According to 2018 records of the population from Wards and Villages General Administrative Offices in Taungoo, the study area consists of 23 Wards, 15,216 housing units and 17,107 households. The total population is 86768. The male population is 39,890 and the female population is 46,878. The female population of 18 years and above is 33433 and it is 71.32% of the female population. In this study, the target population is women aged 18 years and above in urban area of Taungoo.

The two-stage sampling technique was used to select a sample of females aged 18 years and above. In the first stage, a random sample of 7(30%) wards was selected from 23 wards. In the second stage, sample households were proportionately selected from the wards chosen at the first stage. A sample of women with aged 18 years and above was chosen from each sample household. In the selected household, if there were more than one woman of 18 years and above age group, only one of them was taken. In the selection, sick women who were not able to participate and difficult to answer the questionnaire were excluded. If there was no woman for the target age group, the other household was selected to meet the required sample size. To avoid missing respondents in houses, interview was done after working hours and during weekends. Master's degree holders were employed to assist the data collection and they were trained on the basis of appropriate data collection methods.

Binary and multinomial logistic regression analyses were used to determine the factors that influence awareness, knowledge and practice on vaccination and screening of cervical cancer among women in Taungoo.

1.4 Scope and Limitations of the Study

In this study, the target population consists of women aged 18 years and above in Taungoo, Bago Region. The urban area was selected as the study area because there were health facilities for cervical cancer screening and vaccination. Similar studies were already conducted in upper and lower Myanmar. The reason for choosing this area is that no similar studies have been conducted.

1.5 Organization of the Study

The study is organized into five chapters. Chapter 1 provides an introduction of the study. It focuses on the rationale of the study, objectives of the study, method of study and scope and limitations of the study. It also provides the organization of the study at the end of this chapter. Chapter 2 deals with the literature review, which includes research studies about cervical cancer, such as how to prevent cervical cancer, treatment of cervical cancer, burdens of cervical cancer in global and Myanmar, and related previous studies. Chapter 3 is concerned with methodology. It includes research design, sampling methods, measures and analysis utilized in this study. Chapter 4 deals with the empirical results and findings while Chapter 5 focuses conclusion which is based on the results of the study.

CHAPTER 2
LITERATURE REVIEW

2.1 The Global Burden of Cancer

WHO defines cancer as a collective term used to classify a set of diseases, affecting any area of the body, which is characterized by the rapid proliferation of abnormal cells that have the potential to metastasize to other areas of the body. It also refers to a group of illnesses that result from cells in the body growing abnormally. These cells divide and produce new cells in an uncontrolled way that can spread throughout the body and cause damage to essential organs. The body is made up of trillions of living cells. All these cells in our body have certain jobs to do. Normal body cells grow, divide to make new cells, and die in an orderly way. During the early years of a person's life, normal cells divide faster to allow the person to grow. After the person becomes an adult, most cells divide only to replace worn-out or dying cells or to repair injuries.

Because of damage to DNA (Deoxyribonucleic Acid), normal cells change into cancer cells. DNA is present in every cell and directs all its actions. In a normal cell, the cell either repairs the damage or dies when DNA is damaged. In cancer cells, the damaged DNA is not repaired, but the cell does not die. Instead, this cell goes on making new cells that the body does not need. These new cells will all have the same damaged DNA as the first abnormal cell does. People can inherit damaged DNA, but most often the DNA damage is caused by mistakes that happen while the normal cell is reproducing or by something in our environment. Sometimes the cause of the DNA damage is something obvious, like cigarette smoking. But often no clear cause is found. From the earliest times, physicians have puzzled over the causes of cancer. Ancient Egyptians blamed cancers on the gods. In 3000 BC, cancer (although the word cancer was not used) was discovered in Egypt.

The origin of the word cancer is credited to the Greek physician Hippocrates (460-370 BC) considered as the “Father of Medicine". He used the terms Carcinos and Carcinoma to describe non-ulcer forming and ulcer-forming tumors. In Greece, these words refer to a crab. Galen (130-200 AD), another Greek physician, used the word Oncos (Greek for swelling) to describe tumors. Although the crab analogy of

Hippocrates and Celsus is still used to describe malignant tumors, Galen's term is now used as a part of the name for cancer specialists – oncologists.

The Roman physician, Celsus (28-50 BC), later translated the Greek term into cancer. Physicians believed the cause of cancer in different ways (Sudhakar, 2010). They defined different theories.

Humoral Theory

Hippocrates (460-370 B.C) believed that the body had 4 humors (body fluids): blood, phlegm, yellow bile, and black bile. When the humors are balanced, a person is healthy. An excess of black bile in various body sites is thought to cause cancer.

Lymph Theory

Among the theories that replaced the Humoral theory of cancer was the formation of cancer by another body fluid, lymph. Life was believed to consist of continuous and appropriate movement of the fluid parts of the body through the solid parts. Of all the fluids, the most important were blood and lymph. Stahl and Hoffman theorized that cancer was composed of fermenting and degenerating lymph, varying in density, acidity, and alkalinity. John Hunter, the Scottish surgeon from 1700s, agreed that tumors grow from lymph constantly thrown out by the blood.

Blastema Theory

In 1838, German pathologist Johannes Muller demonstrated that cancer cells developed from budding elements (blastema) between normal tissues. Rudolph Virchow (1821-1902), the famous German pathologist, determined that all cells, including cancer cells, are derived from other cells.

Chronic Irritation Theory

Rudolph Virchow proposed that chronic irritation was the cause of cancer, but he believed incorrectly that cancers "spread like a liquid." In the 1860s, Germansurgeon, Karl Theirsch, showed that cancers metastasize through the spread of malignant cells and not through some unidentified fluid.

Trauma Theory

Despite advances in the understanding of cancer, from the late 1800s until the 1920s, trauma was thought by some to cause cancer. This belief was maintained despite the failure of injury to cause cancer in experimental animals.

Infectious Disease Theory

Zacutus Lusitani (1575-1642) and Nicholas Tulp (1593-1674), the two physicians from Holland, concluded that cancer was contagious. Throughout the 17th and 18th centuries, some believed that cancer was contagious. Although human cancer is not contagious, certain viruses, bacteria, and parasites can increase a person's risk of developing cancer.

Generally, worldwide trends show that in developing countries going through rapid social, economic and lifestyle changes, typical industrialized countries leads to a rising burden of cancers associated with reproductive, dietary, and hormonal risk factors. Incidence has been increasing in most regions of the world, but there are huge inequalities between rich and poor countries. Incidence rates remain highest in more developed regions, but mortality is relatively much higher in less developed countries due to lack of early detection and access to treatment facilities.

A person's risk of developing cancer depends on many factors. Cancer is caused by external factors, such as tobacco, infectious organisms, an unhealthy diet, and internal factors, such as inherited genetic mutations, hormones, and immune conditions. These factors may act together or in sequence to cause cancer.

Cancer risk factors are overall similar worldwide. According to the 2015 cancer project, smoking is the single most prevalent cause of death in the world, and around one third of tobacco-caused deaths are due to cancer. Most of the world's smokers live in low or middle income countries. Alcohol drinking causes an estimated 6% of deaths worldwide, around 1 in 8 of which are due to cancer. Alcohol drinking prevalence is highest in Europe and America. Unhealthy diets, such as low in fruit and vegetables and high in salt are becoming more common in lower-resource countries. Overweight and obesity are responsible for most of cancer and the leading causes of death worldwide. Overweight and obesity prevalence is increasing, particularly in low- and middle-income countries. Infections cause 18% of the global cancer burden, with a much higher proportion in low-income countries.

According to estimates by the International Agency for Research on Cancer (IARC), there were 12.7 million new cancer cases in 2008 worldwide, of which 5.6 million occurred in developed countries and 7.1 million in developing countries. The corresponding estimates of total cancer deaths in 2008 were 7.6 million (about 21,000 cancer deaths a day), 2.8 million in developed countries and 4.8 million in developing countries.

The most common types of cancer also vary by geographic area. Factors that contribute to geographic differences in cancer occurrence include variations in the age structure of the population, the prevalence of risk factors, the availability and use of diagnostic tests (e.g., for cancer screening) and the availability and quality of treatment. For example, infections associated with cancer are more common in developing than developed countries. In developing countries, the three most commonly diagnosed cancers are lung, liver, and stomach in males, and breast, cervix uteri, and lung in females.

As a result, in 2012, two of the five leading cancers in men (liver and stomach) and women (cervix and stomach) in developing countries were related to infection. Stomach cancer continued to be the most common infection-related cancer worldwide, followed closely by the liver and cervix. Approximately 16% of all incident cancers worldwide are attributable to infections. This percentage is about three times higher in developing countries than in developed countries.

In 2012, one in seven deaths was due to cancer. There were 14.1 million new cancer cases in worldwide, of which 8 million occurred in developing countries, which contain about 82% of the world's population. These estimates did not include non-melanoma skin cancers, which are not tracked in cancer registries. The corresponding estimates of total cancer deaths in 2012 were 8.2 million (about 22,000 cancer deaths a day), 2.9 million in developed countries and 4.3 million in developing countries. More than 6 in ten cancer deaths worldwide occur in less developed regions of the world. More than half of all cancers (56.8%) and cancer deaths (64.9%) in 2012 occurred in less developed regions of the world, and these proportions will increase further by 2025. In 2018, the new cancer cases increased to 18.1 million and 9.6 million deaths.

The estimated future cancer burden will probably be considerably larger due to the adoption of lifestyles that are known to increase cancer risk, such as smoking, poor diet, physical inactivity and fewer pregnancies in developing countries.

2.2 Cervical Cancer

There are five main types of cancer that affect a woman's reproductive organs: cervical, ovarian, uterine, vaginal, and vulva. When cancer starts in the cervix, it is called cervical cancer. Cervical cancer starts in the cells lining the cervix. This is sometimes called the uterine cervix. The cervix is the lower, narrow end of the uterus.

The cervix connects the vagina (the birth canal) to the upper part of the uterus. The uterus (or womb) is where a baby grows when a woman is pregnant. The part of the cervix closest to the body of the uterus is called the endocervix. The part next to the vagina is the exocervix (or ectocervix*)*. The two main types of cells covering the cervix are squamous-cells (on the exocervix) and glandular-cells (on the endocervix). These two cell types meet at a place called the transformation zone. Most cervical cancers begin in the cells in the transformation zone. These cells do not suddenly change into cancer. The normal cells of the cervix first, gradually develop pre-cancerous changes that turn into cancer. Doctors use several terms to describe these precancerous changes, including cervical intraepithelial neoplasia *(*CIN), squamous intraepithelial lesion (SIL), and dysplasia. These changes can be detected by the Pap test and treated to prevent cancer from developing. Cervical cancers and cervical pre-cancers are classified by how they look under a microscope. The main types of cervical cancers are squamous cell carcinoma and adenocarcinoma. Most of the other cervical cancers are adenocarcinomas. Adenocarcinomas are cancers that develop from gland cells. Cervical adenocarcinoma develops from the mucus-producing gland cells of the endocervix (American Cancer Society, 2016).

Although cervical cancer starts from cells with pre-cancerous changes (pre-cancers), only some of the women with pre-cancers of the cervix will develop cancer. Although it usually takes several years for cervical pre-cancer to change to cervical cancer, it can happen in less than a year in some women. For most women, pre-cancerous cells will go away without any treatment. In some women pre-cancers turn into true (invasive) cancers. Treating all cervical pre-cancers can prevent almost all true cervical cancers.

Cervical cancer tends to occur in midlife. Most cases are found in women younger than 50. It rarely develops in women younger than 20. Many older women do not realize that the risk of developing cervical cancer is still present as they age. More than 15% of cases of cervical cancer are found in women over 65. However, these cancers rarely occur in women who have been getting regular tests to screen for cervical cancer before they are 65. Cervical cancer is the easiest gynecologic cancer to prevent with regular screening tests and follow-up. It is highly curable when found and treated early. All women are at risk for cervical cancer. It occurs most often in women over age 30 (American Cancer Society, 2019).

2.2.1 The Risk Factors of Cervical Cancer

A risk factor is anything that changes the chance of getting a disease such as cancer. Some of the risk factors of cervical cancer include first intercourse at an early age and multiple sex partners. Smoking, oral contraceptive use, and age are other associated risk factors that are mentioned to be contributed in developing cervical cancer (Leaver and Labonte, 2010). The other risk factors also include a family history of cervical cancer, a lack of regular Pap smear testing as well as the number of pregnancies. Different cancers have different risk factors. Women without any of the risk factors rarely develop cervical cancer. Some risk factors are mentioned here.

(1) Human Papilloma Virus Infection

The most important risk factor for cervical cancer is infection by the human papilloma virus (HPV). HPV is a group of more than 150 related viruses, some of which cause a type of growth called a papilloma, which are more commonly known as warts. Doctors believe that a woman must be infected with HPV in order to develop cervical cancer. Although this can mean infection with any of the high-risk types, about two-thirds of all cervical cancers are caused by HPV 16 and 18.

(2) Smoking

Smoking makes the immune system less effective in fighting HPV infections. Women who smoke are about twice as likely as non-smokers to get cervical cancer. Tobacco by - products have been found in the cervical mucus of women who smoke.

(3) Immunosuppression

In women with HIV, a cervical pre-cancer might develop into an invasive cancer faster than normal women. Another group of women at risk of cervical cancer are those taking drugs to suppress their immune response, such as those being treated for an autoimmune disease (in which the immune system sees the body's own tissues as foreign and attacks them, as it would a germ) or those who have had an organ transplant.

(4) Chlamydia Infection

Chlamydia is a relatively common kind of bacteria that can infect the reproductive system. It is spread by sexual contact.

(5) A Diet Low in Fruits and Vegetables

Women whose diets do not include enough fruits and vegetables may be at increased risk for cervical cancer.

(6) Being Overweight

Overweight women are more likely to develop adenocarcinoma of the cervix.

(7) Long-term Use of Oral Contraceptives (Birth Control Pills)

There is evidence that taking oral contraceptives (OCs) for a long time increases the risk of cancer of the cervix.

(8) Intrauterine Device

Women who had ever used an intrauterine device (IUD) had a lower risk of cervical cancer.

(9) Having Multiple Full-term Pregnancies

Women who have had three or more full-term pregnancies have an increased risk of cervical cancer.

(10) Being Younger than 17 at First Full-term Pregnancy

When Women who are younger than 17 years have their first full-term pregnancy, they are almost two times more likely to get cervical cancer later in life than women who wait to get pregnant until they are 25 years or older.

(11) Poverty

Poverty is also a risk factor for cervical cancer. Many low-income women do not have ready access to adequate health care services, including Pap tests. This means they may not get screened or treated for cervical pre-cancers.

(12) Diethylstilbestrol (DES)

There is about one case of this type of cancer in every 1,000 women whose mothers take DES during pregnancy.

(13) Having a Family History of Cervical Cancer

Cervical cancer may run in some families. If mother or sister had cervical cancer, the chances of developing the disease are two to three times higher than if no one in the family had it.

2.2.2 The Stages of Cervical Cancer

The stage is based on whether the cancer has invaded nearby tissues or spread to other parts of the body. Cervical cancer spreads most often to nearby tissues in the pelvis or to lymph nodes. It may also spread to the lungs, liver, or bones. When cancer spreads from its original place to another part of the body, the new tumor has the same kind of cancer cells and the same name as the original tumor. The stage of

cervical cancer is based on where the cancer is found (American Cancer Society, 2017). These are the stages of invasive cervical cancer.

Stage I: Cancer cells are found only in the cervix.

Stage II: The tumor has grown through the cervix and invaded the upper part of the vagina. It may have invaded other nearby tissues, but not the pelvic wall (the lining of the part of the body between the hips) or the lower part of the vagina.

Stage III: The tumor has invaded the pelvic wall or the lower part of the vagina. If the tumor is large enough to block one or both of the tubes through which urine passes from the kidneys, lab tests may show that the kidneys aren't working well.

Stage IV: The tumor has invaded the bladder or rectum. The cancer has spread to other parts of the body, such as the lungs.

2.2.3 Prevention of Cervical Cancer

The most common form of cervical cancer starts with pre-cancerous changes and there are ways to stop this disease from developing. Protecting adolescent girls through vaccination against the two most carcinogenic HPV types is a safe and effective primary prevention strategy against cervical cancer. Most cervical cancers are associated with HPV, a sexually transmitted infection. HPV vaccination is most effective if administered prior to sexual debut and exposure to HPV infection. This vaccination can prevent most cases of cervical cancer if given before a girl or woman is exposed to the virus.

The Centers for Disease Control and Prevention (CDC) recommend routine HPV vaccine for girls and boys ages 11 or 12, although recommend staring the vaccine as early as age 9 or 10 before sexual contact. In 2016, CDC updated the HPV vaccine schedule to recommend that all adolescents and teens ages 9 through 14 receive two doses at least six month apart, rather than the previous recommended three-dose schedule. Teens and young adults who begin the vaccine series at ages 15 through 26 should continue to receive three doses of vaccine. The US Food and Drug Administration recently approved the use of vaccination 9 for males and females ages 9 to 45.

The first way is finding and treatment pre-cancers before they become true cancers, and the second is prevention of the pre-cancers. A well-proven way to

prevent cervical cancer is testing (screening) to find pre-cancers before they can turn into invasive cancer. The Pap test (or Pap smear) and the human papilloma virus (HPV) test are used for the test. Most invasive cervical cancers are found in women who have not had regular Pap tests.

Secondary prevention of cervical cancer is feasible through the detection and treatment of disease at the High-grade Squamous Intraepithelial Lesion (HSIL) stage by cervical cancer screening. The objective of cervical cancer screening is to apply a simple test to detect the disease at the precancerous stage and ensure appropriate treatment before invasive cancer.

The target age for cervical cancer screening and its frequency are decided based on understanding of the natural history of the disease, screening test to be used, realistic assessment of the need and aspirations of the population, and available resources. Countries with resource constraints should not screen women prior to 30 years of age, since cervical cancer is very rare before this age and screening women at a younger age detects many low-grade lesions that are self-limiting and will never progress into cancer.

Pap smear cytology has been used successfully in many resource-rich countries. However, cytology has certain drawbacks that limit its usefulness, especially in resource limited settings. It requires a laboratory infrastructure and highly skilled workforce that may not be easily available in many countries. Pap smear does not provide the result immediately and smear-positive women need to be recalled when results are available from the laboratory. Such additional visits are inconvenient for the women and increase drop-out rates. Pap smear cytology can only be used in countries where quality-assured laboratory facilities exist.

Visual inspection after application of acetic acid (VIA) is a moderately sensitive test that is feasible in most health infrastructure situations, even in limited resource countries. The advantages of the test are: it can be performed by trained nurses or health workers, inexpensive and the results are immediately available. However, the limitations of VIA are its subjective nature and low positive predictive value leading to a high number of unnecessary referrals. VIA is most effective in screening women aged under 50 years, as the test accuracy tends to diminish in older postmenopausal women. The target age range best suited to a VIA-based screening program is 30 to 49 years. An individual country may decide to screen women below 50 years by VIA and older women by cytology, if resources permit.

Tests to detect high-risk HPV DNA have been widely evaluated worldwide and observed to be more sensitive than other screening tests. Using such a sensitive test has the inherent advantage of allowing the screening interval to be extended to 10 years for screen-negative women. The major drawback of the test is the high cost.

The US Preventive Services Task Force (USPSTF) recommends screening for cervical cancer (i) every 3 years with cervical cytology alone in women aged 21 to 29 years (ii) every 3 years with cervical cytology alone, every 5 years with HPV testing alone, or every 5 years with HPV testing in combination with cytology (cotesting) in women aged 30 to 65 years (iii) against screening for cervical cancer in women younger than 21 years. (iv) against screening for cervical cancer in women older than 65 years who have had adequate prior screening and are not otherwise at high risk for cervical cancer (v) against screening for cervical cancer in women who have had a hysterectomy with removal of the cervix and do not have a history of a high-grade precancerous lesion or cervical cancer (American Medical Association, 2018).

2.2.4 Treatment of Cervical Cancer

Treatment for cervical cancer patients depends on many factors. These factors include the stage of the cancer, the tumor size, cell type of the cancer, grade, depth of invasion, and whether or not the cancer has spread to the adjacent lymph nodes. Based on these factors surgeries, chemotherapy and radiation therapy is chosen as the treatment. The stage of a cervical cancer describes its size, depth of invasion (how far it has grown into the cervix), and how far it has spread. Although the choice of treatment depends on the stage of the disease at the time of diagnosis, other factors may influence such as age, general health, individual circumstances, and preferences. Cervical cancer can affect sex life and the ability to have children. These concerns should also be considered as treatment decisions. There are several different methods to treat cervical cancer. Treatment includes surgery, radiation therapy, chemotherapy and a combination of all three.

Surgery is commonly used when cancer is diagnosed at an early stage. Surgery is an option for women with Stage I or II cervical cancer. Women who plan on becoming pregnant undergo surgery in which a cone-shaped wedge of the infected tissue is removed from the cervix. Most women return to their normal activities within 4 to 8 weeks after surgery. During the early stage of disease, surgery or a combination of radiation therapy can be performed.

Radiation therapy is performed with any stage of the disease, but careful attention must be given when treating cervical cancer. Radiation therapy uses high-energy rays to kill cancer cells. Doctors use two types of radiation therapy to treat cervical cancer. Some women receive both types: **external radiation therapy and internal radiation therapy.** Women with early cervical cancer may choose radiation therapy instead of surgery. It may also be used after surgery to destroy any cancer cells that remain in the area. Women with cancer that extends beyond the cervix may have radiation therapy and chemotherapy.

Chemotherapy is administered to high-risk features of the disease and after hysterectomy. Chemotherapy uses drugs to kill cancer cells. For the treatment of cervical cancer, chemotherapy is usually combined with radiation therapy. Treating cervical cancer with a combination of surgery, radiation therapy and chemotherapy increases the chances of survival (Leaver & Labonte, 2010). For cancer that has spread to distant organs, chemotherapy may be used alone.

2.2.5 The Global Burden of Cervical Cancer

Women are a vulnerable population, most evidently due to the risks associated with maternal morbidity and mortality. Reports on cancers demonstrate that there are gender disparities in the developing world, as well as disparities between women in more versus less developed countries. More than half of cancer cases and 60 percent of deaths occur in the less-developed countries and the outcomes for women are far worse than for men. In some resource poor countries, social and cultural barriers may impede early detection and effective management of cancer, particularly in women. The World Cancer Report 2008 cites these regional disparities in both incidence and mortality with women far more vulnerable than men (WHO, 2008).

While many of the leading causes of death in women around the world are the same as those for men (cardiovascular disease, HIV and AIDS, cancers, respiratory diseases), some have a greater or different impact on women, and women may face greater difficulties getting access to the health care they need. The factors involved in improving the health of women are multi-factorial and include reducing gender inequality, improving women's nutritional status, increasing girls' access to education, providing appropriate antenatal, delivery, and postpartum care and providing access to family planning services and information to all women and adolescents of reproductive age.

Approximately 85% of deaths occurred in developing countries and in some parts of the world, cervical cancer claims the lives of more women than pregnancy-related causes. This condition affects not only the health and lives of women, but also their children, families, and their community. This extended impact is often undervalued when setting health priorities and requires greater consideration by policymakers.

Cervical cancer is one of the most preventable and treatable cancer since it takes many years to develop from detectable precursor lesions. There have evidence-based interventions for effective early detection and treatment. This knowledge has been used in many developed countries by well-organized programs over the past 50 years. These efforts have resulted in a remarkable reduction in mortality and morbidity from cervical cancer. Over the same period, however, there was a little or no change in developing countries. Some of the main barriers are the lack of awareness among stakeholders, lack of cervical cancer control programs and absence of country-tailored guidelines for best practice of cervical cancer prevention and control.

Cervical cancer is a preventable disease, yet over a quarter of a million women die of cervical cancer each year, with 90% of deaths occurring in low and middle income countries. Women living with HIV are at 4–5 times greater risk of developing cervical cancer. Cervical cancer has a significant socioeconomic impact on the women affected as well as their families and communities. In 2000, there were more than 493,000 new cases diagnosed and 273,500 deaths. In 2008, cervical cancer was the fourth leading cause of cancer death in women worldwide with an estimated 275,100 deaths. It is the second most common cancer among women worldwide and become an important public health issue (Garland and Smith, 2010). About 490,000 women have been diagnosed with cervical cancer and about 270,000 died annually (Feemster and Kahn, 2010). According to American Institute for Cancer Research, there were over 500,000 new cases in 2018.

Cervical cancer is a major public health problem worldwide due to its disease burden, fatality and tendency for increased incidence. Globally, cervical cancer is the second most prevalent cancer and third most common type of cancer after breast and lung cancers among women (Sogukpinar et al., 2013). The global burden of cervical cancer is disproportionately high among the developing countries where 85% of the estimated 493, 000 new cases and 273, 000 deaths occur world-wide (Ali et al., 2012).

Awareness and health seeking practices have been shown to be poor in many developing countries, necessitating the need for proper awareness programs (Montezari et al., 2008; Khokhar, 2009). Table (2.1) shows the incidence of cervical cancer in global.

Table (2.1)

Incidence of Cervical Cancer Globally, Developed and Developing Regions, 2012

Region	Crude Rate	No. of Cases	Ranking of all women	Ranking women aged15-44 years
World	15.8	529828	3rd	2nd
Developed Regions	12.1	756507	10th	3rd
Developing Regions	16.7	453321	2nd	2nd

Source: Data from WHO/ICO (2013).

According to the results of the 2015 Revision, the world population reached 7.3 billion as of mid-2015, implying that the world has added approximately one billion people in the span of the last twelve years. In 2015, 50.4 per cent of the world's population is male and 49.6 per cent is female. The median age of the global population is 29.6 years. About one-fourth (26 percent) of the world's people are under 15 years of age, 62 per cent are aged 15-59 years, and 12 per cent are 60 or over. Sixty per cent of the global population lives in Asia (4.4 billion) (WHO, 2015).

The Region in general has a high population density, and displays great inequities and diversities across and within countries in terms of socioeconomic indicators, ethnicity, religion, gender, geography, and quality of health care. In any country, approximately one fourth of the total female populations belong to the 30 to 49 years age group – the commonly recommended target age for cervical cancer screening. Asia has the highest burden of cervical cancer among all the continents, primarily due to the lack of organized cervical cancer screening in countries. Current estimates indicate that every year 284,823 Asian women are diagnosed with cancer cervix, the third most frequent cancer among women. Countries in the WHO South-East Asia Region contribute nearly 175,000 new cancer cervix cases every year, which constitutes 35% of the global burden and 60% of the Asian burden of the disease. Every year an estimated 144,434 women die from cancer cervix in Asia, of which 102,665 women are from countries in the WHO South-East Asia Region.

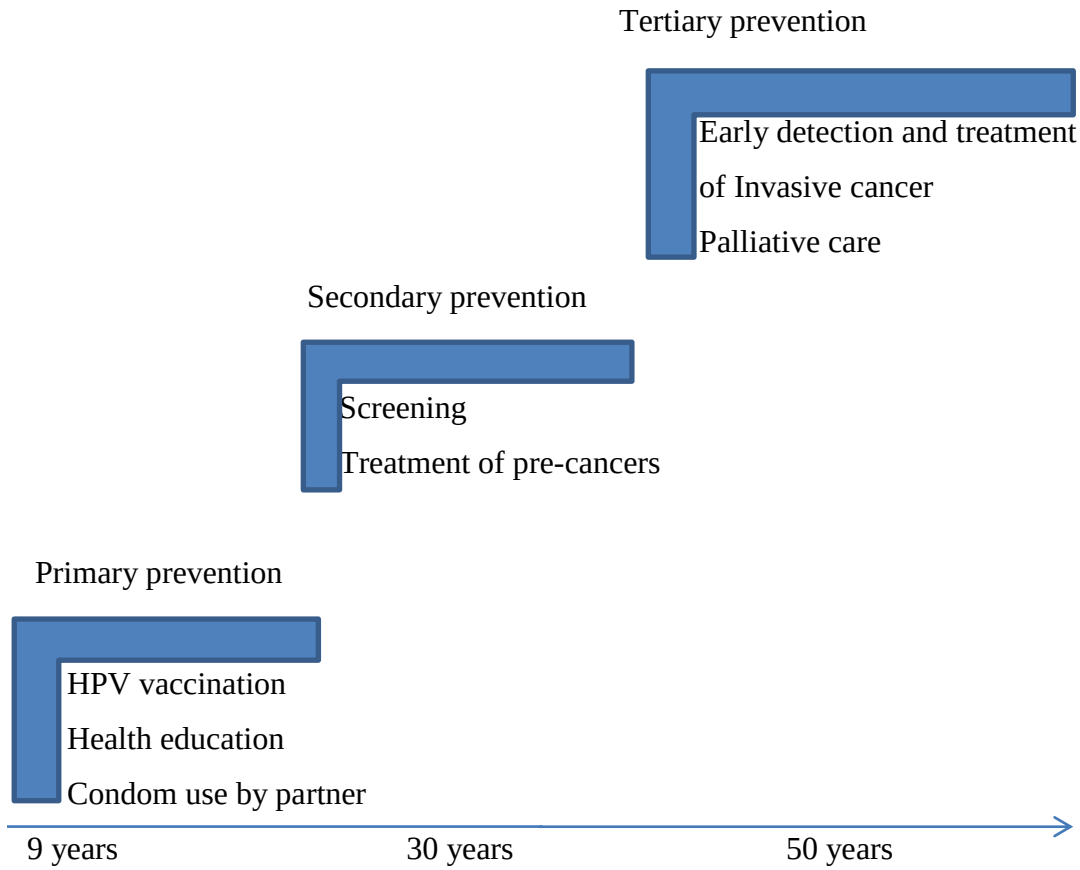
About 10.9% of Asian women are estimated to harbor cervical HPV infection at any given time, and 68.5% of invasive cervical cancers are attributed to HPV types

16 or 18. The observed prevalence of HPV in normal women is quite variable among the individual countries in the Region. To some extent, such variability can be explained by differences in the selection of study subjects and the HPV detection technology used. However, the proportion of invasive cancers attributable to HPV types 16 and 18 (the vaccine-preventable types) is almost uniformly between 65% and 70% in these countries, indicating the high degree of protection expected from the currently available vaccines against HPV (WHO, 2015).

Nine member countries of the South-East Asia Region (Maldives and Timor-Leste not included, as no data available) account for more than one third of the global burden of cervical cancer but lacked effective and organized cervical cancer control program. In some of these countries the number of women dying from cervical cancer annually is compared to the number of maternal deaths during childbirth. Prevention of deaths of middle aged women from cervical cancer through effective control will help these countries advance towards achieving the Sustainable Development Goals. Cervical cancer is a major public health problem in the South-East Asia Region of the World Health Organization (WHO), contributing nearly 35% of the global burden of disease. Mortality rates from cancer cervix are also very high in the Region, due to the late stage at diagnosis and suboptimal therapeutic facilities.

Asia accounts for 60% of the world population and half the global burden of cancer. The incidence of cancer cases is estimated to increase from 6.1 million in 2008 to 10.6 million in 2030, due to ageing and growing populations, lifestyle and socioeconomic changes (Sankaranarayanan et al., 2014).

Figure (2.1) shows cervical cancer prevention and control strategies over the lifespan of women. The proportion of people aged 65 years and above is likely to double from the current 7% by 2030. It is well known that cancer risk increases with age (Curado, et al., 2007). Changing lifestyles, increasing urbanization, changes in reproductive patterns and diet, obesity, tobacco use, alcohol drinking, chronic infection and increasing lifespan contribute to an ever-increasing cancer burden and changing cancer pattern in Asian countries.



Source: Strategic Framework for the Comprehensive Control of Cancer Cervix in South-East Asia Region

Figure 2.1: Cervical Cancer Prevention and Control Strategies over the Lifespan of Women

Table (2.2) provides the incidence and mortality of Cervical Cancer in global and South-East Asia.

Table (2.2)
Estimation of Cervical Cancer Incidence and Mortality, 2012

Indicator	South-East Asia	World
Incidence*		
Annual number of new cancer cases	50566	527624
Crude incidence rate	16.6	15.1
Age-standardized incidence rate	16.3	14.0
Cumulative risk(%) 75 years old	1.7	1.4
Mortality**		
Annual number of deaths	23989	265672
Crude mortality rate	7.9	7.6
Age-standardized mortality rate	7.9	6.8
Cumulative risk (%) at 75 years old	0.9	0.8

Source: * Human Papillomavirus and Related Diseases Report Myanmar, 2017.

** International Agency for Research on Cancer, 2013.

2.3 Health Care System in Myanmar

Investing in health could not only contribute to improving the overall health status of the population but also stimulate economic growth of the country. Rendering quality essential health services together with improving access is critical to sustainable development of the country. Myanmar health care systems have evolved with recent changes of political and administrative systems. The health care systems are a mixture of public and private sectors. But MOHS remains the major provider of health care services.

There are six departments. The Department of Public Health is mainly responsible for primary health care and basic health services. The Department of Medical Services provides effective treatment and rehabilitation services. The Department of Health Professional Resource Development and Management is mainly responsible for training and production of all categories of health personnel. The Department of Medical Research conducts national surveys and research for evidence based medicine and policymaking. The Department of Food and Drug Administration ensures safe food, drugs and medical equipment and cosmetics. The Department of Traditional Medicine is responsible for the provision of health care with traditional medicine, as well as training of traditional medicine personnel. Non-government organizations such as the Myanmar Maternal and Child Welfare Association and the Myanmar Red Cross Society are taking a share of service provision.

The Myanmar health system currently faces many challenges. Human resources are critical inputs in the health system to ensure access to quality care. On November 2016, there were 1.33 health workers per 1000 people (MOHS), well below the WHO minimum recommended threshold of 2.3 in terms of distribution and health workers was largely concentrated in urban areas, including Yangon and Mandalay. Private Health Statistics (2015) by the Department of Medical Services reported that there are 193 private hospitals, 201 private specialist clinics, 3911 private general clinics and 776 private dental clinics.

Some ministries are also providing health care for their employees and their families. General Practitioners' Section of the Myanmar Medical Association with its branches in townships provides these practitioners the opportunities to update and exchange their knowledge and experiences by holding seminars, talks and symposium currently emerging issues and updated diagnostic and therapeutic measures. The

Medical Association and its branches also provide a link between them and their counterparts in the public sector so that private practitioners can also participate in public health care activities. The private, for non-profit, run by Community Based Organizations (CBOs) and Religious based societies also provide ambulatory care though some providing institutional care and social health protection has developed in large cities and some townships.

The National Health Policy NGOs such as Myanmar Maternal and Child Welfare Association, Myanmar Red Cross Society are also taking some share of service provision and their roles are also becoming important as the needs for collaboration in health become more prominent. Recognizing the growing importance of the needs to involve all relevant sectors at all administrative levels and to mobilize the community more effectively in health activities, health committees had been established in various administrative levels down to the wards and village tracts.

Aiming towards the "Health for All Goal", series of National Health Plans based on primary health care services have been systematically developed and implemented. The Ministry of Health and Sport has formulated four yearly People's Health Plans starting from 1978. From 1991 onwards, successive National Health Plans have been formulated and implemented. Considering the rapid changes in demographic, epidemiological and economic trends both nationally and globally, a long-term 30 year health development plan had been drawn up to meet the future health challenges. Myanmar Health Vision 2030 (2000-2001 to 2030-2031) was formulated during the last decade and composed of (9) main areas: health policy and law; health promotion; health service provision; development of human resources for health; promotion of traditional medicine; development of health research; role of co-operative, joint ventures, private sectors and NGOs; partnership for health system development; and international collaboration.

National Health Plan (2011-2016) in the same vein is to be formulated in relation to the fifth five years National Development Plan. It is also developed within the objective frame of the short term first five year period of the National Comprehensive Development Plan (NCDP) – Health Sector, a 20 year long term visionary plan. In activities that were needed to be strengthened in order to achieve the Sustainable Development Goals regarding maternal, newborn and child health, focusing cervical cancer screening, early diagnosis and treatment is one of these

activities. As Myanmar moves on the path of socioeconomic development and changing lifestyle, there is a shift in epidemiological transition towards non-communicable diseases. Myanmar is now facing a double burden of diseases-Communicable Diseases and Non-Communicable Diseases.

Myanmar still has a very low level of awareness among the public, and sometimes even among the providers, about preventive measures such as the HPV vaccine, early detection with visual inspection using acetic acid (VIA) or pap smear, and timely management. Marie Stope International Myanmar is one of international reproductive health organizations that screen for cervical cancer and conduct education, clinical services, and referrals.

2.4 Cervical Cancer in Myanmar

Cervical cancer has four stages. The patients who come to the clinic are usually already in stage two, who is concerned about the low level of public awareness about cervical cancer (Soe Lwin, a consultant obstetrician and gynecologist at Yangon Women's Hospital). One factor in late detection is the reluctance of women to violate traditional attitudes of shame and embarrassment about one's body, as well as a lack of awareness about the disease and how to prevent it. Cervical cancer affects married women more than single women, and most patients are aged between 40 and 60, according to the 2011 Action Study (ASEAN costs in Oncology). Based on South-Eastern Asia studies, performing HPV detection tests in cervical samples, about 7.3% of women in the general population are estimated to harbor cervical HPV-16 infect at a given time, and 72.3% of invasive cervical cancers are attributed to HPVs 16 or 18 (ICO) .

With support from the Union for International Cancer Control (UICC), and in collaboration with the Myanmar Ministry of Health and Sport (MOHS), Program for Appropriate Technology in Health (PATH) organized four training workshops to meet a critical need in cervical cancer prevention services in Myanmar. PATH adapted its international training curriculum to meet the needs of Myanmar. Nine gynecologists received training in basic, clinical and pedagogical skills and six of them had supervised experience, training 39 midwives to use visual inspection with acetic acid for screening. The gynecologists selected for training are reproductive health leaders in the region and have the authority to expand screening and preventive treatment

beyond the two districts, Mandalay and Pyin Oo Lwin. They are also national leaders and will have an important role in the development of the national strategy. Thousands of women have already been screened in the two districts, and plans are in place to screen (and treat as necessary) all eligible women in the coverage area within three years. If this pilot program continues to show good results, the MOHS hopes to expand services to additional districts.

The PATH/MOHS trainings focused on pre-cancer screening and preventive treatment. PATH is introducing smart, low-cost methods to help Myanmar practitioners screen women for cervical cancer and save lives by treating precancerous lesions. In 2014, PATH implemented a train-the-trainer course with obstetricians and gynecologists in three townships in the Mandalay region. Through a training-of-trainers course and the provision of commodities (pelvic models and cryotherapy instruments), PATH led a training of trainers for obstetricians and gynecologists. These trained health staff then trained 40 Basic Health Staff in two districts of the project townships, designated by the Ministry of Health, to conduct the screenings.

PATH is working with the Ministry of Health to stop the spread of this disease through new and easy methods for screening that do not rely on sophisticated laboratories and can deliver quick results and easy low-cost treatments. This method, called visual inspection with acetic acid (VIA), involves swabbing the cervix with vinegar (5% acetic acid) and looking for areas that turn white, which indicates they are likely to be precancerous or cancerous. The provider can then remove the abnormal tissue on the spot using cry therapy, a procedure that freezes abnormal cervical tissue. This screen and treat approach is easy to teach and implement in low-resources settings, making it viable for scale-up nationwide.

Cervical cancer kills about 3,000 women each year in Myanmar. Aside from some limited Pap Smear Services in urban hospitals and a few non-governmental organization service its, there has been little or no screening available to the estimated 7.5 million Myanmar women in their 30s and 40s. PATH is eager to bring vaccine and immunization expertise to Myanmar. In recent years, Myanmar's immunization program has been steadily improving, with coverage rates reported to be 85%. But significant systemic barriers remain, particularly in the 70 townships identified as physically and socio-economically hard to reach. PATH is mobilizing resources to assist the Myanmar government with these challenges and to support them in the

introduction of new vaccines, including plans for Japanese encephalitis and human papillomavirus (HPV). Sun Quality Health is beginning to offer low cost cervical cancer screenings and cry therapy (the use of cold temperatures to destroy abnormal tissue) through its network of franchised clinics.

The new UN Global Joint Program (Joint Program) also implement the World Health Organization (WHO) comprehensive approach to cervical cancer prevention and control which consists of: (i) introduction and scaling-up of Human Papilloma vaccination, (ii) introduction and expanding coverage of screening and treatment of precancerous lesions, (iii) prompt management of invasive cancers, (iv) access to palliative care and, (v) monitor by using a standard set of indicators and tools to end cervical cancer.

The vision of the Joint Program is the elimination of cervical cancer as a public health concern across the world and in the first instance the Joint Program will provide technical assistance to support the planning and implementation of a comprehensive approach to cervical cancer prevention and control initially in 6 countries: Bolivia, Kyrgyzstan, Mongolia, Morocco, Myanmar, and Tanzania.

Under the United Nation Task Force on Non-Communicable Diseases, Seven United Nations Agencies the UN Joint Global Program (UNJDB) on established a new 5 year program, Cervical Cancer Prevention and control (CCPC). Myanmar was chosen as one of six participating countries. The program selects Myanmar as one of six to receive technical and financial aid, according to the Non-communicable Diseases Control Division at the Ministry of Health and Sports. The program Started in 2017 and will be finished in 2020. The UNJGP-CCPC in Myanmar officially began with a 2.5 day. Inception Mission' meeting in March 2017. The meeting sequentially addressed education, primary prevention, secondary prevention and tertiary prevention for cervical cancer.

All six countries have agreed to be partners in this Joint Program. In each country, the Joint Program will build on, as well and aligning with the existing efforts of governments and their development partners as well as providing a platform for new partners to scaling up action in these six countries to reduce the unnecessary deaths and suffering that results from cervical cancer.

The highest incidence of cervical cancer is observed in developing countries, including Myanmar. This high incidence is attributed to paucity of and inadequacy of screening programs as well as the unawareness of the disease in less developed

countries. Cervical cancer is a key reproductive health problem for women, particularly in the developing countries where screening services are lacking or inaccessible for the majority. The absolute burden of cervical cancer is expected to increase in future unless effective preventive measures are undertaken.

Cervical cancer continues to represent a significant health problem in Myanmar. Myanmar has a population of 20.19 million women ages 15 years and older who are at risk of developing cervical cancer. Current estimates indicate that every year 5286 women are diagnosed with cervical cancer and 2998 die from the disease. Since 2002 gynecologists have developed a reproductive health policy and integrated cervical cancer prevention in a five-year scheme to run from 2014-18. More than 500,000 women are diagnosed with cervical cancer annually and over half of them die. Cervical cancer ranks as the 2nd most frequent cancer among women in Myanmar and the 1st most frequent cancer among women between 15 and 44 years of age. Up to 2010, Myanmar cervical cancer rates had been increasing year by year and today still remain higher than most ASEAN countries.

Cervical cancer tends to occur in midlife and is most frequently diagnosed in women between the ages of 35 and 44. It rarely develops in women younger than 20. More than 15% of cases of cervical cancer are found in women over 65. However, these cancers rarely occur in women who have been getting regular tests to screen for cervical cancer before they were 65.

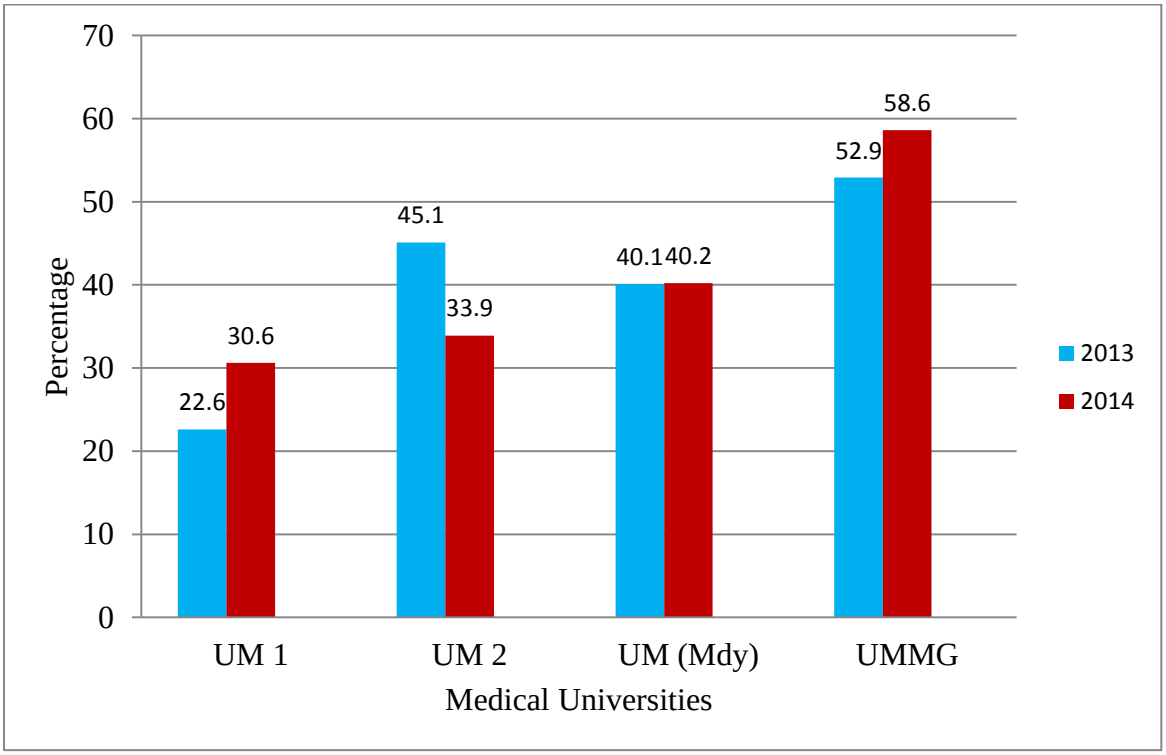
Cervical cancer is a deadly disease once it reaches the invasive stages, but out of all the female genital tract cancers, it is the only preventable cancer if it detected in its early stages. Unfortunately, despite the availability of methods for prevention and early diagnosis, many women in Myanmar have never been screened for cervical cancer due to lack of periodic screening program. Although there is overwhelming evidence that cervical cancer today is almost totally preventable to a large extent through screening and treatment of premalignant lesions, the service is unfortunately not readily available to the general population in most developing countries, including Myanmar.

In Myanmar, there is lack of national routine cervical cancer screening program. And also, prophylactic vaccination program is currently not established. Surgery for cervical cancer cannot be performed in all State and Regional Hospitals. Therefore, cases of cervical cancer are referred to the Teaching Hospitals for surgical treatment. This was expected since treatment of cervical cancer done in early stages

results in better quality of life outcomes than if detected and treated in later stages.

This signifies the importance of screening for early detection and timely, appropriate treatment of cervical cancer. Some patients are reluctant to take radiotherapy treatment. Therefore, counseling and provision of health education are important to reduce the burden of cervical cancer.

The following Figures (2.2) and (2.3) show the proportion of cervical cancer among female cases in all four Teaching Hospitals in Myanmar.

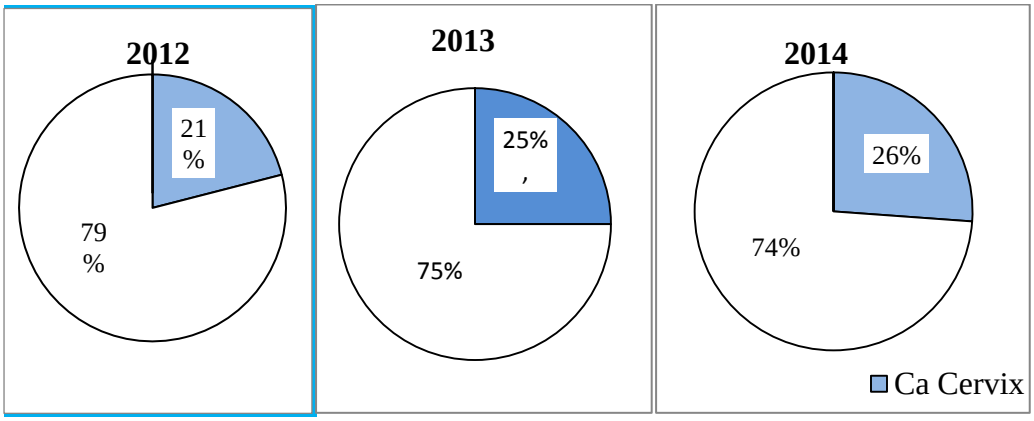


Source: Data from Teaching Hospitals, Myanmar, 2014.

Figure 2.2 Cervical Cancer among Total Gynecological Cancer Admission Cases in the Teaching Hospitals of 4 Medical Universities

Figure (2.2) illustrates the proportion of cervical cancer among total gynecological cancer admission cases in the Teaching Hospital of four Medical Universities during 2013 to 2014.There has generally been an increase in cervical cancer prevalence from 2013 to 2014, except in University of Medicine 2. In 2013, 22.6% of cervical cancer patients attended to the University of Medicine 1 and it rose to 30.6% in 2014 but it was the lowest cervical cancer prevalence of all four universities. A teaching hospital of UM 1 located in the downtown area of Yangon and previous studies described that women from the urban area knowing about cervical cancer vaccine were more than women from rural area. The only university

with more than 50% of cervical patients is the University of Magway, with 52.9% in 2013 and 58.6% in 2014.



Source: Oncology Centers, Myanmar, 2014.

Figure 2.3 Proportion of Cervical Cancer among Female Malignancy Cases in all Four Oncology Centers

Figure (2.3) compares the proportion of cervical cancer among female malignancy cases in four Oncology Centers in the year 2012, 2013 and 2014. Overall, it can be seen that there was increasing in cervical cancer prevalence from 2012 to 2014 in Myanmar.

Table (2.3)
Burden of Cervical Cancer in Myanmar, 2012

	Incidence	Mortality
Annual number of new cases/deaths	5286	2998
Crude rate	21.4	12.1
Age-standardized rate	20.6	12.3
Cumulative risk 0-74 years (%)	2.1	1.4
Ranking of cervical cancer (all years)	2nd	2nd
Ranking of cervical cancer (15-44 years)	1st	2nd

Source: Human Papillomavirus and Related Diseases Report Myanmar, 2017.

Table (2.4) describes the burden of cervical cancer in Myanmar during 2012. In Myanmar, cervical cancer is the second commonest women cancer in all ages and first commonest cancer in women with age between 15 and 44 years. It was the second leading cause of death in Myanmar women.

Table (2.5) shows the morbidity and mortality due to cervical cancer among female cancer patients in Myanmar (2012-2016). Despite the decreasing in the mortality due to cervical cancer after 2014 as a result of early diagnosis by screening countrywide, the incidence of cervical cancer is not much decrease and still rank in

second among Myanmar women due to the lack of awareness about vaccination and prevention of cervical cancer.

Table (2.4)
Morbidity and Mortality due to Cervical Cancer among Female Cancer Patients in Myanmar, (2012-2016)

	2012	2013	2014	2015	2016
Morbidity	8.9	8.9	14.6	13.3	12.4
Mortality	2.9	3.8	11.3	9.6	8.2

Source: Annual Hospital Statistics Reports, 2012-2016.

Table (2.5)
Prevalence of Cervical Cancer in Taungoo Township (2012-2015)

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2012	**Adm**	-	-	-	-	-	-	-	-	-	-	-	-	-
	OPD	-	1	1	-	-	1	1	-	-	1	2	2	9
2013	**Adm**	1	1	-	-	4	1	3	5	-	3	4	-	22
	OPD	1	2	2	4	5	4	7	9	-	6	1	14	55
2014	**Adm**	3		2	4	5	5	3	10	15	12	6	6	71
	OPD	5	2	8	8	14	11	13	22	-	16	15	16	130
2015	**Adm**	3	3	3	2	3	4	4	6	4	-	6	5	43
	OPD	4	4	4	3	4	4	10	11	6	3	12	16	81

Source: Data from General Hospital, Taungoo (2012-2015)

Table (2.6) describes the prevalence of cervical cancer in Taungoo Township between 2012 and 2015. It shows that about one-third of the outpatients are admitted to hospital. Average 6 women were admitted for cervical cancer every month and average 11 women were outpatients for cervical cancer every month in 2014. It was the high prevalence of cervical cancer as the female population of 18 years and above in Taungoo Township. Therefore, the awareness, attitude and practice about cervical cancer among the females in this area should be studied.

Much of the recent research into women's knowledge of cervical cancer and screening has been conducted either in developing countries or among ethnic minorities in developed countries. Such studies usually identify low levels of knowledge, which, it is believed, contribute to low rates of screening uptake in these populations. In addition, there are a few studies about the cervical cancer awareness, knowledge and practice among Myanmar women. Therefore, this study will be conducted to determine the level of cervical cancer awareness, knowledge and practice among women and to determine the socio-economic factors affecting on knowledge and uptake of cervical cancer screening and vaccination among women in Myanmar.

Since 2002 gynaecologists have developed a reproductive health policy and integrated cervical cancer prevention in a five-year scheme to run from 2014-18. More than 500,000 women are diagnosed with cervical cancer annually and over half of them die. Cervical cancer is the second most common cancer in Myanmar's women after breast cancer but it is the first most common cancer among 15-44 years women. The Ministry of Health and Sports is trying to include the cervical cancer vaccine in the regular immunization schedule starting from 2019.

2.5 Literature on Women's Awareness, Knowledge, Attitude and Practice Regarding Cervical Cancer

Awareness and Knowledge

Health education and awareness are key components of a comprehensive cervical cancer control program. Health education should be targeted towards high acceptance of the services. Health education can be delivered at community or health facilities, or both. Health workers and volunteers at community or primary health facilities are the first point of contact with the community and obtain feedback from the community through direct face-to-face meetings. Printed materials such as booklets, flipcharts and posters in the local language aided by pictures, diagrams and charts can help convey the messages more effectively. A broad-based media can improve the visibility of the program and enhance participation rates.

Awareness means having previously heard of the term "cancer", "cervical cancer" or "cervical cancer screening".

Knowledge means the ability to correctly identify signs and symptoms, risk factors, etiologic or preventive aspect of cervical cancer.

Research conducted by the Medical Research Council in Kwa Zulu-Natal and by Women's Health Program (WHP) and Women's Health Research Unit (WHRU) indicates that lack of awareness is one of the major barriers to women seeking cervical cancer screening services. Some other barriers include: (i) fear of the procedure for screening, (ii) women feel embarrassed about gynecological examinations, (iii) socio-cultural barriers (it is considered to be "a woman's disease" discussed openly so women are not "free" to request the service even when they know about it), (iv) Myths and stigmas, (v) poor communication between health providers and women attending health services, services not accessible to women.

Yu and Rymer (1998) conducted a cross-sectional survey of 650 women 15-78 years of age randomly recruited at two hospitals in London, England. The survey found that 76.2% perceived cervical cancer to be a common disease and there were good awareness of the association between this cancer with smoking and the number of sexual partners. Furthermore, 91.7% believed cervical cancer could be treated if detected early enough. Of the respondents, 80.5 percent had had at least one smear test and 71.5 percent of these women have regular smears. The perceived barrier such as embarrassment and discomfort played a part in women's decision in returning for a regular smear.

Chirenje et al. (2001) conducted a study to determine the influencing factors of cervical cancer diagnosis and treatment in countries of East, Central and Southern Africa. The study found that the knowledge of cervical cancer was poor among all age groups irrespective of their education levels. The highest burden of pre-cancer lesions is among HIV infected women and in some cases coexistence of HPV infection also increases cervical cancer risk. In addition to HIV seropositivity is a risk factor, other factors such as smoking, parity (given birth) three times or more, low educational level and non-usage of oral contraceptives were significantly associated with cervical lesions.

Myo Myo Mon et al. (2007) developed a community based study in four peri-urban townships within Yangon Division to assess community awareness of female cancers. According to the study results, only 69.5% of the respondents were aware of cervical cancer. Abnormal bleeding per vagina and white discharge were mentioned as the main symptoms of cervical cancer. Relatives and friends were stated as the main source of information. Only 29% mentioned health staff. Government hospital/ clinics were identified as a main treatment centers.

Saha et al. (2010) conducted a questionnaire survey among 630 students aged 17 to 24 years from four women's colleges in Kolkata, India. The study observed that only 20% of students correctly identified cervix cancer as the most prevalent female cancer in India. Overall, 43% of the students were aware about the age of occurrence of cervix cancer. The students had very low level of knowledge about the risk factors for cervical cancer. Chi-square analysis revealed that educational stream, standard of college and family size were the associated factors of knowledge level. Association with residential status and age were not significant.

Wai Wai Han et al. (2011) conducted a survey to determine the knowledge about cervical cancer, opinion towards screening services among attendees at Cervical Cancer Screening Clinic, Department of Medical Research (Lower Myanmar). The study found that TV/ video was the main source of knowledge about cervical cancer stated by half of the clients, followed by print media (45.7%) and friends/relatives (42.4%) whereas health staff was indicated by only 15.9%. Although the relationship between the number of sexual partners and cervical cancer was known, other risk factors like age of first coitus, number of pregnancy, smoking, diet, family history and female hygiene were not recognized largely and very few were aware of the link between HPV and cervical cancer. Chi-square results showed that education and occupation were the associated factors of cervical cancer knowledge level of women.

Aswathy et al. (2012) conducted the cross sectional study among women in Kerala, India. The study indicated that 89.2% of respondents did not know any risk factor of cervical cancer. Multinomial logistic regression analysis confirmed that women who got information from health staff were more likely to have cervical cancer knowledge. Women with at least primary education were less likely to have knowledge about cervical cancer knowledge.

Soneji and Fukui (2013) developed a study to investigate the socioeconomic determinants of cervical cancer screening knowledge among women in Latin America. Multivariate logistic regression analysis observed that the key determinants of knowledge of Pap smears were age, educational attainment and recent doctor's visit. Women with secondary and higher education were more likely to have screening knowledge.

Kloku (2014) observed that awareness of female health professional in health institutions in Winneba, Gahana was generally high (99%). Knowledge about signs and symptoms of the disease were insufficient. Moreover, knowledge about risk factors was inadequate.

Tchounga et al. (2014) developed a survey to assess knowledge, attitudes and practices of midwives towards cervical cancer prevention in West Africa. This survey showed that nearly half of midwives have the appropriate knowledge to carry on cervical cancer prevention. The results of logistic regression showed that having a long professional experience influenced on the appropriate knowledge of cervical cancer and its prevention. Age, employment status and type of health facility were not associated with appropriate knowledge of prevention of cervical cancer.

Soe Htoo Aung et al. (2016) carried out a study in the rural areas of Thabeik Kyin Township and the urban areas in Mandalay among school girls (grade 10 and 11) to assess awareness and knowledge regarding cervical cancer. The total of 697 students participated and 59.2% had heard of cervical cancer and 45.3% agreed that cervical cancer was the most common form of female cancer in Myanmar. Based on the information, the study found that the knowledge of cervical cancer was weak in high school girls in Upper Myanmar. It was recommended that school health education should include programs relative to aware of cervical cancer, including its prevention.

Vasudevan (2018) found that 2.1% had good knowledge, 3.9% had satisfactory and 94% had poor knowledge about cervical cancer among women in India. Logistic regression analysis indicated that the significant predictors of knowledge were educational status, marital status, employment status, accessibility towards cervical cancer screening, gynecologist advice for screening.

Lemson and Khin Soe Kyi (2018) found that the female students in a private university in Kuala Lumpur, Malaysia had moderate level in general knowledge regarding cervical cancer and low knowledge level about risk factors. Majority of the respondents knew that HPV vaccine could prevent occurrences of cervical cancer. The most common source of information about cervical cancer were public media (30%) and 19% of students were getting information from healthcare personnel. Most of the respondents had never been vaccinated and only 19% had completed the vaccination doses (three times). Only 7% undertook the Pap smear test.

Practice (Vaccination and Screening)

Ruche et al. (1998) developed a survey among women in Africa. A total of 2198 women were included in the study. The study found that early sexual debut and multiple sexual partners, which are known to be risk factors for cervical cancer, were not associated with increasing the risk of cervical cancer. Of the 2170 women who underwent a cervical screening, 254 (11.7%) presented with a dysplasia or neoplasia, 7.6% had low grade SILs, 3.3% had high grade SILs (HSILs), and 0.8% had ICCs.

Nene et al. (2007) used univariate and stepwise multivariate logistic regression analyses to determine the perception in cervical cancer screening trial among women from Maharashtra, India. The findings showed that the screened women were younger (aged 30–39), better educated, and had ever used contraception. A higher proportion of screened women were married and a lower proportion had never been pregnant. In

the logistic regression analysis, age, marital status, level of education, household size, parity and contraceptive use were significantly associated with treatment of cervical cancer. Women with a higher level of education, fewer pregnancies and those who were married were more likely to comply with treatment of cervical cancer.

Abotchie and Shokar (2009) found that the screening rate was 12.0% among college women in a university in Ghana. Only 7.9% were aware of the link between human papillomavirus and cervical cancer. Three barriers were associated with screening in Chi-square analyses. Barriers to take screening take away virginity, the test was painful and lack of belief that cervical cancer can be diagnosed through screening.

Backer-Dreps et al. (2010) found that less than 1% of women in Kenyan had ever been screened for cervical cancer. They knew little about cervical cancer or HPV vaccine. Most women (95%) were willing to have their daughters vaccinated with a vaccine that would prevent cervical cancer, with preference for an inexpensive vaccine requiring fewer doses.

Ndlovu (2011) conducted a study among women aged 30 years and above in rural Kwazulu-natal, South Africa. Only 18.8% reported ever screening for cervical cancer. Logistic regression analysis indicated that older women between the ages 35-44 were less likely to screen for cervical cancer compared to younger women (30-34). Having educational background was the predictor of cervical cancer screening.

John (2011) found that majority of women aged 18 years and above in Songea urban, Ruvuma region (78.6%) had poor knowledge, 19.7% had satisfactory knowledge and 1.6% had good knowledge. 14.2% had ever been screened. Chi-square analysis showed that level of knowledge was not significantly associated with practice of cervical cancer screening.

Balogun et al. (2012) report that only 4.2% of 240 women from two urban slums dwellers in Lagos, Ngeria were aware of cervical cancer prior to the study and none of them believed they were at risk of developing the disease. About 73.3% were willing to take cervical cancer screening test. Chi-square test showed that age, education and previous history of vaginal examination were associated with willingness to take cervical cancer screening.

Aswathy et al. (2012) conducted the cross sectional study among 809 selected women in Kerala, India. The study reported that only 6.9% had taken screening. Most of the women mentioned media and health workers as the most common sources of

information. Binary logistic regression analysis showed that the women age between 30 and 50 were more likely to take cervical cancer screening.

Hoque (2013) carried out a cross sectional study in Mangosuthu University of Technology from Durban, South Africa to assess the awareness and detection methods of cervical cancer. It was found that the level of knowledge regarding cervical cancer, its risk factors and detection method was low among the final year undergraduate female students. Among them, 79.3% did not take the Pap smear test because of personal factors such as fear of the procedure or they thought that it was not necessary for them. Binary logistic regression did not find any significant predictor for doing Pap smear test among the respondents.

Adeyemi (2013) studied African immigrant women living in the United States to investigate the factors affecting cervical cancer screening. Chi-square test and logistic regression analysis showed that age, education, family income were the influencing factors of cervical cancer screening.

Ebu et al. (2014) found that 68.4% of women aged 10-74 years in Elmina, Southern Ghana had never heard about cervical cancer, 93.6% had no knowledge on the risk factors and 92% did not know about the prevention and treatment of cervical cancer. The majority (97.7%) had never heard of the Pap smear test. Only three (0.8%) women out of 392 had had a Pap smear test. Reasons for seeking a Pap smear test included referral, fear of cervical cancer, and radio campaigns. Chi-square test showed that personal barriers were the associated factors of having a Pap smear test.

Murugi (2014) developed the associated factors with cervical cancer screening uptake among women in Embu County, Kenya. It was found that 82.2% were aware of cervical cancer and 25% of the women had ever been screened. According to the Chi-square results, only employment status is an associated demographic factor of cervical cancer screening uptake. Moreover, women's awareness and preventive knowledge were associated with cervical cancer screening

Mya Thida et al. (2015) stated that the CCP mobile team from Central Women's Hospital in the University of Medicine 1 conducted a descriptive community based study from July 2013 to October 2014 in Kungyangon Township, Yangon Region. In the study, 1,617 married women between the ages of 30-49 years were screened for cervical cancer using VIA method. The screening coverage was 8.97% (approximately 9%). The VIA test were positive in 121 women, two women need surgery and two women had invasive cancer on screening.

Chaw Su Nandar et al. (2015) conducted a cross sectional study among migrant women aged 30-49 years old who have been living in the Northern district of Yangon, Myanmar. Chi-square test and logistic regression analysis were used to examine the determinants of cervical cancer screening. The study found that the factors significantly associated with cervical cancer screening were marital status, family history of cervical cancer, knowledge, perceived threats, perceived benefits, perceived barriers and perceived cues to action, enabling factors such as affordability for extra pay to get screened, providers' rapid response for screening services, waiting times at the clinics.

Chit Pyae Pyae Han et al. (2016) reported that only 16.5% of married women from Mandalay had history of Pap smear test in their life time. The main sources of information about cervical cancer were television, radio, magazine and newspaper. Multiple logistic regressions showed that age, marital age, having good perception, whose husband was aware of cervical cancer were significant predictors of Pap smear screening.

Ei Thinzar Kyaw (2017) studied 106 women aged between 20 and 79 with cervical cancer from the Central Women's Hospital and East Yangon General Hospital. The study found that 97 of them had not received cervical check-ups before they were diagnosed.

Khin Swe Aye et al. (2018) carried out a pilot study in Hlegu Township from June 2016 to May 2017 to formulate the strategic approach for establishing a population based cancer registry. The study observed that 126 cancer patients were registered and the most common age was 46 to 65 years. Among 91 registered female cancer patients 16.17% was cervical cancer patients.

Vasudevan (2018) studied women's knowledge, attitude and practice on cervical cancer screening in Kancheepurm, India. The study found that nearly 90% of the women had no screening practice. Binary logistic regression analysis results showed that knowledge, attitude, age, gynecologist advice and employment status are the influencing factors of cervical cancer screening.

Attitude

John (2011) developed a survey in Songea urban, Ruvuma region. The study found that more than half of the respondents had a positive attitude towards screening and cervical cancer. Three quarters of respondents agreed that screening is important in prevention of cervical cancer. If the screening was free of charge and caused no

harm, many women would go for screening. Chi-square analysis indicated that knowledge level was associated with the women's attitude on screening of cervical cancer.

2.6 Conceptual Framework

A conceptual framework concerns with the influencing factors on cervical cancer awareness, knowledge and practice was adapted from the previous studies related to vaccination and screening preventive practice of cervical cancer among women is presented in Figure 2.4.

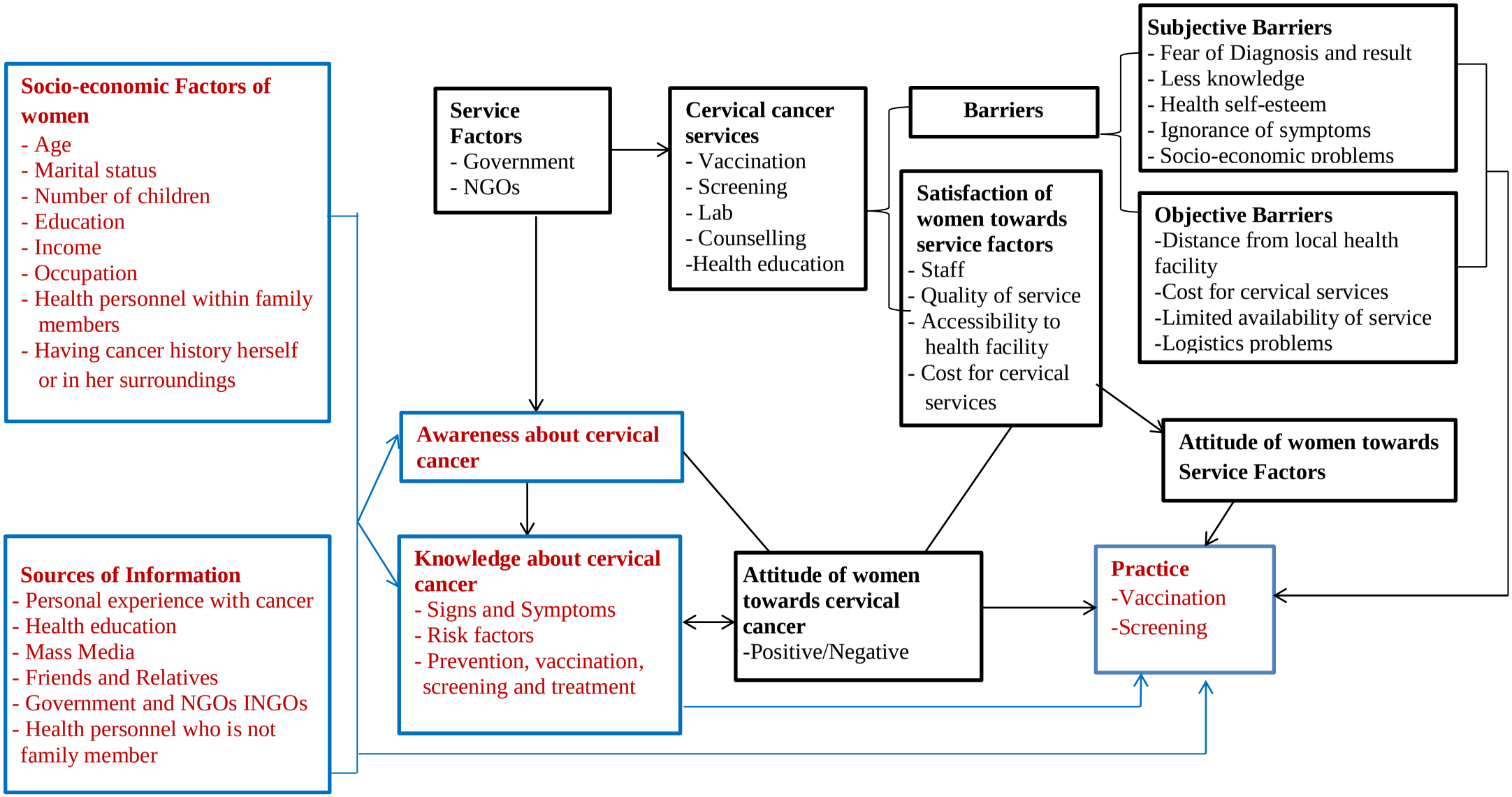


Figure 2.4 Conceptual Framework for Awareness, Knowledge and Practice on Cervical Cancer Adopted from Muasa, 2016, Murugi, 2014 and Nwobodo, 2015

This conceptual framework demonstrates the inter-linkage among the independent and dependent variables, the awareness level, knowledge, attitude, service factors and preventive practice of cervical cancer and which were determined by socio-economic factors, sources of information and service factors.

Socio-demographic factors can determine the individual's awareness and knowledge about cervical cancer which will motivate the person to preventive services (screening and vaccination). Sources of information such as personal experience with cancer, health education and health information from mass media, can also affect the awareness and knowledge of cervical cancer. Awareness and knowledge of cervical cancer can be facilitated by other information sourced from government health professionals, NGOs and INGOs staff, friends and relatives, which in turn affect to the attitude of women. Negative attitude will determine their level of interest for attending health facilities toward the practice of screening and vaccination. Positive attitude towards practice of screening and vaccination, it is likely that this is accompanied with positive intense of participating in these preventive activities.

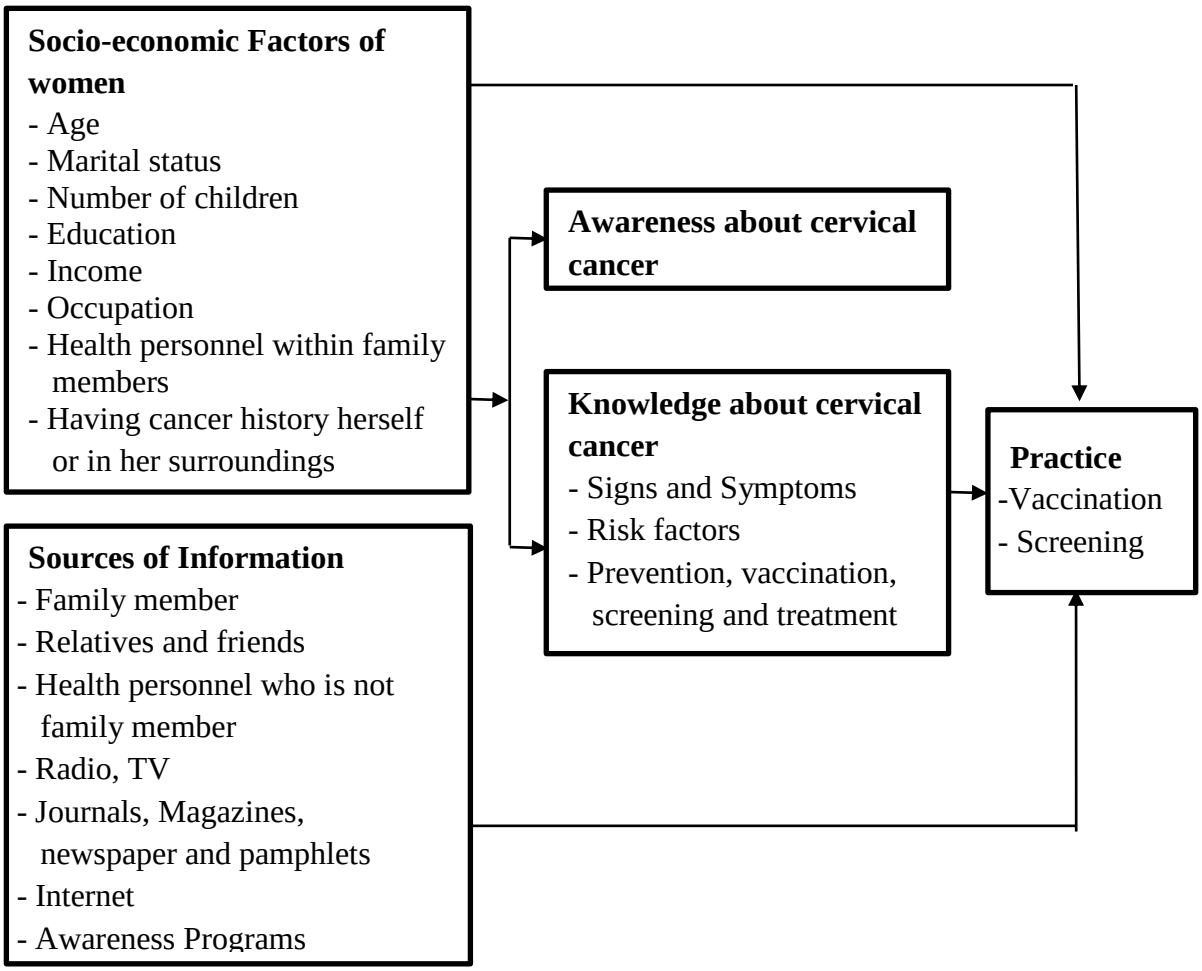
Although women have high awareness and knowledge level, perception of community towards service factors such as vaccination, screening, laboratory services, counseling and health education given by Government, NGOs and INGOs is important for preventive practices.

The women may be satisfied the service factors or may have barriers to access the service factors which in turn can affect the attitude and practice of cervical cancer. Barriers to utilization of services can be divided into subjective barriers and objective barriers. Subjective barriers based on personal feeling while objective barriers are influenced by environmental factors. Subjective barriers include fear of diagnosis, fear of physicians, ignorance of symptoms and socio-economic problems. Objective barriers include distance from local health facility, transportation cost, limited availability of services and other logistics problems. Low socio- economic status, lack of awareness and knowledge, negative attitude towards cervical cancer, and barriers to utilization of service factors are causes of fail to attend the health care services for practice of screening and vaccination. Therefore, the government and non-government organizations should make tremendous efforts to overcome barriers to utilization by increasing accessibility and affordability of health workers and promoting the health education programs by enhancing the sources of information.

Socio-economic factors and sources of information greatly contribute in influencing awareness, knowledge and preventive practice of cervical cancer. This study focuses only on socio-economic factors of women and sources of information and how these factors determine the cervical cancer awareness, knowledge and practice while the remaining factors could not be study due to time and financial limitations.

The conceptual framework is constructed with the interlinkage among all possible variables in medical research. However, only the study variables are used in academic research. So, the conceptual framework for this study is concerned with the study variables socio-economic factors of women, sources of information and how these factors determine the cervical cancer awareness, knowledge and practice.

The conceptual framework for this study which shows the inter-linkage between the independent and dependent variables concerning cervical cancer awareness, knowledge and preventive practice of cervical cancer is depicted in Figure 2.5. Socio-economic factors and sources of information are the independent variables for awareness, knowledge and preventive practice of cervical cancer while knowledge is also independent variable for preventive practice.



Source: Own Compilation (2019)

Figure 2.5 Conceptual Frame work for Awareness, Knowledge and Preventive Practice on Cervical Cancer

The knowledge can also act as the predictor variables of practice on cervical cancer. It is based on the assumed relationship between awareness, knowledge and practice. Social scientists believed that awareness, knowledge and practice are linked to each other. They believe the assumption focus on "if people become more aware of the cervical cancer, in turn, they will try to become more knowledgeable about cervical cancer and its associated problems, thus, be more motivated to practice the screening and vaccination in more positive attitude".

It is clear that all women do not engage in practice of screening and vaccination, because multiple factors can lead to unexpected outcomes for cervical cancer prevention. It is needed to better understand the complex relationships among various determinant factors and cervical cancer awareness, knowledge and practice.

Socio-economic factors of women include age, marital status, number of children, education, income, occupation, health personnel within family members and having a cancer history herself and/or in her surroundings. These factors influence the awareness and knowledge about cervical cancer of women, which in turn, lead to preventive practice such as vaccination and screening, for example, women with higher education may have greater awareness and knowledge and gain greater benefits from screening and vaccination practice. Similarly, older women are more likely to screen than younger women.

Sources of information include personal experience with cancer, health education from government health personnel and/or NGOs, mass media, friends and relatives. Sources of information play an important role both in determining the awareness and knowledge of cervical cancer and practicing the screening and vaccination. Nowadays, mass media are effectively used at improving awareness and knowledge of cervical cancer and motivating to preventive practice screening and vaccination. But health educations disseminated by health personnel are more effective and directly enhance the awareness and knowledge about cervical cancer and preventive practice on screening and vaccination.

CHAPTER 3

METHODOLOGY

This chapter presents the design of the study, the description of the study area, study population, sample size determination, pretest, ethical consideration, data collection technique and analytical method of the study.

3.1 Study Design

The study design was a cross-sectional descriptive and community based study on factors influencing cervical cancer awareness, knowledge and practice among women aged 18 years and above in Taungoo, Bago Region. A face-to-face interview was conducted at respondent's home from January to March, 2018 by following permission from Ward and Village General Administrative Offices.

3.2 Study Area Description

Taungoo, the study area, is the capital of the Taungoo District in Bago Region. There are public and private banks, Universities, one Nurses' Training School, a General Hospital, Urban Health Centers, Maternal and Child Health Care Center, some private hospitals and clinics.

According to 2018 population record of Ward and Village General Administrative Office, there are 23 wards and 17,107 households in the study area and the total population is 86,768. The populations of male and female are 39,890 and 46,878 respectively. The number of females who have attained age 18 years and above is 33,433 and the proportion of female population is 71.32%.

3.3 Study Population

The target population was women aged 18 years and above who had resided in the study area. The study population was women in selected sample wards who aged 18 years and above. The age group of participants was limited to the recommendation of the American cancer society (2016). It recommended that women should start to take cervical cancer screening at 21 years or no later than attaining the age of 70 years. Based on these recommendations, women were advised to start Pap smear screening from 18 years of age (Smith et al., 2010). According to the recommendation

of Shwe Yaung Hninsi cancer foundation in Myanmar, women should start to take cervical cancer screening at 30 years and married women should take ages between 30 and 65 years.

3.4 Sample Size Determination

The urban area of Taungoo was selected to carry out the "Determinants of Cervical Cancer Awareness, Knowledge and Practice among Women". In selecting suitable participants, the two-stage sampling technique was used. There are 23 wards in the study area. In the first stage, only 7 (30 %) wards were randomly selected. In the second stage, the households included in the sample wards were proportionately selected and then a sample woman of age 18 years and above was selected from each sample household. They have given verbal consent to participate in this study.

A household includes all persons who occupy a housing unit. A housing unit is a house, an apartment, a group of rooms or a single room that is occupied as separate living quarters. The occupants may be a single family, one person living alone, two or more families living together, or a group of related or unrelated persons who share living arrangements (U.S. Bureau of the Census, 2000). A household was defined that a person living alone or a group of people, either related or unrelated, who live together as a single unit in the sense that they have common housekeeping arrangements- they share or are supported by a common budget (Myanmar Living Condition Survey, 2017). If there is no woman in the target age group in the selected household, another household was selected to meet the sample number of households. In the selected household, if there is more than one woman in the 18 years and above age group, one of them was interviewed. In that selection, sick women who were not able to participate and difficult to answer the questionnaire were excluded from the study. To avoid missing eligible respondents in houses, interview was done after working hours and during weekends. When the selected woman was not available at the time of data collection, the interviewer made one more attempt to meet the woman next day.

The required sample size was calculated by using the Cochran's (1977) formula. This formula uses two key factors: (i) the risk, the researcher is willing to accept in the study, commonly called the margin of error and (ii) the significant level of acceptable risk the researcher is willing to accept that the true margin of error exceeds the acceptable margin of error. The significant level used in determining

sample size in most educational research studies is either 0.05 or 0.01. The general rule to acceptable margin of error in educational and social research is either 5% or 3%. The researcher may decrease these values when a higher degree of precision is needed (Bartlett et al., 2001). In this study, the uptake of cervical cancer screening rate was assumed 9% based on data from a previous study in Kungyangon Township, Yangon Region, Myanmar, (Mya Thida, 2015).The estimated screening rate was very low. Margin of error (3%) and 95% confidence level were used to meet higher precision. In determining the require sample size, Krejcie and Morgan's (1970) formula adjusted to Cochran's method for qualitative variables was used.

The required sample size was

$$n_o = \frac{z^2\ p\ (1-p)}{E^2} = \frac{(1.96)^2\ 0.09\ (1-0.09)}{0.03^2} = 349.58 \approx 350 \text{ households}$$

Where

n_0 = Sample size

z = Reliability coefficient of 1.96 (95% confidence level)

E = Margin of error = 0.03 (3%)

p = 9%, estimated proportion of cervical cancer screening practice from previous study (Mya Thida, 2015).

The adjusted minimum sample size with population (N=17,107)

$$n \geq \frac{n_o}{1+\frac{n_o-1}{N}} \times \text{deff} = \frac{350}{1+\frac{350-1}{17107}} \times 1.7 = 583.10 \approx 584 \text{ households}$$

Where, deff = design effect.

The design effect is a "correction factor" to account for the heterogeneity between clusters with regard to the measured indicator. The design effect has two primary uses; in sample size estimation and in appraising the efficiency of more complex plans. Design effect reflects the sampling design used in the survey type of study. It is 1 for simple random sampling and higher value (1 to 2) for other designs such as stratified, systematic and cluster random sampling etc., estimate to compensate for deviation from simple random sampling procedure. The design effect for cluster random sampling is taken as 1.5 to 2. For purposive sampling, convenience or judgment sampling, design effect will across 10. Higher the design effect, the more will be sample size required for a study.

In this study, design effect was assumed 1.7 to adjust the require sample size.

It is assumed that 10% of the non-response effect will be used to estimate the required minimum sample size.

$$n \geq 584+(584\times\frac{10}{100})=642.4 \approx 643 \text{ households}$$

Table (3.1)

The Required Sample Size for the Sample Wards

Sample ward number	Number of households	P_i	Sample household n_i
2	2250	0.31	201
5	201	0.03	18
7	195	0.03	17
9	715	0.1	64
18	1316	0.18	118
19	1748	0.24	156
21	790	0.11	71
Total	7215	1	645

Source: Ward and Village Records from General Administrative Office, 2018.

Then, a sample of women aged 18 years and above was selected from each sample household to interview with the structured questionnaire.

3.5 Pre –testing of Questionnaire

Pretesting reveals the weakness of the data collection tool. So the questionnaire was pre-tested with at least two women aged 18 years and above from each ward in the study area and the total of 52 women were interviewed after explaining the purpose of the study, obtaining verbal consent and assuring confidentiality. But three women, who answered "don't know Cervical Cancer" were excluded from the analysis. The reliability test was also performed giving the Cronbach alpha value for knowledge questions of 0.820 and 0.647 for attitude questions. Some knowledge factors were modified that they are confused to answer for the respondent, such as sign and symptom and risk factor of cervical cancer knowledge questions.

3.6 Ethical Considerations and Confidentiality

The research assistants introduced themselves to the participants and explained in detail about the study objective. To let the respondent's decision on whether to participate or not in the study and this ensured the right of self-decision

and autonomy. The respondents who agreed to participate were given a verbal consent that the study causes no physical or psychological harm to the respondents. If the respondent did not have to take part in this research she could stop participating in the research at any time. The collected information from this research project will be kept confidential. Confidentiality was assured by guarantee that their names did not appear anywhere in the questionnaire. Ethical approval was obtained from Defence Services Medical Research Centre, Nay Pyi Taw, Myanmar, Institutional Review Board before data collection.

3.7 Data Collection Techniques

Four research assistants were recruited to assist in the data collection. They were holders of master's degree in Law and Mathematics majors. They had experience in data collection. They were explained about the study tool, the aims and objectives of the study as well as the ethical considerations, how to get verbal consent from the respondents and how to conduct questionnaire interviews to minimize information bias. Permission to conduct the study was obtained from the local administration of the study area. Data were collected by using interviewer administered questionnaire in Myanmar language visited house-to-house and conducted face-to-face interview with the help of four assistant interviewers.

The questionnaire consisted of four parts, namely socio-economic factors, knowledge, reinforcing factors and perceptions of women for cervical cancer screening and vaccination. The socio-economic part of this study included 7 items such as age, marital status, education level, occupation, family income, number of children, having health personnel within family members and family history of cancer. Income of the family refers to the monthly income of all family members in terms of Myanmar currency (kyats). The knowledge part was composed of information about signs and symptoms, risk factors, prevention, vaccination and screening. Multiple-choice questions were used for accessing the knowledge level.

Regarding the reinforcing factors for awareness, knowledge, vaccination and screening of cervical cancer, this part was divided into 3 parts: social support, family support and material support. The questions were about social support that the respondents received cervical cancer information from health personnel who were not a family member, friends and non-government organizations (NGOs), international non-government organizations (INGOs), awareness programs in terms of information

and encouragement. The questions were about support from within the family, such as from family members who live together with the respondents, relatives in terms of information, encouragement that the respondents received. The questions were asked about material support such as a source of information about the cervical cancer information such as journals, internet, magazines, television, radio, newspapers, etc. Attitude was assessed by using 5-point Likert scale, arrange strongly disagree to strongly agree. The questions tried to assess respondents' feelings on the magnitude of cervical cancer in Myanmar. If they feel that they are at risk, their feeling on whether cervical cancer can be transmitted from person to person, how they feel about screening for premalignant cervical lesion, there is any harm caused the procedure, procedure is costly, their feeling on the importance of screening and lastly if they are ready to be screened.

3.8 Assessment of Awareness, Knowledge, Attitude and Preventive Practice of Cervical Cancer

Awareness

In this study, awareness means having previously heard of the term "cervical cancer". If the respondents don't know cervical cancer, they could not contribute any information of knowledge about cervical cancer. So only their socio-economic characteristics are described in the study. The awareness of respondent was binary dependent variable, taking the value of 1 for woman who knows the term cervical cancer and 0 for women who don't know the term cervical cancer.

Knowledge

In this study, knowledge means the understanding of the respondents have about cervical cancer. Knowledge comprised three parts including signs and symptoms, risk factors, prevention, vaccination, screening and treatment methods of cervical cancer. The knowledge part of Signs and symptoms consisted of 12 correct items and the risk factor knowledge constituted 11 correct items. These items were assessed as zero-one indicator (dichotomous) variables. The correct answer (Yes) was scored as 1 and incorrect answer (No and Don't Know) were scored as 0 for each response.

Knowledge on cervical cancer was also evaluated using four categories: prevention, vaccination, screening and treatment methods. There were 8 multiple choice questions that carried a total of 10 correct responses. Each correct response

was given a score of 1 and wrong response and don't know were scored as 0. Total points to be scored were 10 (100%) and the minimum was 0. Points were about the age of the most likely developed cervical cancer (1 point), preventive measures (2 points - any 2 correct responses among quit smoking, vaccination, routine screening, use condom, follow up screening results), eligibility for vaccination (1 point), frequency of vaccination (1 point), frequency of screening (1 point), eligible for screening (1 point), methods of screening (1 point – VIA test or Pap Smear test), treatment methods (2 points - any 2 correct responses among herbal remedies, surgery, specific drugs given by hospital, radiotherapy).

Knowledge level was categorized in different ways in previous studies. In the study of migrants women in the Northern district of Yangon, the knowledge score was classified into three categories " poor " if the score was less than 60%, " moderate " if the score between 60% and 80% and " high " if the score was above 80% according to the Bloom's criteria (Chaw Su Nandar et al., 2015). In another study of assessing the cervical cancer knowledge, knowledge of respondents was considered to be low if they got below mean score. The total knowledge score was 18. Knowledge level was categorized into low (0-6) and high (7-18) (Wai Wai Han et al., 2011).

In the study in Mandalay, the scores were computed by taking the sum and scores lower than 80% of the total score were considered as low and above 80% were considered as high (Chit Pyae Pyae Han et al., 2016). In another study, the knowledge score was classified into three categories " poor " if the score was less than 60%, " moderate " if the score between 60% and 80% and " high " if the score was above 80% according to the Bloom's criteria (Chit Pyae Pyae Han and Yamarat, 2012).

In this study, knowledge was categorized into three categories such as poor, moderate and high according to the Bloom's criteria. The total score for signs and symptoms was 12 and risk factor was 11 respectively. The total score for prevention, vaccination, screening and treatment methods was 10. Scores were computed by taking the sum and scores less than 60% of the total score were considered as poor knowledge. The knowledge level was moderate if the score was between 60% and 80% and above 80% of score defined as high level of knowledge.

Attitude

Attitude is the way an individual thinks and feels about cervical cancer, typically one that is reflected in that individual's behavior. Attitude was assessed by 10 questions with five point Likert scale. The questions tried to assess the respondents feeling on the magnitude of cervical cancer, if they feel that they are at risk, also their feeling on whether cervical cancer can be transmitted person to person, how they feel about vaccination and screening for premalignant cervical lesion, there is any harm caused during the procedure, the vaccination and screening are costly, also their feeling on the importance of vaccination and screening, and lastly if they are ready to be vaccinated and screened. The questions on Likert's scale had positive and negative responses that ranged from strongly disagree, disagree, not sure, agree and strongly agree. The scoring system used with respects to respondents' responses was as follows: strongly agree scored 5, agree 4, not sure 3, disagree 2, strongly disagree 1.

The scores were summed up and a total score was obtained for each respondent. The mean score was calculated and those scored above the mean and mean score had a positive attitude and scores below the mean defined as negative attitude towards cervical cancer. The highest score was expected to be 50 and the lowest score to be 10. The mean score was 30.

Preventive Practice (vaccination and screening)

In this study, the two types of preventive practice were studied. Vaccination practice defined as ever had received vaccination and screening practice defined as ever had a test of screening in a woman's lifetime. The respondents who never received vaccination and never pass the cervical cancer screening were considered as having "no practice". Cervical cancer vaccination and screening practice was assessed using questions having " Yes" or "No" response and taking the value of 1 for "Yes" and 0 for "No", respectively.

3.9 Study Variables

The dependent variables in this study are awareness, knowledge and preventive practice (vaccination and screening) of cervical cancer among women.

The independent variables are women's socio-economic factors such as age, marital status, number of children, education, occupation, family income, having health personnel within family members and type of cancer history. In addition, sources of information for vaccination and screening of cervical cancer are considered

as independent variables to determine the influencing sources of information on practice (vaccination and screening) of the sample women.

Woman's Age

Women were divided into three age categories: 18-under 30, 30-65 and over 65. This categorization is based on the eligible age for cervical cancer screening and vaccination. The US Preventive Services Task Force (USPSTF) recommends for cervical cancer screening every 3 years with cervical cytology alone, every 5 years with HPV testing alone, or every 5 years with HPV testing in combination with cytology in women aged 30 to 65 years. In Myanmar, Shwe Yaung Hninsi cancer foundation recommended that women should start to take screening for cervical cancer at 30 years and married women should screen ages between 30 and 65 years.

Marital Status

Women's marital status was categorized into two groups: single, widowed, divorced marital group and married group. This categorization is based on high risk groups of cervical cancer. The most important risk factor for cervical cancer is infection by the human papilloma virus (HPV) and sexual contact. Married women have more risk than single women.

Number of Children

In this study, the number of children is classified into three groups: women who have no child, between 1 and 3 children and 4 and above children.

Woman's Education

Women were categorized into two groups: below high school (illiterate, read and write only, primary and middle) education group and high school and above high school (high school, university, graduate and post graduate) education group.

Woman's Occupation

Occupation can represent family income and different occupational groups with different income have a different effect on the utilization of health care facilities. In this study, woman's occupation is categorized as dependent and retired occupation group, women who own a business or causal workers group and government or private service occupation group.

Monthly Family Income

Monthly family income is measured by Myanmar currency (kyats) and categorized into three groups: lower than 300000, 300000-600000 and above 600000.

Heaving Health Personnel within Family Member

Health personnel within family members can give the advices and encouragement to seek health knowledge about diseases. In this study, women were classified into two groups: women who have health personnel within family members and women who do not have health personnel within family members.

Having any Cancer History in her Surroundings

The experience of a disease can motivate the women to seek more healthy behaviors and prevention of diseases. The women were categorized into two groups: women who have been any cancer history and women who have no cancer experience in her surroundings.

The operational definitions and coding of the variables to be used in the study are shown in Table (3.2).

Table (3.2)

Definitions of Variables

Variables		Operational Definitions	Indicators	Variable Codes
Awareness		Previously heard of the term 'Cervical Cancer'	No Yes	0 = No 1= Yes
Knowledge		Understanding the signs and symptoms, risk factors, prevention, vaccination, screening and treatment methods of cervical cancer	Poor Moderate High	1=Poor 2=Moderate 3=High
Preventive Practice	Vaccination	Received cervical cancer vaccination in the respondents life time	No Yes	0 = No 1= Yes
	Screening	Uptake of cervical cancer screening test in the respondent's life time	No Yes	0 = No 1= Yes
Age		Age at last birthday	Age in completed years	1=18-under 30 2= 30-65 3= Above65
Number of children		Number of live born children	As reported by respondent	1=none 2=1-3 3=4 and above
Income (Kyats)		Monthly family income (Kyats)	As reported by respondent	1= Less than 300000 2= 300000-600000 3= Above 600000
Marital Status		Expressed in terms of single, married, widowed, divorce, as at the time of research.	▪ Single, ▪ Married, ▪ Divorce, ▪ Widowed	0= Single, Divorce, Widowed 1= Married

Table (3.2) Continued

Variables	Operational Definitions	Indicators	Variable Codes
Occupation	Work perform daily	▪ Dependent ▪ Government employee (non-health sectors) ▪ Private employee (non-health sectors) ▪ Government health personnel ▪ Private health personnel ▪ Own business ▪ Casual workers ▪ Retired	1=Dependent/retired 2=Government employee(non-health sectors)/ Private employee (non-health sectors)/ Government health personnel/Private health personnel 3=Own business/ casual workers
Education level	Highest education level attained	▪ Illiterate ▪ Only read and write ▪ Primary ▪ Middle ▪ High ▪ University/graduate /post graduate	0= Illiterate, only read and write, primary, middle 1= High school, university/ graduate, post graduate
Having health personnel	Having health personnel within family members	▪ No ▪ Yes	0 = No 1 = Yes
Type of cancer history	Having cancer patient in respondent's surroundings, family and including herself	▪ None ▪ Other cancer ▪ Cervical cancer	1 = None 2 = Other cancer 3 =Cervical cancer
Sources of information	Received cervical cancer information from any source	▪ Others ▪ Family member(health and non-health personnel)	0 = No 1 = Yes
		▪ Others ▪ Relatives, friends	0 = No 1 = Yes
		▪ Others ▪ Health personnel (not family member)	0 = No 1 = Yes
		▪ Others ▪ Radio, TV	0 = No 1 = Yes
		▪ Others ▪ Journals, magazines, newspapers and pamphlets	0 = No 1 = Yes
		▪ Others ▪ Internet	0 = No 1 = Yes
		▪ Others ▪ Awareness programs	0 = No 1 = Yes

In the analysis part of the study, cross-classification distribution and Chi-square test for bivariate analysis were used to investigate the socio-economic factors of women associated with the dependent variables such as awareness, knowledge and practice. Moreover, binary and multinomial logistic regression analyses were applied to determine the significant predictors of awareness, knowledge and practice of cervical cancer. In this analysis, Hosmer-Lemeshow test, Omnibus test, Cox and Snell's R squared and Nagelkerke R squared were applied for the overall model evaluation of logistic regression. The likelihood ratio test based on model deviance was used to test the significance of logistic regression coefficients. In addition, Wald test was also used to test of significance for the coefficients in the logistic regression model.

The results of logistic regression analysis were divided into ten different models based on the dependent and independent variables. The different models for this study are shown in Tables (3.3) and (3.4).

Table (3.3)
Identification of Dependent and Independent Variables for Binary Logistic Regression Analysis

Models	Dependent Variables	Independent Variables
Model 1	Awareness	Socio-economic characteristics of women
Model 5	Practice on vaccination	Socio-economic characteristics of women
Model 6	Practice on screening	Socio-economic characteristics of women
Model 7	Practice on vaccination	Sources of information for vaccination
Model 8	Practice on screening	Sources of information for screening
Model 9	Practice on vaccination	Knowledge about cervical cancer
Model 10	Practice on screening	Knowledge about cervical cancer

According to Table (3.3), seven different models represent the results of binary logistic regression analysis, based on different dependent and independent variables. Model 1 represents the binary logistic regression analysis between women's awareness of cervical cancer and their socio-economic characteristics. Model 5 and 6 stands for the binary logistic regression analysis between practice of cervical cancer (vaccination and screening) and socio-economic characteristics of the sample women. The binary logistic regression analysis results for practice of cervical cancer (vaccination and screening) and sources of information for practice are named as model 7 and 8. Moreover, Model 9 and 10 also describe the results for binary logistic

regression analysis between Practice of cervical cancer (vaccination and screening) and knowledge about cervical cancer of women.

Three different models represent the results of multinomial logistic regression analysis, based on different dependent and independent variables are shown in Table (3.4). Model 2 represents the multinomial logistic regression analysis for women's knowledge about signs and symptoms of cervical cancer and socio-economic characteristics of the sample women. Model 3 describes the multinomial logistic regression analysis for knowledge about risk factors of cervical cancer and socio-economic characteristics of the sample women. Model 4 stands for the multinomial logistic regression analysis for knowledge about prevention, vaccination and screening of cervical cancer and socio-economic characteristics.

Table (3.4)
Identification of Dependent and Independent Variables for Multinomial Logistic Regression Analysis

Models	Dependent Variables	Independent Variables
Model 2	Knowledge about signs and symptoms of cervical cancer	Socio-economic characteristics of women
Model 3	Knowledge about risk factors of cervical cancer	Socio-economic characteristics of women
Model 4	Knowledge about prevention, vaccination, screening and treatment methods of cervical cancer	Socio-economic characteristics of women

3.10 Logistic Regression

This section presents some types of logistic regression and goodness of fit test statistics and test statistics which are used to assess the significance of the individual coefficient.

Multivariate analysis commonly appears in general health science literature. Multivariate analysis refers to simultaneously predict multiple outcomes and uses multiple variables to predict a single outcome. It serves two purposes: (1) it can predict the value of dependent variable for new values of the independent variables, and (2) it can help describe the relative contribution of each independent variable to the dependent variable, controlling for the influences of the other independent variables.

In logistic regression, the outcome variable is usually categorized. In discriminant analysis, the outcome variable is a category or group to which a subject

belongs. For only two categories, discriminant analysis produces results similar to binary logistic regression. In proportional hazards regression, the outcome variable is the duration of time to the occurrence of a binary "failure" event during a follow-up period of observation. The logistic regression is the most popular multivariable method used in health science.

Binary logistic regression is typically used when the dependent variable is dichotomous and the independent variables are either continuous or categorical. When the dependent variable is not dichotomous and is comprised of more than two categories, a multinomial logistic regression can be employed.

3.10.1 Assumptions of Logistic Regression Model

The assumptions of logistic regression model are:

1. Logistic regression requires large sample size.
2. Logistic regression requires each observation to be independent.
3. Logistic regression requires there to be little or no multicolinearity among the independent variables.
4. The error terms (the residuals) do not need to be normally distributed in logistic regression analysis.

3.10.2 Binary Logistic Regression Model

Binary logistic regression is a prognostic model that is fitted where there is a dichotomous/binary dependent variable. Since logistic regression calculates the probability of an event occurring over the probability of an event not occurring, the impact of independent variables is usually explained in terms of odds. With logistic regression the mean of the response variable Y in terms of an explanatory variable X is modeled relating Y and X through the equation

$Y = E(Y \mid X) + \varepsilon_i$

$$\text{Logit}(Y) = \ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_i \qquad (3.1)$$

Where,

p_i is the probability of the outcome of interest

$p_i = 1$, if the event will occur.

$p_i = 0$, if the event does not occur.

Unfortunately, the extreme values of X will give values of $\hat{\beta}_0+\hat{\beta}_1 X_i$ that does not fall between 0 and 1. The logistic regression solution to this problem is to transform the odds using the natural logarithm. The estimated logit model is

$$\hat{L}=\ln\left(\frac{\hat{p}_i}{1-\hat{p}_i}\right) = \hat{\beta}_0+\hat{\beta}_1 X_i \qquad (3.2)$$

Where, p is the probability of the interested outcome and X is the explanatory variable. The parameters of the logistic regression are β_i. This is the simple logistic model. Taking the antilog of the Equation (3.2) on both sides, one can derive an equation for the prediction of the probability of the occurrence of the interested outcome as

P = P (Y=interested outcome | X= x, a specific value)

$$p=\frac{e^{(\beta_0+\beta_1 X)}}{1+e^{(\beta_0+\beta_1 X)}} \qquad (3.3)$$

Extending the logic of the simple logistic regression to multiple predictors, one may construct a complex logistic regression as

$$\ln\left[\frac{p(Y=1 \mid X_1 ... X_k)}{1-p(Y=1 \mid X_1 ... X_k)}\right] = \text{Logit (Y) = ln (odds)}$$

$$= \ln\left(\frac{p}{1-p}\right) = \beta_0+\beta_1 X_1+\beta_2 X_2+...+\beta_k X_k$$

$$=\ln\left(\frac{p}{1-p}\right) = \beta_0+\sum_{j=1}^{k}\beta_j X_j$$

Where, p = P (Y= 1 | X_1= x_1, ... X_k= x_k)

$$p=\frac{e^{\beta_0+\sum_{j=1}^{k}\beta_j X_j}}{1+e^{\beta_0+\sum_{j=1}^{k}\beta_j X_j}} \qquad (3.4)$$

$$=\frac{1}{1+e^{-(\beta_0+\sum_{j=1}^{k}\beta_j X_j)}}$$

1-p = P (Y= 0 | X_1= x_1, ... ,X_k= x_k)

$$1-p=\frac{1}{1+e^{(\beta_0+\sum_{j=1}^{k}\beta_j X_j)}}$$

In this study, Binary Logistic regression model has been used to find the variables that influenced on awareness and practice (vaccination and screening) of cervical cancer among women aged 18 years and above. Since the study is interested the awareness and practice of cervical cancer as the dependent variables (dichotomous outcome), binary logistic regression model has been used. Independent variables are socio-economic factors such as;

(i) Age (X_1)

(ii) Marital status (X_2)

(iii) Number of children (X_3)

(iv) Education (X_4)

(v) Occupation (X_5)

(vi) Monthly family income (X_6)

(vii) Having health personnel within family members (X_7)

(viii) Type of cancer history (X_8)

The dependent variable (awareness about cervical cancer) is defined as

$$Y_i = \begin{cases} 1, & \text{if the woman have awareness about cervical cancer} \\ 0, & \text{if the woman does not have awareness about cervical cancer} \end{cases}$$

The dependent variable (practice on vaccination) is defined as

$$Y_i = \begin{cases} 1, & \text{if the woman received cervical cancer vaccination} \\ 0, & \text{if the woman does not received cervical cancer vaccination} \end{cases}$$

The dependent variable (practice on screening) is defined as

$$Y_i = \begin{cases} 1, & \text{if the woman uptake cervical cancer screening} \\ 0, & \text{if the woman does not uptake cervical cancer screening} \end{cases}$$

The independent variables concerned with sources of information for cervical cancer vaccination, and screening are defined as,

(i) Family Members (Health personnel and Non-health personnel) (X_1)

(ii) Relatives, Friends (X_2)

(iii) Health Personnel who is not a family member (X_3)

(iv) Radio, TV (X_4)

(v) Journals, Magazines, Newspapers, Pamphlets (X_5)

(vi) Internet (X_6)

(vii) Awareness programs (X_7)

3.10.3 Multinomial Logistic Regression

Binary logistic regression model when the outcome variable is dichotomous or binary, has been modified by McFadden (1973) to handle the case where the outcome variable is nominal with more than two categories. The modified model is frequently referred to as the discrete choice model in business and econometric literature while it is called the multinomial, polychotomous or polytomous logistic regression model in the health and life science (Hosmer and Lemeshow, 2000).

The multinomial logistic regression model is a fairly straightforward generalization of the binary model and both models depend on logit analysis. The simplest approach to multinomial data is to nominate one of the response categories as a baseline or reference cell, calculate log-odds for all other categories relative to the baseline, and then let the log odds be a linear function of the predictors.

Assume that there are 'n' independent observations with 'p' explanatory variables. The qualitative response variable has 'k' categories. Let P_j denote the probability of an observation falling in the jth category, the relationship between this probability and the p explanatory variables $X_1, X_2, \ldots, X_p$, and the last k^{th} category is defined as reference category.

The multinomial logistic regression model is

$$\log\left[\frac{p_j}{p_k}\right] = \beta_0 + \beta_{1j}X_{1i} + \beta_{2j}X_{2i} + \ldots + \beta_{pj}X_{pi}$$

where j=1,2,…,(k-1), i=1,2,…,n

P_j= P (Y= j th interested outcome | X_i= x)

$$\log(p_j) = \frac{e^{(\beta_0 + \beta_{1j}X_{1i} + \ldots + \beta_{pj}X_{pi})}}{1 + e^{(\beta_0 + \beta_{1j}X_{1i} + \ldots + \beta_{pj}X_{pi})}} \qquad (3.5)$$

Multinomial Logistic regression was chosen in this study because the study was interested in the knowledge level as the dependent variables (more than two outcomes). The knowledge level was classified into three categories namely a woman who has poor knowledge, moderate knowledge and the third is high knowledge. The independent variables are socio-economic factors of women. The dependent variables are knowledge on signs and symptoms, knowledge on risk factors and knowledge on prevention, vaccination, screening and treatment methods of cervical cancer. The dependent variable for knowledge of respondent is defined as

$$Y_i = \begin{cases} 1, \text{ if the respondent has poor knowledge} \\ 2, \text{ if the respondent has moderate knowledge} \\ 3, \text{ if the respondent has high knowledge} \end{cases}$$

3.10.4 Parameter Estimating in the Logistic Regression Model

In logistic regression analysis, the parameters are usually estimated by using the method of maximum likelihood. Maximum likelihood will provide values of β_0 and β_i which maximize the probability of obtaining the data set. The likelihood function is used to estimate the probability of observing the data, given the unknown parameters (β_0 and β_i). A "likelihood" is a probability that the observed values of the dependent variable may be predicted from the observed values of the independent variables. The likelihood varies from 0 to 1 like any other probabilities. Suppose each individual sample of size 'n' selected from a population has the same probability p, an event occurs, $Y_i = 1$ indicates that an event occurs for the ith subject, otherwise, $Y_i = 0$. The observed data are $Y_1, \ldots, Y_n$ and $X_1, \ldots, X_n$. The joint probability of the data (the likelihood) is given by

$$L = \prod_{i=1}^{n} p^{y_i} (1-p)^{1-y_i}$$

$$= (p)^{\sum_{i=1}^{n} y_i} (1-p)^{n - \sum_{i=1}^{n} y_i}$$

Natural logarithm of the likelihood is

$$L = \text{Log}(L) = \sum_{i=1}^{n} y_i \log p + \left(n - \sum_{i=1}^{n} y_i \right) \log(1-p) \tag{3.6}$$

Estimating the parameters β_0 and β_i is done by using the first derivatives of log-likelihood, and solving them for β_0 and β_i. The iterative computing is used in this case. An arbitrary value for the coefficients (usually 0) is chosen first. Then log-likelihood is computed and variation of coefficient values is observed. Reiteration is performed until maximization of *l* (equivalent to maximizing *L*) and the results become the maximum likelihood estimates of β_0 and β_i.

3.10.5 Goodness of Fit Test and Selecting Predictor Variables for Logistic Regression

After estimating the Logistic regression model parameters using the maximum likelihood estimator, there is a need to assess the significance of the variables with regards to predicting the response variable. There are a number of statistical methods that can be used to carry out the assessment which include Deviance, likelihood ratio test, Hosmer-Lemeshow goodness of fit test, Omnibus test, Wald test. These test statistics are distributed as chi-square with degrees of freedom equal to the number of predictors.

Deviance

According to Hosmer & Lemeshow (2000), the statistic D, is called the deviance, and it plays an essential role in the assessment of goodness of fit of the model. Deviance (D) follows a Chi-square distribution with q- degrees of freedom, where q is the number of covariates in the equation.

$$D=-2\sum_{i=1}^{n}\left[y_i \ln\left(\frac{p_i}{y_i}\right)+(1-y_i)\ln\left(\frac{1-p_i}{1-y_i}\right)\right]$$

Likelihood Ratio Test

The likelihood ratio test is a test based on the difference in deviancies: the deviance without any predictor in the model (or the intercept only model) minus the deviance with all predictors in the model. The Likelihood ratio test, tests the significance of all the variables included in logistic regression model. The likelihood-ratio test is Chi-square distributed and if the test is significant then the dropped variable will be a significant predictor in the equation whilst on the other hand, if the test is not significant then the variable is considered to be unimportant and thus will be excluded from the model. The Log-likelihood ratio is the difference between the deviance of the null model (model with just the constant) and a model after adding independent variables.

The statistic is given by:

$$-2\log\left(\frac{L_0}{L_1}\right)=-2\left[\log(L_0)-\log(L_1)\right]=-2(\ell_0-\ell_1)$$

where , ℓ_o is the maximum value for the likelihood function of a simple model and , ℓ_1 is the maximum value for the likelihood function of a full model. The full model

has all the parameters of interest and the simple model has one variable dropped (Hosmer and Lemeshow, 2000).

Hosmer – Lemeshow Goodness of Fit Test

The test compares the predicted values against the actual values of the dependent variable. The method is similar to the Chi-square goodness of fit. The Hosmer–Lemeshow test is to examine whether the observed proportions of events are similar to the predicted probabilities of occurrence in subgroups of the model population. The Hosmer-Lemeshow test is performed by dividing the predicted probabilities into deciles (10 groups based on percentile ranks) and then computing a Pearson Chi-square that compares the predicted to the observed frequencies in a 2-by-10 table. The value of the test statistics is

$$\chi^2 = \sum_{i=1}^{10} \frac{(O_i - E_i)^2}{E_i}$$

Where O_i and E_i denote the observed events, and expected events for the ith risk decile group.

Omnibus Test

The omnibus test statistic is a measure of the overall model fit. The test is implemented on an overall hypothesis that the null hypothesis; all the coefficients of independent variables are equal to zero against at least one coefficient of an independent variable that is not equal to zero. The null hypothesis is rejected when the p-value is less than significance level. It implies that the logistic regression can be used to model the data.

Wald Test

The Wald statistic can be used to assess the contribution of individual predictors or the significance of the individual coefficients in a given model. The Wald test is obtained from a vector-matrix calculation that involves the parameter vector, its transpose and the inverse of its variance matrix (Hosmer and Lemeshow, 2000). The formula for computing the Wald statistic is;

$$W = \frac{\hat{\beta}_i}{SE\ (\hat{\beta}_i)}$$

where, $\hat{\beta}_i$ is the estimate of the coefficient of the independent variable x_i and SE $(\hat{\beta}_i)$ is the standard error of $\hat{\beta}_i$. The squared value of the Wald statistics as indicated below is chi-square distributed with one degree of freedom.

$$W^2 = \left(\frac{\hat{\beta}_i}{SE\ (\hat{\beta}_i)} \right)^2 .$$

The Wald statistic follows a chi-square distribution with 1 degree of freedom. The null hypothesis is rejected if the p-value of the test is less than α (significance level). A coefficient with a p-value of the Wald statistic less than α (significance level) implies that the variable is important in the model.

Score Test

Score test is one method of assessing the importance of individual independent variables that does not require the calculation of the maximum likelihood estimates of coefficients. According to Thompson (2009), the score test is computed by finding the first and second derivatives of the log likelihood function. The score test is based on the distribution of the k-derivatives of the fitted model's likelihood function with regard to all parameters. The statistic to test the hypothesis:

$$S(\beta) = \frac{U(\beta)^2}{L(\beta)}$$

$$U(\beta_k) = \frac{\partial L\left(\beta_k \middle| x \right)}{\partial(\beta)}$$

$$l\ (\beta) = \frac{-\partial^2 L\left(\beta_k \middle| x \right)}{\partial \beta^2}$$

Where, L is the log-likelihood function depending

R Square for Logistic Regression

Cox and Snell R^2 is based on the log likelihood for the model compared to the log likelihood for the base line model. The R^2 for logistic regression is estimated by Cox and Snell R^2 computed as

$$\text{Cox\& Snell}\, R^2 = \left[\frac{-LL_0 - LL_k}{-LL_0} \right]^{n/2}$$

CHAPTER 4
RESULTS AND FINDINGS

The results and findings of the study are presented in this chapter. The findings involve the investigation of factors that affected on the dependent variables. The results and findings are based on the information provided by the women aged 18 years and above.

4.1 The Socio-economic Characteristics of the Respondents

Table (4.1) shows the socio-economic characteristics of the total respondents. The total of 645 women who are 18 years old and above participated in this study. It is found that the mean age of respondents is 44.75 years with a standard deviation of 13.23 years. The youngest woman is 18 years and the oldest is 74 year, providing for a range of 56 years. The majority of the respondents are between 30 and 65 years old, representing 507 (78.6%) of the sample respondents. Forty five (7%) of the respondents are above 65 years old while 93 (14.4%) are between 18 and under 30.

Among the respondents, 456 women (70.7%) are married and 98 women (15.2%) are single. Among them, 14 women (2.2%) are divorces and 77 women (11.9%) are widows. The age of the women who got first marriage ranges from 13 to 41 years. Only 73 (13.35%) of the women got married at under 18 years while 64 (11.7%) of the sample women were married at above 30 years. In this study, 121 married women (22.12%) have more than 3 children while 40 married women (7.31%) have no children. Regarding education, only 16 (2.5%) of sample women are illiterate and 136 women (21.1%) completed high school education. The study of occupation shows that 245 women (38%) are dependents and 237 women (36.7%) have their own business. But, only 11 women (1.7%) are civil servants of health sector and 4 women (0.6%) are private health personnel. Family income of each respondent ranges from 45,000 kyats to 10,000,000 kyats per month and the median income is 250,000 kyats per month. Only 52 women (8.1%) have health personnel within family members. There are 252 women (39.1%) who have a history of cancer themselves or in their surroundings, but only 36 (5.6%) of them have a history of cervical cancer

Table (4.1)

Socio-economic Characteristics of the Respondents

Characteristics	Classification	Number of women	Percentage
Age (year)	18 – under 30	93	14.4
	30 – 65	507	78.6
	Above 65	45	7
Marital Status	Single	98	15.2
	Married	456	70.7
	Divorced	14	2.2
	Widowed	77	11.9
Age at first marriage (year)	13 –17	73	13.35
	18 – 30	410	74.95
	31– 41	64	11.7
Number of children alive	None	40	7.31
	1–3	386	70.57
	4 and above	121	22.12
Education Level	Illiterate	16	2.5
	Read and Write	16	2.5
	Primary	128	19.8
	Middle	171	26.5
	High	178	27.6
	University/Graduate/Post graduate	136	21.1
Occupation	Dependent	245	38
	Government employee (non-health sector)	57	8.8
	Private employee (non-health sector)	10	1.6
	Government Health personnel	11	1.7
	Private Health personnel	4	0.6
	Own business	237	36.7
	Casual workers	59	9.1
	Retired	22	3.4
Monthly family income (Kyats)	Less than 300,000	467	72.4
	300,000 – 600,000	139	21.6
	Above 600,000	39	6
Having health personnel within family members	Yes	52	8.1
	No	593	91.9
History of cancer	Yes	252	39.1
	No	393	60.9
Type of cancer history	Cervical	36	5.6
	Others	216	33.5
	None	393	60.9

Source: Survey data (2018)

4.2 Sources of Information for Cervical Cancer

As the results of Table (4.2), majority of 645 women heard about cervical cancer from relatives, friends (55.66%) and media: such as radio, TV (34.42%), journals, magazines, newspapers and pamphlets (24.03%), and internet (4.19%). Ninety two (14.26%) of the sample women heard about cervical cancer from health personnel who are not family members. Only 2.17% heard about the disease from a family member who serves in health sector and 3.88% received the term of cervical cancer from a family member who is not health personnel. The least source of cervical cancer is NGOs, INGOs (0.16%). Only 3.72% of the respondents have heard from awareness programs providing by nursing association, MMWCA and medical companies.

The predominant sources of information about cervical cancer vaccination are relatives and friends (30.25%), followed by media such as radio, TV (23.42%), journals, magazines, newspapers and pamphlets (19.49%), and internet (3.93%). Meanwhile, 18.97% of the women received the information about vaccination from health personnel who are not family members. Only 1.71% of the respondents heard about the cervical cancer vaccination from a family member who serves in health sector and 3.25% received the term of vaccination from a family member who is not health personnel. The least source of cervical cancer vaccination is NGOs, INGOs (0.17%). Only 4.62% have heard from awareness programs providing by nursing association, MMWCA and medical companies.

With regard to the source of information about cervical cancer screening, 27.52% received from relatives and friends. Only few mentioned family members as their source, 20.51% received from health personnel who is not a family member. The study has found that media is one of the sources of information about cervical cancer screening, 18.29% of the women have heard about screening from radio, TV , Journals, Magazines, Newspapers, Pamphlets (16.07%) and internet (3.59%). The least source of cervical cancer screening is NGOs, INGOs (0.34%). Only 3.42% had heard from awareness programs providing by nursing association, MMWCA and medical companies.

Table (4.2)

Sources of Information for Cervical Cancer

Sources (multiple response)	Cervical cancer		Vaccination		Screening	
	Number of women	%	Number of women	%	Number of women	%
Family members (Health personnel)	14	2.17	10	1.71	7	1.20
Family members (Non-health personnel)	25	3.88	19	3.25	11	1.88
Relatives, friends	359	55.66	177	30.25	161	27.52
Other health personnel	92	14.26	111	18.97	120	20.51
Radio, TV	222	34.42	137	23.42	107	18.29
Journals, Magazines, Newspapers, Pamphlets	155	24.03	114	19.49	94	16.07
Internet	27	4.19	23	3.93	21	3.59
NGOs, INGOs	1	0.16	1	0.17	2	0.34
Awareness programs (nursing association, MMWCA, medical companies)	24	3.72	27	4.62	20	3.42
Other (Market)	1	0.16	1	0.17	1	0.17

Note: Some respondents got information from more than one source of information.
Source: Survey data (2018)

4.3 Awareness of Respondents about Cervical Cancer

Table (4.3) shows the awareness of cervical cancer, vaccination and screening for cervical cancer. As the results, 585 (90.7%) of the women have heard about cervical cancer, 392 (60.8%) have heard about vaccination for cervical cancer and approximately half of the respondents did not know screening for cervical cancer.

Table (4.3)

Awareness of Respondents about Cervical Cancer, Vaccination and Screening

Awareness	Yes	Percentage	No	Percentage
Ever heard of cervical cancer	585	90.7	60	9.3
Ever heard of cervical cancer vaccine	392	60.8	253	39.2
Ever heard of cervical cancer screening	346	53.6	299	46.4

Source: Survey data (2018)

4.4 Knowledge of Respondents about Cervical Cancer

In this section, the women who did not know about cervical cancer were excluded from the analysis because they could not contribute any information on

cervical cancer and it is impossible to measure their knowledge and attitude. So, only 585 women of the respondents were included in the sample for analysis.

4.4.1 Knowledge of Respondents about Signs and Symptoms of Cervical Cancer

As part of the assessment of the knowledge of the respondents, they were asked to identify some warning signs and symptoms associated with cervical cancer.

Table (4.4.1)
Knowledge of Respondents about Signs and Symptoms of Cervical Cancer

Signs and Symptoms (multiple response)	Yes		No / Don't know	
	Number of women	%	Number of women	%
Vaginal bleeding between regular periods	359	61.4	226	38.6
Menstrual periods that are heavier or longer than usual	382	65.3	203	34.7
Persistent vaginal discharge that smells unpleasant	450	76.9	135	23.1
Pain and virginal bleeding during or after sex	246	42.1	339	57.9
Persistent diarrhea is not its sign and symptom	58	9.9	527	90.1
Persistent pelvic pain	224	38.3	361	61.7
Persistent lower back pain	270	46.2	315	53.8
Persistent blood in the stool or urine	243	41.5	342	58.5
Virginal bleeding after Menopause	378	64.6	207	35.4
Unexplained weight loss	214	36.6	371	63.4
Abnormal discharge per vagina, serous, pus, mucus	503	86	82	14
Pain and tenderness in pelvic organs	426	72.8	159	27.2

Note: The response "No" and "Don't know" were considered as the respondents don't know the signs and symptoms of cervical cancer.
Source: Survey data (2018)

Regarding the knowledge of respondents about the signs and symptoms of cervical cancer, 346 (59.1%) of the respondents have poor knowledge, 167 (28.5%) moderate knowledge and 72 (12.3%) high knowledge respectively (see Appendix Table A-1). As the results of Table (4.4.1), more than half of respondents are found to be mentioned the common signs and symptoms of cervical cancer. The women who

reported knowledge of signs and symptoms are as follows: vaginal bleeding between regular periods (61.4%), vaginal bleeding after menopause (64.6%) and menstrual periods that are heavier or longer than usual (65.3%).

The majority of the respondents could identify the invasive signs and symptoms. Eighty-six percent of the respondents identified abnormal discharge per vagina, serous, pus, mucus and 76.9% reported persistent vaginal discharge that smells unpleasant as invasive symptoms and 72.8% correctly identified that pain and tenderness in pelvic organs is one of the signs and symptoms of cervical cancer. Only 42.1% stated that pain and virginal bleeding during or after sex is a major symptom of cervical cancer. Only 9.9% of the women correctly identified persistent diarrhea is not a symptom of cervical cancer. Approximately half of the women (46.2%) correctly pointed out that persistent lower back pain is the common signs and symptoms of cervical cancer.

4.4.2 Knowledge of Respondents about Risk Factors of Cervical Cancer

Regarding the knowledge about risk factors of cervical cancer, 402 (68.7%) of the women have poor knowledge, 122 (20.9%) have moderate knowledge and 61 (10.4%) have high knowledge (see Appendix Table B-1). According to Table (4.4.2), infection with HPV is not mentioned by most respondents as the risk factor. It is accounted for 72.6% of the respondents. Tobacco and cigarette smoking has been listed as one of the risk factors for the development of all types of cancers including cervical cancer. But, 69.4% of the respondents did not mention it as the risk factor of cervical cancer in this study. One of the risk factors identified by the respondents which account for 67.9% is long term use of contraceptive pills.

It has been found that more than half of the respondents identified " having many sexual partners" and " having multiple marriage" are the risk factors of cervical cancer. They could not accept that appearance of viral warts in sexual organ of both sexes as the risk factor of cervical cancer and only 34.7% accept the factor.

Table (4.4.2)

Knowledge of Respondents about Risk Factors of Cervical Cancer

Risk Factors (multiple response)	Yes		No/Don't know	
	Number of women	%	Number of women	%
Infection with HPV (human papilloma virus)	160	27.4	425	72.6
Smoking any cigarette	179	30.6	406	69.4
Having a weakened immune system (e.g. because of HIV/AIDS, immunosuppressant drugs or having a transplant)	243	41.5	342	58.5
Long term use of the contraceptive pills	397	67.9	188	32.1
Sexual intercourse, marriage and child bearing under the age of 18 years	272	46.5	313	53.5
Having many sexual partners	338	57.8	247	42.2
Having many children	186	31.8	399	68.2
Having a sexual partner with many previous partners	286	48.9	299	51.1
Not going for regular smear (Pap) tests	322	55	263	45
Appearance of viral warts in sexual organ of both sexes	203	34.7	382	65.3
Having multiple marriage	319	54.5	266	45.5

Note: The response "No" and "Don't know" were considered as the respondent don't know the risk factors of cervical cancer.

Source: Survey data (2018)

4.4.3 Knowledge of Respondents about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer

According to Table (4.4.3), it has been found that 27.5% of the women correctly identified the age which is the most likely to develop cervical cancer. More than half of the respondents mentioned frequencies of vaccination, prevention methods and treatment methods as a mean of avoiding cervical cancer. Especially they pointed out having surgery as a main treatment option. Only 14.2% stated the screening methods. Most of them knew Pap-Smear test but some respondents did not know which method was used when they were screened. Only 2.6% of the

respondents correctly identified the factors of prevention, vaccination, screening and treatment methods, and they have high knowledge about cervical cancer, while 176 (30.1%) have moderate and 394 (67.4%) have poor knowledge (see Appendix Table C-1).

Table (4.4.3)

Knowledge of Respondents about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer

Knowledge items (multiple response)	Number of women	%
Which age is the most likely to develop cervical cancer?(15-49)	161	27.5
Eligible age for vaccination	204	34.9
Frequencies of vaccination	300	51.3
Eligible age for screening	195	33.3
Frequencies of screening	110	18.8
Method of screening (VIA and Pap- Smear test)	83	14.2
Prevention method 1	530	90.6
Prevention method 2	403	68.9
Treatment method1	423	72.3
Treatment method 2	226	38.6

Note: The response "No" and "Don't know" were considered as the respondent don't know the prevention, vaccination, screening and treatment methods of cervical cancer.

Source: Survey data (2018)

4.5 Attitudes of Respondents about Cervical Cancer

Detailed responses for the items related to attitude for cervical cancer are provided in Table (4.5). The majority of the women (34.9%) participated in the study strongly agreed and (34.9%) agreed that cervical cancer is a highly prevalent disease and the leading cause of death in Myanmar. Among the sample women, 47.5% strongly agreed and 45% agreed that vaccination and screening can help in prevention of cervical cancer.

More than half of the women (53.7%) strongly agreed that every adult woman should be vaccinated and screened for cervical cancer and 65% had strongly willingness to take screening of cervical cancer. However, only 9.6% strongly agreed and 28% agreed that vaccination and screening are not expensive. 1.9% of the

respondents strongly disagreed to support that cervical cancer can be cured. Among the analytical sample of 585 women only 3 (0.5%) have negative attitude and the remainder 582 (99.5%) have positive attitude for cervical cancer.

Table (4.5)

Attitude of Respondents about Cervical Cancer

Attitude questions	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)
Cervical cancer is highly prevalent disease and a leading cause of deaths in Myanmar.	204 (34.9%)	204 (34.9%)	77 (13.2%)	92 (15.7%)	8 (1.4%)
Any adult woman including you can acquire cervical cancer.	187 (32%)	274 (46.8%)	40 (6.8%)	77 (13.2%)	7 (1.2%)
Cervical cancer cannot be transmitted from one person to another.	197 (33.7%)	279 (47.7%)	42 (7.2%)	49 (8.4%)	18 (3.1%)
Vaccination and screening helps in prevention of cervical cancer.	278 (47.5%)	263 (45%)	26 (4.4%)	12 (2.1%)	6 (1%)
Vaccination and screening causes no harm to the client.	167 (28.5%)	234 (40%)	128 (21.9%)	47 (8%)	9 (1.5%)
Vaccination and screening are not expensive.	56 (9.6%)	164 (28%)	147 (25.1%)	201 (34.4%)	17 (2.9%)
Every woman should be vaccinated and screened for cervical cancer.	314 (53.7%)	252 (43.1%)	9 (1.5%)	7 (1.2%)	3 (0.5%)
If you had a symptom that you thought might be a sign of cervical cancer, would you visit a health center?	362 (61.9%)	211 (36.1%)	2 (0.3%)	6 (1%)	4 (0.7%)
Cancer of the cervix can be cured.	99 (16.9%)	278 (47.5%)	101 (17.3%)	96 (16.4%)	11 (1.9%)
If you were offered a free cervical cancer screening, would you be willing to be screened?	380 (65%)	172 (29.4%)	5 (0.9%)	23 (3.9%)	5 (0.9%)

Source: Survey data (2018)

4.6 Preventive Practice of Respondents for Cervical Cancer

This section describes the practice on vaccination of cervical cancer and reasons for not vaccination of cervical cancer. It also describes the practice on screening of cervical cancer and reasons for not screening of cervical cancer.

4.6.1 Practice on Vaccination of Cervical Cancer

As the results of Tables (4.6.1) and (4.6.2), 19.7% of the respondents have received cervical cancer vaccination. Among the vaccinated women, 30.4% have received three times of vaccination, 29.6% have received two times and 40% have once of vaccination in their life time. They received vaccination at the age of between 14 and 54 years and most of women vaccinated when there was a vaccination project in their wards. Only one woman cannot report the place when she received the vaccination. Three women did not remember the age when they received the last vaccination.

Table (4.6.1)
Practice on Vaccination of Cervical Cancer

Descriptions	Number of women	%
Ever vaccine for cervical cancer	115	19.7
Frequency of vaccination		
1 time	46	40
2 times	34	29.6
3 times	35	30.4
Age at first vaccination		
14 – 29	28	24.3
30 – 54	41	35.7
Place of first vaccination		
Government hospital	3	2.6
Health care center	2	1.7
Ward administration office	54	47
Private hospital	3	2.6
Others (Army, school, university, nurse's home)	6	5.2
Not remember	1	0.9
Age at last vaccination		
15 – 29	36	31.3
30 – 54	76	66.1
Not remember	3	2.6
Place of last vaccination		
Government hospital	5	4.3
Health care center	7	6.1
Ward administration office	87	75.7
Private hospital	10	8.7
Others (Army, school, university, nurse's home)	5	4.3
Not remember	1	0.9

Source: Survey data (2018)

In this study, the reason of the low vaccination of cervical cancer is that they believe that they are being healthy and they cannot suffer from cervical cancer. It is

accounted for 15.38% of the respondents. The other reasons were, ' not knowing where to go for taking cervical cancer vaccination ' and ' it is expensive ', and their percentages are 7.35% and 7.18%, respectively. There was no woman who considered long distances to a health facility'. Moreover, 2.05 % of the women think that vaccination may have side effect as they are over age for vaccination. Among the analytical sample women, 32.99% have never heard of cervical cancer vaccination.

Table (4.6.2)

Reasons for Not Vaccination of Cervical Cancer

Descriptions (multiple response)	Number of women	%
Little understanding of cervical cancer	27	4.62
Not knowing where to go for taking cervical cancer vaccination	43	7.35
Not suggested by anyone	18	3.08
Lack of convenient time for vaccination	20	3.42
Long distance to a health facility	0	0
I am healthy (I can't suffer Cervical Cancer)	90	15.38
It is expensive	42	7.18
I am not informed/knowledge cervical cancer	2	0.34
I haven't just decided	18	3.08
I am afraid of the pain of vaccination	9	1.54
Others (over age, side effect of vaccination)	12	2.05
Don't know vaccination	193	32.99

Note: Some respondents answered more than one reason.
Source: Survey data (2018)

4.6.2 Practice on Screening of Cervical Cancer

According to the results of Tables (4.6.3) and (4.6.4), the percentage of cervical cancer screening of the women who had at least one time of screening with VIA or Pap smear method of screening was 6.49% of the analytical sample women. Among the screened women, 18.4% have received three times of screening, 15.8% have received two times and 57.9% had once in their life time. They took screening at the ages between 18 and 63 years. Most of the screened women took screening of cervical cancer in private hospital and the second choice of screening place is government hospital. Majority of the women were screened for cervical cancer by using Pap smear test. Three women forgot the frequency, place and age of their screening.

Table (4.6.3)

Practice on Screening of Cervical Cancer

Descriptions	Number of women	%
Ever screen for cervical cancer	38	6.49
Frequency of screening		
1 time	22	57.9
2 times	6	15.8
3 times	7	18.4
Not remember	3	7.9
Age at first screening		
18-under 30	4	10.5
30-63	8	21.1
Place of first screening		
Government hospital	4	10.5
Private hospital	8	21.1
Health care center	1	2.6
Method for first screening		
VIA test	1	2.6
Pap smear test	9	23.7
Don't know	3	7.9
Age at last screening		
18 – 29	4	10.5
30 – 63	31	81.5
Place of last screening		
Government hospital	10	26.3
Private hospital	22	57.9
Health care center	3	7.9
Method for last screening		
VIA test	2	5.3
Pap smear test	27	71.1
Don't know	6	15.8

Source: Survey data (2018)

Table (4.6.4) shows that most of the sample women have not taken screening for various reasons. 27.35% of analytical sample women gave reason about their health as being good and 5.47% answered they have little understanding of cervical cancer. Fourteen of them (2.39%) said that they are afraid the virginal exam and 4.79% answered they don't know where to go for screening of cervical cancer. Twelve (2.05%) respondents did not take screening because the cost of screening is too expensive and 4.49% of respondents did not take screening due to the lack of clinic time and being busy with their daily activities. Another reason that was evident from 3.08% of the respondents is that they do not have anyone to suggest for screening of cervical cancer and 51.11% have never heard of cervical cancer screening.

Table (4.6.4)
Reasons for Not Screening of Cervical Cancer

Descriptions (multiple response)	Number of women	%
Little understanding of cervical cancer	32	5.47
It may be painful	6	1.03
Fear of a vaginal exam	14	2.39
Not knowing where to go for screening	28	4.79
Not suggested by anyone	18	3.08
Lack of convenient clinic time	28	4.49
Long distances to a health facility	0	0
I feel shy	2	0.34
I am healthy	160	27.35
I am afraid a screening test would reveal cervical cancer	0	0
It is expensive	12	2.05
I am not informed/knowledge cervical cancer	0	0
I haven't just decided	6	1.03
Other (over age, no need after vaccination)	3	0.51
Don't know screening	299	51.11

Note: Some respondents answered more than one reason.
Source: Survey data (2018)

4.7 Analysis of Relationship between Awareness of Cervical Cancer and Socio-economic Characteristics

In this section, cross-tabulation and Chi-square test were used to determine the association between awareness of cervical cancer and socio-economic characteristics of the respondents. Binary logistic regression was used to determine the influencing factors on awareness of cervical cancer.

4.7.1 Association between Awareness of Cervical Cancer and Socio-economic Characteristics

Cross-tabulation and Chi-square test were done to determine the association between the socio-economic characteristics of respondents and awareness of cervical cancer. The major socio-economic variables included age, marital status, number of children, education, occupation, monthly family income, having health personnel within family members and the history of cancer.

Table (4.7.1)
Association between Awareness of Cervical Cancer and Socio-economic Characteristics

Variables	Classification	Awareness		χ^2	P-value
		No	**Yes**		
Age (years)	18 – under 30 30 – 65 Above 65	8 49 3	85 458 42	0.503	0.777
Marital status	Married Single/ widowed/ divorced	39 21	168 417	1.037	0.309
Number of children	None 1 – 3 4 and above	11 28 21	127 358 100	11.51***	0.003
Education	(Illiterate/Read and write/ Primary /Middle) (High/University/ Graduate/Post graduate)	41 19	290 295	7.667***	0.006
Occupation	Dependent/Retired (Own business / Causal workers /Government or private personnel/ Government or private health personnel)	26 34	241 344	0.102	0.749
Monthly family Income (kyats)	Less than 300,000 300,000-600,000 Above 600,000	49 9 2	418 130 37	2.907	0.234
Having health personnel within family member	No Yes	56 4	537 48	0.174	0.677
Cancer history	No Yes	45 15	348 237	5.501**	0.019

***, **, * Statistically significant at 1% , 5% and 10% level.
Source: Survey Data (2018)

According to the results of Table (4.7.1), 585 (90.7%) of the sample women have awareness of cervical cancer. Among the sample women, 458 women (71.01%) between 30 and 65 years old contribute the highest percentage of women who have awareness of cervical cancer. Single, widowed and divorced group has more percentage of cervical cancer awareness than married women.

The result for awareness and number of children shows that 358 (55.5%) of the sample women have between 1 and 3 children and they have heard about cervical cancer. The result of Chi-square analysis indicates that number of children is the associated factor of awareness of cervical cancer and significant at 1% level.

In the analysis of the women's education and awareness of cervical cancer, the percentage of women is nearly the same in under high school and high school or above high school levels of education. The result of Chi-square analysis suggests that women's education is associated with the awareness of cervical cancer and significant at 1% level.

Concerning with the aspect of occupation the number of working women who have awareness about cervical cancer is more than dependant and retired. Majority of the women 418 (71.45%) heard about cervical cancer and their family income is lower than three hundred thousand kyats.

Among the sample women, 537 (83.26%) did not have health personnel among the family members but they had heard about cervical cancer.

Only 15 (2.33%) of the women had a history of cancer herself or in her surroundings but they did not have awareness of cervical cancer. 348 (53.95%) have no cancer history but they had heard about cervical cancer. According to the Chi-square test, cancer history (woman who has any cancer history herself or in her related persons) is associated with awareness of cervical cancer. Women who had family history of cancer might have more experience and awareness about cervical cancer than other women.

4.7.2 Binary Logistic Regression Analysis for Awareness of Cervical Cancer

According to the results of Table (4.7.2), the values of R square 0.039 (Cox and Snell R square) and 0.084 (Nagelkerke R square) indicate that 8.4% of the variation in awareness of cervical cancer can be explained by the variation of independent variables. The overall percentage classification indicates that 90.7% of the women are predicted correctly. According to the result of Chi-square statistics 25.418, p value is found to be 0.008, the model is significant at 1% level. Since -2log likelihood statistics is 25.418, it can be said that the existence of a relationship between the dependent variable and independent variables is supported. Hosmer and Lemeshow statistic (Chi-square = 8.668, df = 8, p value = 0.371>0.01) indicates that there is no evidence for lacking of fit of the model.

Table (4.7.2)
Model Fitting Information for Awareness of Cervical Cancer

Model fitting criteria	χ^2 value	df	P value
Hosmer and Lemeshow Test	8.668	8	0.371
Omnibus Test Model coefficients	25.418	11	0.008
Cox and Snell R^2	0.039		
Nagelkerke R^2	0.084		
Overall correct percentage	90.7		

Source: Survey Data (2018)

The parameter estimates for the socio-economic characteristics in Binary Logistic model for the awareness of cervical cancer are shown in Table (4.7.3). For independent variables, age group between 18 – under 30, single, windowed and divorced marital status group, the women who have more than three children, under high school (illiterate, read and write only, primary and middle) level of education, dependent or retired occupation group, income level under three hundred thousand (Kyats), not having health personnel within family members and not having a cancer history themselves or in their surroundings are classified as the reference categories for analysis.

According to the binary logistic regression results, number of children, education and cancer history are the significant predictors of cervical cancer awareness of the women. The coefficient of women group who have no children is 0.965 and adjusted odds ratio is 2.626. It indicates that the women who have no children are about 3 times more likely to have the awareness of cervical cancer than women who have more than three children when the influence of other predicators are held constant. The marginal effect is 0.096, it means that the percentage of awareness is 9.6% higher for women who have no children than women who have more than three children holding other independent variables constant at the reference point.

The coefficient of women group who have between 1 and 3 children is 0.946 and adjusted odds ratio is 2.575. It indicates that the women who have between 1 and 3 children are about 3 times more likely to have the awareness of cervical cancer than the women who have more than three children when the influence of other predicators are held constant. The marginal effect is 0.094; it means that the percentage of having awareness is 9.4% higher for women who have between 1 and 3 children than women who have more than three children holding other independent variables constant at the reference point.

Table (4.7.3)
Parameter Estimates of Binary Logistic Regression Model for Awareness of Cervical Cancer

Variables	Classification	B	Wald	Sig	Adjusted OR	Marginal effect
	Constant	.482	.671	.413	1.619	
Age (years)	18 – under 30 (Ref) 30 – 65 Above 65	 .193 1.059	 .206 1.968	 .650 .161	 1.212 2.884	 .017 .069
Marital Status	Single/Widowed /Divorced (Ref) Married	 .397	 1.334	 .248	 1.487	 .034
Number of Children	None 1– 3 4 and above (Ref)	.965** .946***	4.155 7.922	.042 .005	2.626 2.575	.096 .094
Education	(Illiterate/Read and write/ Primary/Middle) (Ref) High/University/ Graduate/Postgraduate	.528*	2.846	.092	1.695	.041
Occupation	Dependent/Retired (Ref) (Own business /Casual worker/Government or private personnel/ Government or private health personnel)	.076	.069	.793	1.079	.006
Monthly family Income (kyats)	Less than 300000 (Ref) 300000-600000 Above 600000	 .413 .663	 1.115 .754	 .291 .385	 1.511 1.941	 .031 .045
Having health personnel within family members	No (Ref) Yes	 - .003	 .000	 .996	 .997	 - .0002
Cancer history	No (Ref) Yes	 .703**	 4.874	 .027	 2.020	 .052

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is the woman who does not awareness of cervical.
Source: Survey Data (2018)

The coefficient of women groups who have high school or above high school education level is 0.528 and adjusted odds ratio is 1.695. It shows that the women group who have high school or above high school education level are about 2 times more likely to have the awareness of cervical cancer than the women who have under high school level of education when the influence of other predicators are held constant. The marginal effect is 0.041, it means that the percentage of having awareness is 4.1% higher for women who have high school or above high school education level than women with under high school level of education holding other independent variables constant at the reference point.

The coefficient of women group who have a cancer history themselves or in their surroundings is 0.703 and adjusted odds ratio is 2.02. It indicates that the women who have a cancer history themselves or in their surroundings are 2 times more likely to have the awareness of cervical cancer than women who have no cancer history when the influence of the other predicators are held constant. The marginal effect is 0.052; it means that the percentage of having awareness is 5.2% higher for women who have a cancer history themselves or in their surroundings than women who have no cancer history holding other independent variables constant at the reference point.

4.8 Analysis of Relationship between Knowledge about Signs and Symptoms of Cervical Cancer and Socio-economic Characteristics

In this section, cross-tabulation and Chi-square analysis were used to determine the association between knowledge about signs and symptoms of cervical cancer and socio-economic characteristics of the respondents. The major socio-economic variables included age, marital status, number of children, education, occupation, family income, having health personnel within family members and the type of cancer history. Multinomial Logistic Regression analysis was used to explore the impact of socio-economic factors on knowledge of respondents.

4.8.1 Association between Knowledge about Signs and Symptoms of Cervical Cancer and Socio-economic Characteristics

Cross-tabulation was made to determine the association between the socio-economic factors of respondents and their knowledge about signs and symptoms of cervical cancer (see Appendix Table A-1). It has been found that more than half of the sample women 346 (59.1%) have poor knowledge, 167 (28.5%) have moderate and 72 (12.3%) have high knowledge about signs and symptoms of cervical cancer. The sample women who are between 30 and 65 have the highest percentage in poor knowledge level compared to the other aged groups (see Appendix Table A-1). Married women contribute more percentage than the other marital groups (single, widows and divorces) and it has the highest percentage of poor knowledge (see Appendix Table A-3). Concerning with the education, the percentage of women who are under high school and high school or above high school levels of education is nearly the same. In both education groups, the percentage of women who have poor

knowledge of signs and symptoms of cervical cancer is high (see Appendix Table A-7).

Table (4.8.1)
Association between Knowledge about Signs and Symptoms of Cervical Cancer and Socio-economic Characteristics

Factors	Classification	χ^2	P-value
Age (years)	18 – under 30 30 – 65 Above 65	11.926**	0.018
Marital status	Married Single/Widowed and Divorced	0.361	0.835
Number of children	None 1– 3 4 and above	12.148**	0.016
Education	(Illiterate/Read and write/ Primary/Middle) (High/University/Graduate/Post graduate)	10.943***	0.004
Occupation	Dependent/Retired (Government /private personnel /Government / private health personnel) (Own business /Casual worker)	18.920***	0.001
Monthly family Income (kyats)	Less than 300,000 300,000 – 600,000 Above 600,000	15.723***	0.003
Having health personnel within family member	No Yes	1.081	0.583
Type of cancer history	Cervical Others None	5.820	0.213

***, **, * Statistically significant at 1% , 5% and 10% level
Source: Survey Data (2018)

Two-way contingency test was performed and reported in Table (4.8.1) for the bivariate association between knowledge about signs and symptoms of cervical cancer and socio-economic variables. The results of Chi-square analysis suggest that education (Chi-square = 10.943, df= 2, p = 0.004 < 0.01), occupation (Chi-square = 18.920, df= 4, p = 0.001< 0.01) and family income (Chi-square = 15.723, df= 4, p = 0.003 < 0.01) are the major related factors of knowledge about signs and symptoms of cervical cancer. These factors are highly significant at 1% level. Age of respondents (Chi-square = 11.926, df= 4, p = 0.018 < 0.05) and number of children (Chi-square = 12.148, df= 4, p = 0.016 < 0.05) are associated at 5% level of significance, respectively. In this study, marital status, having health personnel in a

family member and type of cancer history are not significant it means that these factors are not related with woman's knowledge about signs and symptoms of cervical cancer.

4.8.2 Multinomial Logistic Regression Analysis for Knowledge about Signs and Symptoms of Cervical Cancer

Multinomial logistic regression model was provided to explore the influence of socio-economic factors on knowledge of respondents about signs and symptoms of cervical cancer. The knowledge was categorized into three groups; poor, moderate and high. The independent variables are socio-economic characteristics of sample respondents such as age, marital status, number of children, education, occupation, monthly family income, having health personnel within family members and the type of cancer history. The overall model fitting for multinomial logistic regression analysis is shown in Table (4.8.2).

Table (4.8.2)
Model Fitting Information for Knowledge about Signs and Symptoms of Cervical Cancer

Model fitting criteria	χ^2 **value**	df	P value
- 2 Log Likelihood	66.162	26	0.000
Cox and Snell	0.107		
Nagelkerke	0.127		
McFadden	0.061		
Overall correct percentage	61.0%		

Source: Survey Data (2018)

According to the results of Table (4.8.2), the value of the three R square 10.7% (Cox and Snell R square), 12.7% (Nagelkerke R square) and McFadden (6.1%) indicate that the variation on knowledge about signs and symptoms of cervical cancer can be explained by the variation of independent variables. The overall percentage classification indicates that 61% of the women are predicted correctly. According to the result of Chi-square statistics 66.162, p value is found to be 0.000; the model is significant at 1% level. Since -2log likelihood statistics is 66.162, it can be said that the existence of a relationship between the dependent variable and independent variables is supported.

The parameter estimates for the socio-economic characteristics in Multinomial Logistic model for the knowledge of respondents are shown in Table (4.8.3). In this analysis, the reference category of dependent variable is poor knowledge. For

independent variables, 18 – under 30 years of age group, single, windowed and divorced marital status group, the women who have no children, under high school (illiterate, read and write only, primary and middle) level of education, dependent or retired occupation group, income level under three hundred thousand (Kyats), not having health personnel within family members and not having a cancer history themselves or in their surroundings are classified as reference categories for analysis.

According to the results from Table (4.8.3), the significant predictors of the moderate knowledge about signs and symptoms of cervical cancer are age, education, occupation and monthly family income. By comparing moderate knowledge versus poor knowledge, it can be found that age groups of 30 – 65 years and above 65 years are statistically significant at 1% level. The coefficients of all age groups are positive. The coefficient of age group 30 – 65 is 0.849 and the adjusted odds ratio is 2.338. It indicates that the women who are between 30 and 65 years are more than 2 times more likely to have moderate knowledge than the women who are between 18 and under 30 when the influence of other selected predictors are held constant. The value of marginal effect is 0.119; it means that the percentage of having moderate knowledge is 11.9% higher for the women who are between 30 and 65 years than women who are between 18 and under 30, holding other independent variables constant at the reference points.

The coefficient of age group which is above 65 years is 0.820 and the adjusted odds ratio is 2.270. It indicates that the women who are above 65 years are more than 2 times more likely to have moderate knowledge than women who are between 18 and under 30 when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.112) shows that the percentage of having moderate knowledge is 11.2% higher for the women who are above 65 years than the women are between 18 and under 30, holding other independent variables constant at the reference point.

Table (4.8.3)

Parameter Estimates of Multinomial Logistic Regression Model for Knowledge about Signs and Symptoms of Cervical Cancer

Knowledge Level	Variables		B	Wald	Sig	Adjusted OR	Marginal effect
Moderate		Constant	-2.365	33.126	.000	.094	
	Age	18-under 30 (Ref)					
		30 – 65	.849***	7.205	.007	2.338	.119
		Above 65	.820***	2.727	.009	2.270	.112
	Marital Status	Single/Widowed/ Divorced (Ref)					
		Married	-.051	.038	.845	.950	-.024
	Number of children	None (Ref)					
		1–3	.423	1.862	.172	1.527	.096
		4 and above	.545	2.008	.156	1.725	.084
	Education	Illiterate/Read and write/ Primary/ Middle (Ref)					
		High/Graduate/ Post graduate	.423*	3.684	.055	1.527	.080
	Occupation	Dependent/ Retired (Ref)					
		Own business/ casual workers	.097	.193	.661	1.102	.002
		Government or private services	.831***	7.382	.007	2.296	.163
	Monthly family income (kyats)	Less than 30,000 (Ref)					
		300,000 – 600,000	.388*	2.742	.098	1.473	.093
		Above 600,000	1.041**	6.405	.011	2.832	.169
	Having health personnel within family members	No (Ref)					
		Yes	.036	.010	.919	1.037	- .001
	Type of cancer history	None (Ref)					
		Cervical	.435	1.160	.281	1.545	.063
		Other cancer	-.027	.015	.901	.974	- .018

***, **, * Statistically significant at 1% , 5% and 10% level.

Reference category is poor knowledge level.

Source: Survey Data (2018)

Table (4.8.3) Continued

Knowledge Level	Variables		B	Wald	Sig	Adjusted OR	Marginal effect
High		Constant	-3.270	24.982	.000	.038	
	Age	18-under 30 (Ref)					
		30 – 65	1.331**	5.549	.018	3.784	.084
		Above 65	1.361*	3.328	.068	3.902	.088
	Marital Status	Single/Widowed/ Divorced (Ref)					
		Married	.433	1.534	.215	1.542	.044
	Number of children	None (Ref)					
		1–3	-.629	2.605	.107	.533	- .080
		4 and above	.303	.472	.492	1.354	.019
	Education	Illiterate/Read and write/ Primary/ Middle (Ref)					
		High/Graduate/ Post graduate	.036	.015	.903	1.037	.011
	Occupation	Dependent/ Retired (Ref)					
		Own business/ casual workers	.386	.568	.451	1.471	.048
		Government or private services	0.491	2.646	.104	1.633	.006
	Monthly family income (kyats)	Less than 30,000 (Ref)					
		300,000 – 600,000	-.557	1.946	.163	.573	-.060
		Above 600,000	0.914*	3.055	.080	2.493	.062
	Having health personnel within family members	No (Ref)					
		Yes	.216	.203	.652	1.241	.022
	Type of cancer history	None (Ref)					
		Cervical	.649	1.502	.220	1.913	.053
		Other cancer	.394	1.934	.164	1.483	.042

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is poor knowledge level.
Source: Survey Data (2018)

According to the Table (4.8.3), women's education is one of the influencing factors of knowledge about signs and symptoms of cervical cancer. The coefficient of women's high school or above high school level of education is positive and statistically significant at 10% level. The adjusted odds ratio suggests that the women with high school or above high school level of education are approximately twice as likely to have a moderate knowledge as the women with under high school education level when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.080) shows that the percentage of having moderate knowledge is 8% higher for the women with high school or above high school level of education than the women with under high school education level, holding other independent variables constant at the reference point.

In the analysis of occupation, women who serve in government or private sector including health or non-health sectors have more chances to have a moderate knowledge and are statistically significant at 1% level. The adjusted odds ratio is 2.296. It can be concluded that the chance of having moderate knowledge is 2.296 times higher than women who depend on their family or retired when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.163) suggests that the percentage of having moderate knowledge is 16.3% higher for the women who serve in government or private sector including health or non-health sectors than the women who depend on their family or retired, holding other independent variables constant at the reference point.

Regarding the income level, the signs of coefficients for both income levels are positive. It means that income level of respondents is positively associated with moderate knowledge about signs and symptoms of cervical cancer. The adjusted odds ratio of income group (between three hundred thousand kyats and six hundred thousand kyats) (Adjusted OR= 1.473) suggests that the women with higher income level are about 2 times more likely to have moderate knowledge about signs and symptoms of cervical cancer compared to the women with income level which is below three hundred thousand kyats when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.093) shows that the percentage of having moderate knowledge is 9.3% higher for the women with income level which is between three hundred thousand kyats and six hundred thousand kyats than the women with income level which is below three hundred thousand kyats, holding other independent variables constant at the reference point.

The coefficient of income group which is above six hundred thousand kyats is statistically significant at 5% level. The adjusted odds ratio is 2.832 and it suggests that the women with income which is above six hundred thousand kyats are more likely to have moderate knowledge about signs and symptoms of cervical cancer by 2.832 times compared to the women with the income which is below three hundred thousand kyats when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.169) shows that the percentage of having moderate knowledge is 16.9% higher for the women with the income level which is above six hundred thousand kyats than the women with the income level below three hundred thousand kyats, holding other independent variables constant at the reference point.

By comparing high knowledge versus poor knowledge, it can be found that the age groups between 30 – 65 years old and above 65 years are statistically significant at 10% level. The coefficients of all age groups are positive. The coefficient of age group 30 – 65 is 1.331 and the adjusted odds ratio is 3.784. It indicates that the women who are between 30 and 65 years old are 4 times more likely to have high knowledge while the influences of other selected predictors are held constant. The value of marginal effect is 0.084; it means that the percentage of having high knowledge is 8.4% higher for the women who are between 30 and 65 years old than the women age group which is between 18 – under 30, holding other independent variables are constant at the reference point.

The coefficient of the age group which is above 65 years is 1.361 and the adjusted odds ratio is 3.902. It indicates that the women who are above 65 years are 4 times more likely to have high knowledge compared to the women who are between 18 and under 30 when the influences of other selected predictors are held constant. The value of marginal effect (ME=0.088) shows that the percentage of having high knowledge is 8.8% higher for the women who are above 65 years than the women who are between 18 and under 30, holding other independent variables are constant at the reference point.

Regarding the income level, the coefficient of income group which is above six hundred thousand kyats is statistically significant at 10% level. The adjusted odds ratio is 2.493 and it suggests that the women with income above six hundred thousand kyats are more likely to have high knowledge about signs and symptoms of cervical cancer by 3 times compared to the women with income level which is below three hundred thousand kyats when the influence of other selected predictors are held

constant. The value of marginal effect (ME=0.062) shows that the percentage of having high knowledge is 6.2% higher for women whose income is above six hundred thousand kyats than the women whose income is below three hundred thousand kyats , holding other independent variables are constant at the reference point.

4.9 Analysis of Relationship between Knowledge about Risk Factors of Cervical Cancer and Socio-economic Characteristics

Bivariate analysis and Logistic Regression analysis were used to determine the relationship between knowledge about risk factors of cervical cancer and independent variables including socio-economic characteristics. The major socio-economic variables include age, marital status, number of children, education, monthly family income, occupation, health personnel within family members and type of cancer history. Bivariate analysis was used to measure the strength of association and Multinomial Logistic Regression analysis was used to determine the effect of socio-economic factors on knowledge of respondents.

4.9.1 Association between Knowledge about Risk Factors of Cervical Cancer and Socio-economic Characteristics

Cross-tabulation and Chi-square test were done to determine the association between the socio-economic characteristics of respondents and their knowledge about risk factors of cervical cancer. It has been observed that 68.7% of respondents have poor knowledge, 20.9% have moderate and 10.4% have high knowledge. The majority of sample women in every age group have the highest percentage in poor knowledge (see Appendix Table B-1).

Married women have more percentage than other marital status group and it has the highest percentage of poor knowledge (see Appendix Table B-3). Regarding the number of children, the women who have children between 1 and 3 have the highest frequency of the sample women (see Appendix Table B-5).

Table (4.9.1) shows the association between knowledge about risk factors of cervical cancer and socio-economic variables. Results of Chi-square analysis has been found that only respondents' education (Chi-square = 7.414, df= 2, $p = 0.025 < 0.05$) and number of children (Chi-square = 10.683, df= 4, $p = 0.03 < 0.05$) are significant at 5% level. The remaining factors are not related with the knowledge about risk factors of cervical cancer.

Table (4.9.1)

Association between Knowledge about Risk Factors of Cervical Cancer and Socio-economic Characteristics

Factors	Classification	χ^2	P-value
Age (years)	18 – under 30 30 – 65 Above 65	6.267	0.180
Marital status	Married Single/Widowed and Divorced	0.926	0.629
Number of children	None 1– 3 4 and above	10.683**	0.030
Education	(Illiterate/Read and write/ Primary/Middle) (High/University/Graduate/Post graduate)	7.414**	0.025
Occupation	Dependent/Retired (Government /private personnel /Government / private health personnel) (Own business /Casual worker)	4.056	0.399
Monthly family Income (kyats)	Less than 300,000 300000 – 600,000 Above 600,000	1.254	0.869
Having health personnel within family members	No Yes	3.454	0.178
Type of cancer history	Cervical Others None	1.067	0.900

***, **, * Statistically significant at 1% , 5% and 10% level.

Source: Survey Data (2018)

4.9.2 Multinomial Logistic Regression Analysis for Knowledge about Risk Factors of Cervical Cancer

Table (4.9.2) illustrates the model evaluation of Multinomial Logistic Regression Model. The overall percentage of classification is 68.5% and it means that 68.5% of the women are predicted correctly. The values of the three R^2 (Cox and Snell R^2 =0.057, Nagelkerke R^2 =0.070, McFadden R^2 =0.036) indicate the proportion of variation of women's knowledge being explained by the model. According to the values, only 7% is being explained by the socio-economic characteristics of the respondents.

Table (4.9.2)
Model Fitting Information for Knowledge about Risks Factors of Cervical Cancer

Model fitting criteria	χ^2 value	df	P value
- 2 Log Likelihood	34.142	26	.131
Cox and Snell	0.057		
Nagelkerke	0.070		
McFadden	0.036		
Overall correct percentage	68.5%		

Source: Survey Data (2018)

Table (4.9.3) is concerned with the determination of influencing socio-economic factors on the knowledge about risk factors of cervical cancer. In this analysis, the reference category of dependent variable is poor knowledge. For independent variables, under 30 years of age, single, windowed and divorced marital status group, the women who have no children, under the high school level of education (Illiterate, read and write only, primary and middle), dependent or retired respondents, income level under three hundred thousand kyats, not having health personnel within family members and type of cancer history herself of in her surroundings are identified as the reference categories. It was found that only age, occupation and health personnel in the family members are the influencing factors of the moderate knowledge about risk factors of cervical cancer.

According to the comparison of moderate and poor knowledge, it has been found that the coefficient of the age group which is above 65 is statistically significant at 1% level and the coefficient has a positive sign. The adjusted odds ratio is 3.701, it shows that the older women have a higher chance to have a moderate knowledge compared to younger women when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.214) shows that the percentage of having moderate knowledge is 21.4% higher for women who are above 65 than the women who are between 18 and under 30, holding other independent variables are constant at the reference point. The age group between 30 and 65 years old is not significant.

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Table (4.9.3)
Parameter Estimates of Multinomial Logistic Regression Model for Knowledge about Risk Factors of Cervical Cancer

Knowledge Level	Variables		B	Wald	Sig	Adjusted OR	Marginal effect
Moderate		Constant	-2.185	24.493	.000	.112	
	Age	18-under 30 (Ref)					
		30 – 65	.561	2.607	.106	1.753	.075
		Above 65	1.309***	6.767	.009	3.701	.214
	Marital Status	Single/Widowed/ Divorced (Ref)					
		Married	.466	2.521	.112	1.594	.061
	No of Children	None (Ref)					
		1–3	-.407	1.611	.204	.666	-.052
		4 and above	-.349	.751	.386	.705	-.066
	Education	Illiterate/Read and write/ Primary/ Middle (Ref)					
		High/Graduate/ Post graduate	.255	1.200	.273	1.290	.053
	Occupation	Dependent/ Retired (Ref)					
		Own business/ casual workers	.429*	3.225	.073	1.536	.059
		Government or private services	-.013	.001	.971	.987	-.008
	Monthly family income (kyats)	Less than 30,000 (Ref)					
		300,000 – 600,000	.056	.046	.830	1.057	.013
		Above 600,000	-.285	.345	.557	.752	-.042
	Having health personnel within family members	No (Ref)					
		Yes	.633*	3.213	.073	1.883	.119
	Type of cancer history	None (Ref)					
		Cervical	.260	.368	.544	1.297	.041
		Other cancer	.037	.027	.870	1.038	.001

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is poor knowledge level.
Source: Survey Data (2018)

Table (4.9.3) Continued

Knowledge Level	Variables		B	Wald	Sig	Adjusted OR	Marginal effect
High		Constant	-2.137	13.934	.000	.118	
	Age	18-under 30 (Ref) 30 – 65 Above 65	 .158 .385	 .122 .314	 .727 .575	 1.171 1.469	 .004 .004
	Marital Status	Single/Widowed/ Divorced (Ref) Married	 .511	 1.873	 .171	 1.667	 .035
	No of Children	None (Ref) 1–3 4 and above	 -.745* .262	 3.084 .316	 .079 .574	 .475 1.300	 -.057 .045
	Education	Illiterate/Read and write/ Primary/ Middle (Ref) High/Graduate/ Post graduate	 -.566*	 2.903	 .088	 .568	 -.056
	Occupation	Dependent/ Retired (Ref) Own business/ casual workers Government or private services	 .348 .503	 .415 2.515	 .113 .519	 1.416 1.654	 .030 .035
	Monthly family income (kyats)	Less than 30,000 (Ref) 300,000 – 600,000 Above 600,000	 -.170 -.008	 .205 .000	 .650 .990	 .844 .992	 -.016 .005
	Having health personnel within family members	No (Ref) Yes	 -.098	 .029	 .865	 .906	 -.023
	Type of cancer history	None (Ref) Cervical Other cancer	 .126 .217	 .046 .516	 .830 .472	 1.135 1.242	 .005 .019

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is poor knowledge level.
Source: Survey Data (2018)

In Table (4.9.3), the coefficient of women who own a business or casual workers indicates that the women who own a business or casual workers have more chances to have a moderate knowledge and the coefficient has positive sign and is statistically significant at 10% level. It can be concluded that a woman's occupation has a positive relation to knowledge about risk factors of cervical cancer. The adjusted odds ratio value is 1.536. The adjusted odds ratio suggests that the women who own a business or casual workers are approximately 2 times more likely to have moderate knowledge than dependent or retired women when the influence of other selected predictors are held constant. The value of marginal effect (ME=0.059) shows that the percentage of having moderate knowledge is 5.9% higher for women who own a business or casual workers than dependent or retired women, holding other independent variables are constant at the reference point.

In this analysis, it has been observed that having health personnel within family members is also a significant factor of knowledge. The characteristic is significant at 10% level and the coefficient has positive sign. The adjusted odds ratio (Adjusted OR=1.833) indicates that the women who have health personnel within family members are more likely to have moderate knowledge about risk factors of cervical cancer than other women when the influence of other selected predictors are held constant. Marginal effect (ME=0.119) shows that the percentage of having moderate knowledge is 11.9% higher for women who have health personnel within a family than other women, holding other independent variables are constant at the reference point.

By comparing women with a high knowledge versus women with a poor knowledge about risk factors of cervical cancer, it has been observed that education and number of children are the significant predictors of knowledge of the respondents and significant at 10% level. The coefficients of the two factors indicate the negative sings and the adjusted odds ratios are 0.475 for women who have between 1 and 3 children, 0.568 for women with high school or above high school education level. It can be concluded that the two factors are negatively related to the high knowledge level and less likely to have knowledge about risk factors of cervical cancer when the influences of other selected predictors are held constant. Marginal effect also shows that the percentage of having moderate knowledge is 5.7% lower for the women who have between 1 and 3 children than the women who have no children, holding other independent variables are constant at the reference point. For education, the

percentage of having moderate knowledge is 5.6% lower for the women with high school or above high school education level than the women with under high school education level, holding other independent variables are constant at the reference point. According to the results of overall knowledge, marital status, monthly family income and having a history of cancer are insignificant factors for women's knowledge about risk factors of cervical cancer.

4.10 Analysis of Relationship between Knowledge about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Socio-economic Characteristics

In this section, the dependent variable of interest is knowledge about prevention, vaccination, screening and treatment methods of cervical cancer. There are three levels of knowledge, classified as poor, moderate and high. Chi-square test of independence was used to evaluate the relationship between each predictor variables and dependent variable. Multinomial Logistic Regression analysis was used to investigate the influencing socioeconomic characteristics on the knowledge of respondents.

4.10.1 Association between Knowledge about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Socio-economic Characteristics

Cross-tabulation and Chi-square test were done to determine the association between the socio-economic characteristics and knowledge about prevention, vaccination, screening, and treatment methods of cervical cancer. The analysis of cross-tabulation shows that 67.4% of the sample women have poor knowledge, 30.1% have moderate and 2.6% have high knowledge. It has been found that the percentage of women in the 30 – 65 age group is the highest in all age groups (see Appendix Table C-1), 31.4% of married women have a moderate knowledge , but only (1.7%) of the married women have high knowledge (see Appendix Table C-3).

According to the cross-tabulation of education and knowledge, women with high school or above high school education level are expected to have more knowledge. However, only 8 women have high knowledge and 107 women have moderate knowledge (see Appendix Table C-7).The results for occupation and knowledge cross table shows that the percentage of occupation group in which the

women own a business or casual workers is lower than other occupation groups. However, half of the respondents have poor knowledge (see Appendix Table C-9). The results for women in the income level indicate that the percentage of women with poor knowledge is high in all category of income (see Appendix Table C-11). Regarding the history of cancer, 36 women (6.2%) of sample group have history of cervical cancer themselves or in their surroundings but only 3 women (8.3%) have high knowledge about the history of cancer. The marginal effect is 0.052; it means that the percentage of having awareness is 5.2% higher for the women who have a cancer history themselves or in their surroundings than the women who have no cancer history, holding other independent variables are constant at the reference point. (see Appendix Table C-15).

Table (4.10.1) illustrates the results of Chi-square test to determine the association between study variables. The results show that women's education, occupation and type of cancer history are significant at 1% level. Marital status and family income are also found to be significant at 10% level. It means that education, occupation, marital status, monthly family income and cancer history are associated with knowledge about prevention, vaccination, screening, and treatment methods of cervical cancer.

Table (4.10.1)

Associated between Knowledge about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Socio-economic Characteristics

Factors	Classification	χ^2	P-value
Age (years)	18 – under 30 30 – 65 Above 65	7.341	0.119
Marital status	Married Single/Widowed and Divorced	5.335*	0.069
Number of children	None 1– 3 4 and above	2.191	0.701
Education	(Illiterate/Read and write/ Primary/Middle) (High/University/ Graduate/Post graduate)	11.163***	0.004
Occupation	Dependent/Retired (Government /private personnel /Government / private health personnel) (Own business /Casual worker)	14.581***	0.006
Monthly family Income (kyats)	Less than 300000 300,000 – 600,000 Above 600,000	8.627*	0.071
Having health personnel in family members	No Yes	2.111	0.348
Type of cancer history	Cervical Others None	33.141***	0.000

***, **, * Statistically significant at 1% , 5% and 10% level.

Source: Survey Data (2018)

4.10.2 Multinomial Logistic Regression Analysis for Knowledge about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer

The results of model fitting for Multinomial Logistic Regression Analysis are described in Table (4.10.2). According to the model evaluation criteria (Cox and Snell R^2 = 0.115, Nagelkerke R^2 = 0.150), about 15% of the variation in women's knowledge is being explained by the socio-economic characteristics of the

respondents. The overall percentage classification indicates that 69.1% of the women are predicted correctly. The value of Chi-Square statistics is 71.385 and p value is 0.000. It can be concluded that the Multinomial Logistic Regression model is statistically significant at 1% level. Therefore, the model can explain the association of knowledge and socio-economic characteristics of respondents.

Table (4.10.2)

Model Fitting Information for Knowledge about Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer

Model fitting criteria	χ^2 **value**	df	P value
- 2 Log Likelihood	71.385	26	0.000
Cox and Snell	0.115		
Nagelkerke	0.150		
McFadden	0.085		
Overall correct percentage	69.1%		

Source: Survey Data (2018)

Table (4.10.3) is concerned with the determination of influencing socioeconomic factors on the knowledge about prevention, vaccination, screening, and treatment methods of cervical cancer. In this analysis, the reference category of dependent variable is poor knowledge. For independent variables, under 30 years of age, single, windowed and divorced marital status group, the women who have no children, under the high school level of education (illiterate, read and write only, primary and middle), dependent or retired respondents, income level under three hundred thousand kyats, not having health personnel within family members and women who have no cancer history themselves or in their surroundings are classified as reference categories.

It has been found that age, education, occupation and type of cancer history herself or in her surroundings are significant predictors of the moderate knowledge about prevention, vaccination, screening and treatment methods of cervical cancer.

According to the comparison of moderate and poor knowledge, it has been found that the coefficient of age group 30 – 65 is statistically significant at 10% level and the coefficient is positive. The adjusted odds ratio (Adjusted OR = 1.805) suggests that women who are 30 – 65 have a higher chance to have a moderate knowledge than women who are between 18 and under 30 when the influences of other variables are held constant. Marginal effect (ME=0.112) shows that the percentage of having moderate knowledge is 11.2% higher for the women who are

between 30 and 65 years old than the women age group between 18 and under 30, holding other independent variables are constant at the reference point.

The results of education level indicate that the coefficient of women with high school or above high school education level is statistically significant at 10% level and it has positive sign of the coefficient and the adjusted odds ratio is 1.503. It can be suggested that the women's education has a positive relation to knowledge about prevention, vaccination, screening, and treatment methods of cervical cancer. The adjusted odds ratio suggests that the women with high school or above high school level of education are 1.503 times more likely to have moderate knowledge than the women with under high school education when the influences of other variables are held constant. Marginal effect (ME=0.078) shows that the percentage of having moderate knowledge is 7.8% higher for women with high school or above high school education level than the women with under high school education, holding other independent variables are constant at the reference point.

As the results of the occupation, it has been found that the coefficient of women who serve in government or private sectors is statistically significant at 5% level and it has positive sign of coefficient and the adjusted odds ratio is 1.853. It indicates that the women's occupation has a positive relation to their knowledge. The adjusted odds ratio value suggests that the women who serve in government or private sectors are approximately 2 times more likely to have moderate knowledge than the women who are dependant or retired when the influences of other variables are held constant. Marginal effect (ME=0.131) shows that the percentage of having moderate knowledge is 13.1% higher for the women who serve in government or private sectors than the dependant or retired, holding other independent variables are constant at the reference point.

Table (4.10.3)
Parameter Estimates of Multinomial Logistic Regression Model for Knowledge about Prevention, Vaccination, Screening and Treatment methods of Cervical Cancer

Knowledge Level	Variables	Classification	B	Wald	Sig	Adjusted OR	Marginal effect
Moderate		Constant	-1.944	24.567	.000	.143	
	Age	18-under 30 (Ref)					
		30 – 65	.591*	3.723	.054	1.805	.112
		Above 65	.150	.087	.768	1.161	.029
	Marital Status	Single/Widowed/ Divorced (Ref)	.				
		Married	363	1.850	.174	1.437	.081
	No of Children	None (Ref)					
		1–3	-.306	1.103	.294	.736	-.069
		4 and above	-.353	.934	.334	.703	
	Education	Illiterate/Read and write/ Primary/ Middle (Ref)					
		High/Graduate/ Post graduate	.408*	3.621	.057	1.503	.078
	Occupation	Dependent/ Retired (Ref)					
		Own business/ casual workers	-.122	.318	.573	.885	-.024
		Government or private services	.617**	4.261	.039	1.853	.131
	Monthly family income (kyats)	Less than 30,000 (Ref)					
		300,000 – 600,000	.165	.501	.479	1.180	.029
		Above 600,000	-.308	.515	.473	.735	-.070
	Having health personnel within family members	No (Ref)					
		Yes	.147	.184	.668	1.159	.020
	Type of cancer history	None (Ref)					
		Cervical	1.810***	20.580	.000	6.113	.346
		Other cancer	.608***	8.951	.003	1.837	.115

***, **, * significant at 1% ,5% and 10% level.
Reference category is poor knowledge level.
Source: Survey Data (2018).

Table (4.10.3) Continued

Knowledge Level	Variables	Classification	B	Wald	Sig	Adjusted OR	Marginal effect
High		Constant	-3.519	13.691	.000	0.030	
	Age	18-under 30 (Ref)					
		30 – 65	-.722	1.082	.298	.486	-.027
		Above 65	-.538	.170	.680	.584	-.019
	Marital Status	Single/Widowed/ Divorced (Ref)					
		Married	-1.432**	4.650	.031	.239	-.048
	No of Children	None (Ref)					
		1–3	1.104	1.890	.169	3.016	.029
		4 and above	-.622	.219	.640	.537	-.006
	Education	Illiterate/Read and write/ Primary/ Middle (Ref)					
		High/Graduate/ Post graduate	.129	.046	.831	1.137	.0001
	Occupation	Dependent/ Retired (Ref)					
		Own business/ casual workers	.171	.078	.779	1.186	.005
		Government or private services	-.145	.023	.879	.865	-.007
	Monthly family income (kyats)	Less than 30,000 (Ref)					
		300,000 – 600,000	.403	.304	.581	1.496	.008
		Above 600,000	1.360*	3.059	.080	3.895	.055
	Having health personnel within family members	No (Ref)					
		Yes	.833	1.020	.313	2.300	.025
	Type of cancer history	None (Ref)					
		Cervical	2.625***	10.402	.001	13.802	.077
		Other cancer	.764	1.606	.205	2.147	.012

***, **, * significant at 1% ,5% and 10% level.

Reference category is poor knowledge level.

Source: Survey Data (2018).

According to the results from Table (4.10.3), it has been observed that having cervical cancer history is a significant factor and the most influential predictor of respondent's knowledge. The factor is significant at 1% level and the coefficient has positive sign. The adjusted odds ratio (adjusted OR=6.113) indicates that the women who have a cervical cancer history themselves or in their surroundings may be increased health knowledge about cancer and the women are more likely to have moderate knowledge of prevention, vaccination, screening and treatment methods of cervical cancer compared to the women who do not have any cancer history when the influences of other variables are held constant. Marginal effect (ME=0.346) shows that the percentage of having moderate knowledge is 34.6% higher for women who have cervical cancer history themselves or in their surroundings than the women who do not have any cancer history, holding other independent variables are constant at the reference point.

The coefficient of women with a history of any cancer except cervical cancer in their surroundings is also significant at 1% level. Moreover, its odds ratio and positive sign of coefficient indicate the higher likelihood of having knowledge. The adjusted odds ratio value of any type of cancer history is 1.837. It can be concluded that a woman with a family history of cancer is approximately two times more likely to have a moderate knowledge than the women who do not have any cancer history when the influences of other variables are held constant. Marginal effect (ME=0.115) shows that the percentage of having moderate knowledge is 11.5% higher for women with a history of any cancer except cervical cancer in their surroundings than women who do not have any cancer history, holding other independent variables are constant at the reference point.

The other factors such as marital status, number of children, income and having health personnel in family members are insignificant factors of moderate knowledge about prevention, vaccination, screening and treatment methods of cervical cancer. By comparing women with high knowledge versus women with a poor knowledge of prevention, vaccination, screening and treatment methods of cervical cancer, it has been found that marital status is a significant predictor of knowledge and is significant at 5% level. The coefficient of married women has a negative effect and the adjusted odds ratio indicates that married women are 76.1% less likely to have knowledge about prevention, vaccination, screening and treatment methods of cervical cancer than singles, divorces and widows when the influences of

other variables are held constant. Marginal effect shows that the percentage of having knowledge about them is 4.8% lower for the group of married women than single, divorced and widowed group, holding other independent variables constant at the reference point.

The second predictor of high knowledge about prevention, vaccination, screening and treatment methods of cervical cancer is monthly family income. The coefficient of women with monthly family income which is above six hundred thousand kyats is positive and significant at 10% level. The adjusted odds ratio indicates that the women with monthly family income which is above six hundred thousand kyats are nearly 4 times more likely to have high knowledge than the women with monthly family income which is less than three thousand kyats, when the influences of other variables are held constant. Marginal effect (ME=0.055) shows that the percentage of having high knowledge is 5.5% higher for women with monthly family income which is above six hundred thousand kyats than women with monthly family income which is less than three thousand kyats, holding other independent variables are constant at the reference point.

The most influencing predictor of high knowledge about prevention, vaccination, screening, and treatment methods of cervical cancer is the history of cervical cancer and found to be significant at 1% level. The adjusted odds ratio of women with cervical cancer history appears to be about 14 times more likely to have high knowledge on prevention, vaccination, screening and treatment methods of cervical cancer when the influences of other variables are held constant. Marginal effect (ME=0.077) shows that the percentage of having knowledge is 7.7% higher for women with cervical cancer history than women who do not have any cancer history, holding other independent variables are constant at the reference point.

As the results of overall knowledge, number of children and having health personnel in family member are insignificant factors for knowledge of prevention, vaccination, screening, and treatment methods of cervical cancer.

4.11 Analysis of Relationship between Practice on Vaccination of Cervical Cancer and Socio-economic Characteristics

In this section, cross tabulation and Chi-square analysis were used to determine the association between the practice on vaccination of cervical cancer and independent variables. The independent variables are socio-economic characteristics

of women. Binary Logistic Regression analysis was used to determine the influencing factors of the practice on vaccination of cervical cancer.

4.11.1 Association between Practice on Vaccination of Cervical Cancer and Socio-economic Characteristics

The results of cross-tabulation and Chi-square test are shown in Table (4.11.1). It has been found that 115 of 585 analytical sample women received vaccination of cervical cancer in their lifetime. Therefore, the overall vaccination is only 19.7% of the sample. It has been observed that 98 (16.75%) of the analytical sample women who have been received vaccination are between the ages of 30 and 65 years. Bivariate analysis of the data using Chi-square test reveal that there is an association between the ages of women and practice on vaccination of cervical cancer (Chi-square = 6.996, df= 2, $p = 0.030 < 0.05$).

As the results of marital status, the vaccination rate of married women is higher than single, widowed and divorced group. Moreover, the vaccination rate of women who have between 1 and 3 children is higher than women who have no child. The vaccination rate of women with high school and above high school education level is slightly more than those who are under high school level of education. As the occupation aspect, the women who own a business or casual workers represent the smallest rate of vaccination.

The results for monthly family income which is less than three hundred thousand kyats show that 72 women are expected to have practice on vaccination of cervical cancer, and in the women group with second income level (300,000 – 600,000), 32 sample women have practice on vaccination of cervical cancer. In the women group with higher income which is above six hundred thousand kyats, only 11 women received vaccination of cervical cancer. Based on the results from Chi-Square test, monthly family income is associated with cervical cancer vaccination (Chi-square = 5.966, df= 2, $p = 0.051 < 0.1$).

The results for women who have health personnel in family members show that there is no association with vaccination practice. Only 36 (6.15%) of the women have a cervical cancer history themselves or in their surroundings. However, only 12 (33.33%) of them have received cervical cancer vaccination. An examination of the association between cancer history and vaccination indicates that there is a significant association (Chi-square = 4.803, df= 2, $p = 0.091 < 0.1$). Cancer history (woman who

has any cancer history herself or in her related persons) is associated with vaccination of cervical cancer. Women who had family history of cancer might have gain experience, awareness and knowledge about cervical cancer. This leads to increase uptake of cervical cancer vaccination and screening than others.

Table (4.11.1)

Association between Practice on Vaccination of Cervical Cancer and Socio-economic Characteristics

Variables	Classification	Vaccination		χ^2	P-value
		No	**Yes**		
Age (years)	18 – under 30 30 – 65 Above 65	70 360 40	15 98 2	6.996**	0.030
Marital status	Married Single/widowed and divorced	338 132	79 36	0.468	0.494
Number of children	None 1– 3 4 and above	100 284 86	27 74 14	2.466	0.291
Education	(Illiterate/Read and write/ Primary/Middle) (High/University/ Graduate/Post graduate)	236 234	54 61	0.392	0.531
Occupation	Dependent/Retired (Own business /Casual workers) (Government /private personnel /Government / private health personnel)	193 66 211	48 16 51	0.017	0.991
Monthly family Income (kyats)	Less than 300,000 300,000 – 600,000 Above 600,000	346 98 26	72 32 11	5.966*	0.051
Having health personnel within family members	No Yes	429 41	108 7	0.853	0.356
Type of cancer history	None Cervical Others	285 24 161	63 12 40	4.803*	0.091

***, **, * Statistically significant at 1% , 5% and 10% level.

Source: Survey Data (2018)

4.11.2 Binary Logistic Regression Analysis for Practice on Vaccination of Cervical Cancer

Binary logistic regression model is a prognostic model that is fitted where there is a dichotomous dependent variable. In this study, the dependent variable is practiced on vaccination of cervical cancer (binary outcome) and independent variables are socio-economic characteristics of the respondents and classified into appropriate group. The binary outcome variable was categorized into two classes; women who received practice on vaccination and women who did not receive practice on vaccination. In this study, the model was used to explore the significant socio-economic factors of practice on vaccination.

Table (4.11.2) shows the summary results for evaluation of Binary Logistic Regression Model. According to the model evaluation criteria (Cox and Snell R square = 0.04 and Nagelkerke R^2=0.064), only 6.4% of the variation in practice on vaccination can be explained by the socio-economic characteristics of the respondents. The overall percentage of classification indicates that 80.2% of the women are predicted correctly.

Omnibus test of model coefficients shows that the addition of the independent variables improved the predictive power of the model. According to the Omnibus test of model coefficients, it has been found that the model is significant (Chi-square=24.126, df=13, p value=0.030 < 0.05). The results of Hosmer and Lemeshow statistic (Chi-square=6.778, df = 8, p value = 0.651>0.01) show that there is no evidence of lack of fit of the model.

Table (4.11.2)
Model Fitting Information for Practice on Vaccination of Cervical Cancer

Model fitting criteria	χ^2 value	df	P value
Hosmer and Lemeshow Test	6.778	8	0.561
Omnibus Test Model coefficients	24.126	13	0.030
Cox and Snell R^2	0.04		
Nagelkerke R^2	0.064		
Overall correct percentage	80.2%		

Source: Survey Data (2018)

Table (4.11.3) is concerned with the parameter estimates for socio-economic variables in Binary Logistic Regression analysis. According to the results, it has been found that age, income and type of cancer history are significant characteristics in the analysis of practice on vaccination of cervical cancer. The coefficient of age group

30 – 65 years is 1.633 and the odds ratio is 5.121. The odds ratio suggests that the women who are between the ages of 30 and 60 years are more than 5 times more likely to receive cervical cancer vaccination than women who are above 65 years old when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 16.4% higher for the women who are between 30 and 65 than the women who are above 65, holding other independent variables are constant at the reference point.

Regarding the income level, the signs of coefficients for both income levels are positive and significant at 5% level. It means that the income level of respondents is positively associated with vaccination. The adjusted odds ratio of women with above six hundred thousand kyats income level (Adjusted OR=2.293) suggests that women with higher income level are more than 2 times more likely to receive vaccination compared to the income group which is below three hundred thousand kyats when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 8% higher for women with the income which is above six hundred thousand kyats than the women with the income which is below three hundred thousand kyats, holding other independent variables are constant at the reference point.

The coefficient of income group (Ks 300000 – 600000) is also statistically significant at 5% level. The adjusted odds ratio is 1.653 and it suggests that women with income Ks 300000 – 600000 are more likely to receive vaccination by 1.653 times compared to women with income group which is below three hundred thousand kyats when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 14.3% higher for women with income Ks 300000 – 600000 than the women with below three hundred thousand kyats, holding other independent variables are constant at the reference point.

In the case of cancer history, the factor is significant at 5% level. The adjusted odds ratio (OR=2.414) shows that the likelihood of vaccination is higher among women with cervical cancer history compared to women who do not have any cancer history when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on

vaccination is 16.1% higher for women with cervical cancer history than women who do not have any cancer history.

The other factors like respondent's marital status, number of children, education, and occupation are not significant. Having health personnel in family may increase the health knowledge in family members and induce to receive vaccination, but the factor is not significant in this study.

Table (4.11.3)
Parameter Estimates of Binary Logistic Regression Model for Practice on Vaccination of Cervical Cancer

Variables	Classification	B	Wald	Sig	Adjusted OR	Marginal effect
	Constant	-2.793	12.784	.000	.0661	
Age (years)	18– under 30 30 – 65 Above 65 (Ref)	1.214 1.633**	2.282 4.785	.131 .029	3.366 5.121	.103 .164 .
Marital Status	Single/Widowed/ Divorced (Ref) Married	-.235	.685	.408	.790	-.037
Number of Children	None (Ref) 1–3 4 and above	.080 -.479	.061 1.273	.804 .259	1.083 .620	.013 -.064
Education	(Illiterate/Read and write/ Primary/Middle) (Ref) High/University/ Graduate/Postgraduate	-.055	.054	.817	.946	-.008
Occupation	Dependent/Retired (Ref) (Own business /Casual worker) (Government or private personnel/ Government or private health personnel)	-.223 -.330	.902 .871	.342 .351	.800 .719	-.035 -.050
Monthly family Income (kyats)	Less than 300,000 (Ref) 300,000 – 600,000 Above 600,000	.503** .830**	3.833 4.233	.050 .040	1.653 2.293	.080 .143
Having health personnel within family members	No (Ref) Yes	-.387	.778	.378	.679	-.053
Type of cancer history	None (Ref) Cervical Others	.881** .060	5.035 .068	.025 .794	2.414 1.062	.161 .009

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is woman who did not receive cervical cancer vaccination.
Source: Survey Data (2018)

4.12 Analysis of Relationship between Practice on Screening of Cervical Cancer and Socio-economic Characteristics

The analysis of influencing factors on the practice on screening of cervical cancer presents in this section. Chi-square analysis was used to determine the

association between the practice on screening of cervical cancer and predictor variables. The practice on screening of cervical cancer is the dichotomous dependent variable. The independent variables are socio-economic characteristics of sample women. For the determination of influencing factors on the screening practice, Binary Logistic Regression analysis was used.

4.12.1 Association between Practice on Screening of Cervical Cancer and Socio-economic Characteristics

In Table (4.12.1), the socioeconomic characteristic of women, cervical cancer screening practice and Chi-square test results for each characteristic are shown. According to the cross-tabulation of respondent's age and screening practice, only 38 (6.49%) of the sample women have taken screening at least one time in their life time. The age group of the women which is between 18 and under 30 represents the smallest proportion of women who have taken the screening test. Out of the women who were the eligible age group for screening which is between 30 and 65 years old, 33 women have taken screening in this study. Based on the results from Chi Square test, age of the woman is not associated with cervical cancer screening.

As the results of marital status, only 31 married women had screening test for cervical cancer in their life time and 26 women who have between 1 and 3 children had the screening test at least one time.

Education level is categorized into two groups; under high school and high school or above high school. Women who have high school or above high school education level were expected to have had the practice on screening of cervical cancer, however, only 24 had the test done. The test of association between education level and practice on screening shows that there is no significant association. Occupation is also not associated with practice on screening of cervical cancer.

The income level was grouped into three categories: lower than 300,000 kyats, 300,000 – 600,000 kyats and above 600,000 kyats. Women who have high income level were expected to have the practice on screening than the other income groups. However, only 3 had the screening done. The test of association indicates that there is no association between income level and practice on screening of cervical cancer.

Although 36 (6.15%) of 585 sample women have a cervical cancer history themselves or in their surroundings, 6 (16.7%) of them have taken practice on

screening of cervical cancer in their life time. The factor is significantly associated with cervical cancer screening (Chi-square=8.905, df =2, p = 0.012 < 0.05).

According to the results of association between socioeconomic factors and practice on screening of cervical cancer, it has been found that only one factor is significantly associated with cervical cancer screening is a type of cancer history. The other socioeconomic factors are not associated with cervical cancer screening.

Table (4.12.1)
Association between Practice on Screening of Cervical Cancer and Socio-economic Characteristics

Variables	Classification	Screening		χ^2	P-value
		No	Yes		
Age (years)	18 – under 30	83	2	2.810	0.245
	30 – 65	425	33		
	Above 65	39	3		
Marital status	Married	386	31	2.105	0.147
	Single/Widowed/ Divorced	161	7		
Number of children	None	121	6	1.043	.594
	1– 3	332	26		
	4 and above	94	6		
Education	(Illiterate/Read and write/ Primary/Middle)	276	14	2.635	0.105
	(High/University/Graduate/ Post graduate)	271	24		
Occupation	(Dependent/Retired)	226	15	0.629	0.730
	(Own business /Casual workers)	78	4		
	(Government /private personnel /Government / private health personnel)	243	19		
Monthly family Income (kyats)	Less than 300000	392	26	0.250	0.883
	300000 – 600000	121	9		
	Above 600000	34	3		
Having health personnel within family member	No	501	36	0.467	0.494
	Yes	46	2		
Type of cancer history	None	332	16	8.905**	0.012
	Cervical	30	6		
	Others	185	16		

***, **, * Statistically significant at 1% , 5% and 10% level.
Source: Survey Data (2018)

4.12.2 Binary Logistic Regression Analysis for Practice on Screening of Cervical Cancer

The Logistic Regression Model was used to investigate the relationship between cervical cancer screening and socio-economic variables; age, marital status,

number of children, education, occupation, monthly family income, having health personnel within family members and the type of cancer history. The overall model evaluation criteria of logistic regression model are presented in Table (4.12.2).

Table (4.12.2)
Model Fitting Information for Practice on Screening of Cervical Cancer

Model fitting criteria	χ^2 value	df	*P* value
Hosmer and Lemeshow Test	12.176	8	0.144
Omnibus Test Model coefficients	18.940	13	0.125
Cox and Snell R^2	0.032		
Nagelkerke R^2	0.083		
Overall correct percentage	93.5%		

Source: Survey Data (2018)

According to the results in Table (4.12.2), the model Chi-square and the significance levels for test of the null hypothesis indicate that all the coefficients are equal to zero, and the null hypothesis is not rejected. It means that the addition of the independent variables does not improve the predictive power of the model. The Cox & Snell R Square which attempts to provide a logistic regression is the coefficient of determination. The value of Cox & Snell R Square is low at 3.2% implying a poor fit. The Nagelkerke R Square which adjusts the Cox & Snell R Square is 8.3%. These values were low, signifying a poor fit of the model. The value of "pseudo R^2" indicates that only 8.3% of the variance in screening practice can be predicted from the combination of socio-economic factors of the respondents.

The Hosmer Lemeshow test explores whether the predicted probabilities are the same as the observed probabilities. An overall goodness of fit of the model is indicated by the p value > 0.05 (Hosmer and Lemeshow, 2000). There is no evidence of lack of fit based on Hosmer and Lemeshow statistics (Chi-square =12.176, df = 8, P value= 0.144 > 0.01). Overall percentage classification shows 93.5% of the women are predicted correctly.

The parameter estimates for socioeconomic factors of respondents in Binary Logistic Regression analysis are illustrated in Table (4.12.3). The results in the table show that the two predictor variables: women's education and the type of cancer history are significant. The coefficient of woman's education level (high school and above high school) is statistically significant at 10% level and it has a positive association with the screening practice. The odds ratio (OR= 1.968) indicates that the screening practice of cervical cancer is approximately twice as likely to screen among women with high school and above high school education level than women with

under high school education level when the influences of other variables are held constant. The marginal effect for practice on screening of cervical cancer shows that the percentage of practice on screening is 3.9% higher for women with high school or above high school education than women with under high school education, holding other independent variables are constant at the reference point.

Table (4.12.3)

Parameter Estimates of Binary Logistic Regression Model for Practice on Screening of Cervical Cancer

Variables	Classification	B	Wald	Sig	Adjusted OR	Marginal effect
	Constant	-5.044	30.895	.000	.006	
Age (years)	18– under 30 (Ref) 30 – 65 Over 65	 1.234 1.561	 2.648 2.506	 .104 .113	 3.436 4.761	 .049 .072
Marital Status	Single/Widowed/ Divorced (Ref) Married	 .682	 1.742	 .187	 1.977	 .035
Number of Children	None (Ref) 1– 3 4 and above	 .017 -.238	 .001 .119	 .976 .730	 1.017 .789	 .001 - .013
Education	(Illiterate/Read and write/ Primary/Middle) (Ref) High/University/ Graduate/Post graduate	 .677*	 3.206	 .073	 1.968	 .039
Occupation	Dependent/Retired (Ref) (Own business /Casual workers) (Government or private personnel/ Government or private health personnel)	 .184 -.479	 .235 .598	 .628 .439	 1.202 .620	 .011 - .023
Monthly family Income (kyats)	Less than 300,000 (Ref) 300,000 – 600,000 Above 600,000	 -.001 .370	 .000 .303	 .998 .582	 .999 1.448	 -.00006 .025
Having health personnel within in family member	No (Ref) Yes	 -.602	 .614	 .433	 .548	 -.029
Type of cancer history	None (Ref) Cervical Others	 1.433*** .549	 7.194 2.148	 .007 .143	 4.192 1.732	 .118 .031

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is woman who did not take cervical cancer screening.
Source: Survey Data (2018)

In the analysis of cancer history, having cervical cancer history is significant at 1% level. The adjusted odds ratio (OR=4.192) shows that the women who have cervical cancer history themselves or in their surroundings are 4 times more likely to take practice on screening than women who do not have any cancer history when the

influences of other variables are held constant. The marginal effect for practice on screening of cervical cancer shows that the percentage of practice on screening is 11.8% higher for women who have cervical cancer history themselves or in their surroundings than the women who did not have any cancer history, holding other independent variables are constant at the reference point. The other factors are insignificant for practice on screening of cervical cancer.

4.13 Analysis of Relationship between Practice on Vaccination of Cervical Cancer and Sources of Information

In this section, vaccination of cervical cancer is considered as dependent variable and sources of information for vaccination are assigned as independent variables. Binary logistic regression analysis was used to determine the influencing sources of information on the practice of vaccination. The model fitting information for the practice on vaccination for cervical cancer is shown in Table (4.13.1).

Table (4.13.1)
Model Fitting Information for Practice on Vaccination and Sources of Information

Model fitting criteria	χ^2 value	df	P value
Hosmer and Lemeshow Test	6.505	7	.482
Omnibus Test Model coefficients	35.057	7	0.000
Cox and Snell R^2	0.086		
Nagelkerke R^2	0.122		
Overall correct percentage	71.7%		

***, **, * Statistically significant at 1% , 5% and 10% level.

Source: Survey Data (2018)

According to the results in Table (4.13.1) of the model Chi-square value which is the difference between the null model and the full model value is 35.057 and the significance levels for test of the null hypothesis that all the coefficients are equal to zero, hence the null hypothesis is rejected. It means that the addition of the independent variables improved the predictive power of the model. The Cox & Snell R Square which attempts to provide a logistic regression is the coefficient of determination. The value of Cox & Snell R Square is 8.6% and Nagelkerke R Square which adjusts the Cox & Snell R Square is 12.2%. The value of "pseudo R^2" indicates that 12.2% of the variance in vaccination practice can be predicted from the combination of sources of information.

The Hosmer-Lemeshow test explores whether the predicted probabilities are the same as the observed probabilities. An overall goodness of fit of the model is indicated by p value > 0.05 (Hosmer and Lemeshow, 2000). There is no evidence of lack of fit based on Hosmer and Lemeshow statistics (Chi-square = 6.505, df=7, *P*value=0.482 > 0.01). Overall percentage classification shows that 71.7% of the women are predicted correctly. Table (4.13.2) illustrates the summary results of the relationship between sources of information and vaccination.

Table 4.13.2

Parameter Estimates of Binary Logistic Regression model for Practice on Vaccination and Sources of Information

Sources of information	B	Wald	Sig	Adjusted OR	Marginal effect
Constant	.632	4.802	.028	.531	
Family member No (Ref) Yes	- .272	.337	.562	.762	- .049
Relatives, friends No (Ref) Yes	.004	.000	.988	1.004	.0007
Other health personnel No (Ref) Yes	.650**	4.759	.029	1.916	.132
Radio, TV No (Ref) Yes	- .915***	9.963	.002	.400	- .167
Journals, magazines, newspaper, pamphlets No (Ref) Yes	-.528*	3.307	.069	.590	- .097
Internet No (Ref) Yes	-.495	.714	.398	.597	- .086
Awareness program No (Ref) Yes	-.166	.125	.723	.900	- .031

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is woman who did not receive cervical cancer vaccination.
Source: Survey Data (2018)

According to Table (4.13.2), the coefficient of source of information from health personnel who is not a family member is statistically significant at 5% level and shows positive in relation to cervical cancer vaccination. The odds ratio indicates that women who get the information from health personnel are about 2 times more likely to receive vaccination when the influences of other variables are held constant.

The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 13.2% higher for women who get the information from health personnel than other women, holding other independent variables constant at the reference point.

The second influencing source of information is radio and television. Its coefficient is significant at 1% level and it has negative sign. The odds ratio suggests that women who get the information about cervical cancer from radio and television are less likely to receive vaccination when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 16.7% lower for women who get the information from radio and television than other women, holding other independent variables constant at the reference point.

The coefficient of source of information from Journals, Magazines, newspapers and pamphlets is statistically significant at 10% level and it has negative relationship with cervical cancer vaccination. The odds ratio indicates that women who get the information from the source are less likely to receive vaccination when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 9.7% lower for women who get the information from Journals, Magazines, newspapers and pamphlets than other women, holding other independent variables are constant at the reference point.

4.14 Analysis of Relationship between Practice on Screening of Cervical Cancer and Sources of Information

In this section, screening for cervical cancer is considered as dependent variable and sources of information about the screening are assigned as independent variables. Binary logistic regression was used to find out the influencing sources of information on the screening practice of the women. The model fitting information about the relationship between sources of information and practice on screening of cervical cancer is shown in Table (4.14.1).

According to the results in Table (4.14.1), the model Chi-square value which is the difference between the null model and the full model value is 22.012 and the significance levels for test of the null hypothesis are that all the coefficients are equal to zero, hence the null hypothesis is rejected. It means that the addition of the

independent variables improved the predictive power of the model. The Cox & Snell R Square which attempts to provide a logistic regression is the coefficient of determination. The value of Cox & Snell R Square is 6.1% and Nagelkerke R Square which adjusts the Cox & Snell R Square is 12.3%. The value of "pseudo R^2" indicates that 12.3% of the variance in screening practice can be predicted from the combination of sources of information.

Table (4.14.1)

Model Fitting Information for Practice on Screening and Sources of Information

Model fitting criteria	χ^2 value	df	P value
Hosmer and Lemeshow Test	0.556	7	0.997
Omnibus Test Model coefficients	22.012	7	0.003
Cox and Snell R^2	0.061		
Nagelkerke R^2	12.3		
Overall correct percentage	89.1		

***, **, * Statistically significant at 1% , 5% and 10% level.

Source: Survey Data (2018)

The Hosmer-Lemeshow test explores whether the predicted probabilities are the same as the observed probabilities. An overall goodness of fit of the model is indicated by p value > 0.05 (Hosmer and Lemeshow, 2000). There is no evidence of lack of fit based on Hosmer and Lemeshow statistics (Chi-square = 0.556, df =7, P value = 0.997 > 0.01). Overall percentage classification shows that 89.1% of the women are predicted correctly. Table (4.14.2) illustrates the summary results of the relationship between sources of information and practice on screening of cervical cancer.

Table (4.14.2) reveals the sources of information and their impact on cervical cancer screening. The final predicted results show that only one factor of getting information from health personnel who is not a family member is significantly associated with cervical cancer screening practice. The coefficient of source of information from health personnel who is not a family member is statistically significant at 1% level and it is positive in relation to cervical cancer screening. The odds ratio indicates that the women who get the information from health personnel are about 4 times more likely to screen when the influences of other variables are held constant. The marginal effect for practice on screening of cervical cancer shows that the percentage of practice on screening is 13.8% higher for the women who get the information from health personnel than other women, holding other independent

variables constant at the reference point. The other sources of information are not significant.

Table 4.14.2
Parameter Estimates of Binary Logistic Regression model for Practice on screening and Sources of Information

Sources of information	B	Wald	Sig	Adjusted OR	Marginal effect
Constant	-2.577	28.222	.000	.076	
Family member No (Ref) Yes	.432	.285	.593	1.540	.044
Relatives, friends No (Ref) Yes	- .141	.100	.752	.868	-.013
Other health personnel No (Ref) Yes	1.385***	9.113	.003	3.995	.138
Radio, TV No (Ref) Yes	- .686	1.869	.172	.503	-.055
Journals, Magazines, newspaper, pamphlets No (Ref) Yes	.306	.420	.517	1.358	.029
Internet No (Ref) Yes	-.562	.270	.604	.570	-.043
Awareness programme No (Ref) Yes	- .982	.854	.355	.374	-.065

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is woman who did not take cervical cancer screening.
Source: Survey Data (2018)

4.15 Analysis of Relationship between Practice on Vaccination of Cervical Cancer and Knowledge of Cervical Cancer

In this section, vaccination of cervical cancer is considered as dependent variable and knowledge of cervical cancer is defined as independent variable. Binary logistic regression was used to determine the influence of knowledge on vaccination of cervical cancer. The model fitting information for the practice on vaccination of cervical cancer is shown in Table (4.15.1).

According to the results in Table (4.15.1), the model Chi-square value which is the difference between the null model and the full model value is 44.695 and the null hypothesis is rejected. It means that the addition of the independent variables

improved the predictive power of the model. The Cox & Snell R Square which attempts to provide a logistic regression is the coefficient of determination. The value of Cox & Snell R Square is 7.4% and Nagelkerke R Square which adjusts the Cox & Snell R Square is 11.7%. The value of "pseudo R^2" indicates that 11.7% of the variance in vaccine practice can be predicted from the combination of knowledge about cervical cancer.

Table (4.15.1)
Model Fitting Information for Practice on Vaccination and Knowledge of Cervical Cancer

Model fitting criteria	χ^2 value	df	P value
Hosmer and Lemeshow Test	4.598	5	0.467
Omnibus Test Model coefficients	44.695	6	0.000
Cox and Snell R^2	0.074		
Nagelkerke R^2	0.117		
Overall correct percentage	80.3		

***, **, * Statistically significant at 1% , 5% and 10% level.

Source: Survey Data (2018)

The Hosmer-Lemeshow test explores whether the predicted probabilities are the same as the observed probabilities. An overall goodness of fit of the model is indicated by p value > 0.05 (Hosmer and Lemeshow, 2000). There is no evidence of lack of fit based on Hosmer and Lemeshow statistics (Chi-square = 4.598, df = 5, Pvalue=0.467> 0.01). Overall percentage classification shows that 80.3% of the women are predicted correctly. Table (4.15.2) illustrates the summary results of the relationship between practice on vaccination of cervical cancer and knowledge about cervical cancer.

According to the Table (4.15.2), the coefficients of moderate knowledge and high knowledge about signs and symptoms of cervical cancer are positive and statistically significant at 10% and 5% level, respectively. The adjusted odds ratios indicate that women with higher knowledge about signs and symptoms of cervical cancer are approximately 2 times more likely to receive vaccination practice than those with poor knowledge when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 6% higher for women with moderate knowledge than those with poor knowledge, holding other independent variables are constant at the reference point. The marginal effect for practice on vaccination of cervical cancer also shows that the percentage of practice on vaccination is 13.4%

higher for the women with high knowledge than those with poor knowledge, holding other independent variables are constant at the reference point.

Table 4.15.2
Parameter Estimates of Binary Logistic Regression model for Practice on Vaccination and Knowledge of Cervical Cancer

Knowledge	B	Wald	Sig	Adjusted OR	Marginal effect
Constant	-1.991	122.152	.000	.137	
Signs and symptoms					
Poor (Ref)					
Moderate	.418*	2.788	.095	1.519	.060
High	.833**	6.433	.011	2.300	.134
Risks factors					
Poor (Ref)					
Moderate	-.536*	3.365	.067	.585	-.073
High	-.353	.880	.348	.702	-.050
Prevention, vaccination, screening and treatment methods					
Poor (Ref)					
Moderate	1.082***	22.736	.000	2.952	.174
High	2.029***	13.568	.000	7.604	.394

***, **, * Statistically significant at 1% , 5% and 10% level.
Reference category is woman who did not receive cervical cancer vaccination.
Source: Survey Data (2018)

As the results of risk factors knowledge, the coefficient of moderate knowledge is negative and significant at 10% level. The adjusted odds ratio indicates that the women with moderate knowledge are 41.5% less likely to receive vaccination practice than women with poor knowledge when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 7.3% less for women with moderate knowledge than those with poor knowledge, holding other independent variables are constant at the reference point.

The study has found that the coefficient of moderate knowledge about prevention, vaccination, screening and treatment methods is positive and significant at 1% level. The adjusted odds ratio indicates that women with moderate knowledge are nearly 3 times more likely to receive vaccination practice than those with poor knowledge when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 17.4% higher for the women with moderate knowledge than those with poor knowledge, holding other independent variables are constant at the reference point.

The adjusted odds ratio for high knowledge indicates that the women with high knowledge about prevention, vaccination, screening and treatment methods are approximately 8 times more likely to receive vaccination practice than the women with poor knowledge when the influences of other variables are held constant. The marginal effect for practice on vaccination of cervical cancer shows that the percentage of practice on vaccination is 39.4% higher for the women with high knowledge than those with poor knowledge, holding other independent variables are constant at the reference point.

4.16 Analysis of Relationship between Practice on Screening of Cervical Cancer and Knowledge of Cervical Cancer

In this section, screening of cervical cancer is considered as dependent variable and knowledge of cervical cancer is defined as independent variable. Binary logistic regression was used to determine the influence of knowledge on practice on screening of cervical cancer. The model fitting information for the practice on screening of cervical cancer is shown in Table (4.16.1).

According to the results in Table (4.16.1), the model Chi-square value which is the difference between the null model and the full model value is 28.052 and the significance levels for test of the null hypothesis are that all the coefficients are equal to zero, hence the null hypothesis is rejected. It means that the addition of the independent variables improved the predictive power of the model. The Cox & Snell R Square which attempts to provide a logistic regression is the coefficient of determination. The value of Cox & Snell R Square is 4.7% and Nagelkerke R Square which adjusts the Cox & Snell R Square is 12.3%. The value of "pseudo R^2" indicates that 12.3% of the variance in screening practice can be predicted from the combination of knowledge about cervical cancer.

Table (4.16.1)
Model Fitting Information for Practice on Screening and Knowledge of Cervical Cancer

Model fitting criteria	χ^2 value	df	P value
Hosmer and Lemeshow Test	2.787	7	.904
Omnibus Test Model coefficients	28.052	6	.000
Cox and Snell R^2	.047		
Nagelkerke R^2	.123		
Overall correct percentage	93.5		

***, **, * Statistically significant at 1% , 5% and 10% level.
Source: Survey Data (2018)

The Hosmer-Lemeshow test explores whether the predicted probabilities are the same as the observed probabilities. An overall goodness of fit of the model is indicated by p value > 0.05 (Hosmer and Lemeshow, 2000). There is no evidence of lack of fit based on Hosmer and Lemeshow statistics (Chi-square = 2.787, df = 7, Pvalue=0.904> 0.01). Overall percentage classification shows that 93.5% of the women are predicted correctly. Table (4.16.2) illustrates the summary results of the relationship between practice on screening of cervical cancer and knowledge about cervical cancer.

According to the Table (4.16.2), only knowledge about prevention, vaccination, screening and treatment methods influences on the screening practice of the sample women. The study has found that the coefficients of moderate and high knowledge about prevention, vaccination, screening and treatment methods are positive and significant at 1% and 5% level, respectively. The adjusted odds ratio indicates that women with higher knowledge are nearly 6 times more likely to take screening practice than those with poor knowledge when the influences of other variables are held constant. The marginal effect for practice on screening of cervical cancer shows that the percentage of practice on vaccination is approximately 11% higher for women with higher knowledge than those with poor knowledge, holding other independent variables are constant at the reference point.

Table 4.16.2

Parameter Estimates of Binary Logistic Regression model for Practice on Screening and Knowledge of Cervical Cancer

Knowledge	B	Wald	Sig	Adjusted OR	Marginal effect
Constant	-3.675	111.584	.000	.025	
Signs and symptoms					
Poor (Ref)					
Moderate	.145	.141	.707	1.156	.009
High	-.443	.601	.438	.642	-.022
Risks factors					
Poor (Ref)					
Moderate	.112	.069	.793	1.119	.006
High	.826	2.687	.101	2.285	.059
Prevention, vaccination, screening and treatment methods					
Poor (Ref)					
Moderate	1.741***	20.806	.000	5.703	.112
High	1.683**	4.091	.043	5.380	.105

***, **, * Statistically significant at 1% , 5% and 10% level.

Reference category is woman who did not take cervical cancer screening.

Source: Survey Data (2018).

CHAPTER 5
CONCLUSION

The study was conducted to assess the awareness, knowledge, preventive practice, attitude of women about cervical cancer and to determine the factors affecting on awareness, knowledge and preventive practice on vaccination and screening of cervical cancer among women in Taungoo. Most of the respondents have high level of awareness and positive attitude on cervical cancer but their preventive practices on vaccination and screening are quiet low. Moreover, this study found that socio-economic factors greatly affected on awareness, knowledge and preventive practice among women in Taungoo. Accordingly, this chapter presents how the socio-economic factors influence the awareness, knowledge and preventive practices on vaccination and screening of cervical cancer among women and compares with findings of the previous studies.

5.1 Findings

Awareness

In this study, the women who have 3 and fewer than 3 children were about 3 times more likely to have the awareness of cervical cancer than women who have more than three children when the influence of other predicators are hold constant. This might be due to the fact that those who had larger family members shouldered more family responsibilities and experienced severe socio-economic problems, which prevented them from appropriate health seeking behaviors and visiting appropriate healthcare facilities for their health.

This study found that education of women is one of the determinants of cervical cancer awareness. The women who have high school and above high school education level are nearly 2 times more likely to have the awareness of cervical cancer than women with below high school level of education when the influence of other predicators are hold constant. This was consistent with the previous Indian study (Patra et al., 2017) done among women residents aged 30–60 years in an urban resettlement colony and Myo Myo Mon et al., (2007) who studied the awareness of common cancer among Myanmar Peri-urban woman, that described the proportion of women who were aware of cancer cervix increased as the literacy status increased,

and this association was statistically significant. Education is highly associated with increased access to health care services and more aware about diseases. Increasing the proportion of educated women may facilitate the dissemination of awareness and knowledge to those with lower education, aiding them in accessing health services through informal social networks and contacts.

This study revealed that the women have a cancer history herself or in her surroundings are 2 times more likely to have the awareness of cervical cancer than women who have no cancer history when the influence of other predicators are hold constant. The result was consistent with the finding of two studies concerning the relationship between cancer history and women's awareness and knowledge about cervical cancer. Matsubara et al., (2013) conducted a survey concerning the awareness about cervical cancer among Japanese female nurses aged between 30 and 59 and a study of Chaw Su Nandar et al., (2015) whose research done on migrant women aged between 30 and 49 years in Yangon also revealed that family history of uterine and breast cancer was associated with knowledge of cervical cancer screening regardless of age and life style behaviors. Women who had family history of cancer might have gained experience and awareness about cervical cancer. This led to increase uptake of cervical cancer vaccination and screening than others.

Knowledge

Regarding knowledge about cervical cancer, 346 (59.1%) of the respondents had poor knowledge, 167 (28.5%) had moderate knowledge and 72 (12.3%) had high knowledge on signs and symptoms, 402 (68.7%) of the women had poor knowledge, 122 (20.9%) had moderate knowledge and 61 (10.4%) had high knowledge on risk factors and 2.6% had high knowledge, 176 (30.1%) had moderate and 394 (67.4%) had poor knowledge on prevention, vaccination, screening and treatment methods of cervical cancer, respectively.

This study found that women age between 30 and 65 years and above 65 years were more than 2 times more likely to have higher knowledge about signs and symptoms, risk factors, prevention, vaccination, screening and treatment methods of cervical cancer than women age group 18-under 30 when the influence of other selected predictors are hold constant. This study is similar with John et al., (2011) who studied the knowledge, attitude, practice and perceived barriers towards screening for premalignant cervical lesions among women aged 18 years and above,

in Songea Urban, Ruvuma, and Kloku et al., (2014) who studied awareness and prevention of cervical cancer among female health professionals in Winneba, Ganha. A previous study was done on urban women whose age is 21-64 years by Segni et al., at Ethiopia in 2017. It found that age was not significantly influence the knowledge of cervical cancer. This difference could be due to high attention to non-communicable diseases like cervical cancer on the national non-communicable disease prevention policy.

It was found that married women were 76.1% less likely to have high knowledge about prevention, vaccination, screening and treatment methods of cervical cancer than single, divorces and widows when the influence of other variables are hold constant. This was inconsistent with the studies of John et al., (2011) and Sengi et al., (2017), which described that the married women were more likely to have knowledge about prevention and treatment options of cervical cancer. It is possible that single women in this study pay more attention to their health and more opportunity to obtain relevant information and thereby increase their knowledge.

In the present study, the women with high school or above high school level of education are approximately twice as likely to have moderate knowledge about signs and symptoms, and prevention, vaccination, screening and treatment methods about cervical cancer as women with below high school education level when the influence of other selected predictors are hold constant. Similarly, the previous studies done by Myo Myo Mon et al., (2007), Kloku et al., (2014) and Segni et al., (2017) stated that higher education has more knowledge on cervical cancer than women with no education, this has shown that women education has greater value in prevention and control of non-communicable disease like cervical cancer.

In the present study, it has been found that women who serve in government or private sectors were approximately 2 times more likely to have higher knowledge on signs and symptoms, prevention, vaccination, screening and treatment methods of cervical cancer than women who are dependant or retired when the influence of other variables are hold constant. This was similar with study of Murugi (2014) and Segni et al., (2015). In addition, this study found that there were statistically significant association between income and knowledge about signs and symptoms of cervical cancer. They are less depended on their family as they are income earners and they have also making household decisions including seeking healthcare. They have also enough knowledge to participate seeking healthcare.

Women who have health personnel within family members are more likely to have moderate knowledge about risk factors of cervical cancer than other women when the influence of other selected predictors are hold constant. Regardless of no association with knowledge on signs and symptoms, and risk factors; a woman with a family history of cancer is approximately two times more likely to have a higher knowledge on prevention, vaccination, screening, and treatment methods about cervical cancer than women who did not have any cancer history when the influence of other variables are hold constant. Moreover, this study found that women with cervical cancer history appears to be about 14 times more likely to have high knowledge on prevention, vaccination, screening and treatment methods of cervical cancer when the influence of other variables are hold constant. This indicates that health personnel within family members can give the advices and encouragement to seek health knowledge about cervical cancer and experience of any cancer is a determinant of knowledge on cervical cancer.

Preventive Practices

This study found that there were 115 (19.7%) and 38 (6.49%) of respondents have the experience of vaccination and screening practices at least one time in their life. Most of the women did the screening and vaccination in private hospital and private clinics and cost for vaccination and screening is expensive. Healthy self-esteem and the expenses for cervical cancer services were the barriers of practice on cervical cancer.

It was found that the women who aged between 30 and 65 years are more than 5 times more likely to receive cervical cancer vaccination than women who are above 65 years old. The women who aged between 30 and 65 years are eligible age group for screening practice. In this study, the age of women is not a significant factor of cervical cancer screening practice. So, the results of this study were dissimilar with that of Chaw Su Nandar et al., (2015) which found that the women with older age group (40-49 year) were 1.27 times more likely to get cervical cancer screening. This might be due to lack of knowledge on the standard criteria for having cervical cancer screening and vaccination so awareness rising should implement for women to get cervical cancer screening and vaccination.

Concerning the aspect of education, women with high school or above high school education are approximately 2 times more likely to take cervical cancer

screening. It indicates that educational attainment is linked with health practice as it can lead to increase health knowledge, healthy promoting behaviors and better decision making in health-related options for healthy life.

In the present study, women with higher income level (300,000-600,000 and above 600,000) are about 2 times more likely to receive vaccination compared to income group below 300,000 kyats when the influence of other variables are hold constant. These findings were similar with previous studies done by Patra (2017), Murugi (2014) and a study on Chinese women aged between 30 and 65 years by. Liu (2017) which highlighted those women with higher income are able to finance their health care needs.

This study found that the likelihood of screening is 4 times higher among women with cervical cancer family history compared to women who did not have any cancer history when the influence of other variables are hold constant. These findings were consistent with results of Matsubara et al., (2013) and Chaw Su Nandar et al., (2015) which described that women with family history of cervical cancer were 2.23 times more likely to have cervical cancer screening. These findings show that experience of cervical cancer can drive the women to seek more healthy behaviors and practices on vaccination and screening of cervical cancer.

Regarding sources of information for vaccination practice, women who get the information from health personnel are about 2 times more likely to receive vaccination when the influence of other variables are hold constant. Although there were many health education programs for cervical cancer on TV, radios and printed media, health education by health care personnel is more effective and lead to practices than any other sources. Regarding sources of information for screening practice, there is the only factor that women who get the information from health personnel are about 4 times more likely to screen when the influence of other variables are hold constant. These results are consistent with the findings of Chaw Su Nandar et al., (2015) that described women who were encouraged by the nurses were about 2 times more likely to undergo screening practice. The results highlighted that health care personnel are critical to contribute the awareness, knowledge and preventive practices about cervical cancer, therefore, health staff should be encouraged to provide health information concerning cervical cancer whenever they have a chance.

Regarding knowledge about cervical cancer of the women, the study has been found that women with higher knowledge are more likely to take preventive practice of cervical cancer than those with poor knowledge when the influences of other variables are hold constant. This finding is similar with the previous study. The study among migrant women by Chaw Su Nandar et al., (2015) which found that the migrants with higher level of knowledge were more likely to have cervical cancer screening than those with poor knowledge level. Therefore, to increase the knowledge on cervical cancer, the health education programs to the women should be promoted.

5.2 Recommendations

This study proved that approximately half the women have low knowledge on signs and symptoms, risk factors, prevention, vaccination, screening and treatment methods of cervical cancer and very low practice of cervical cancer vaccination and screening among women. In addition, this study found that there were some respondents who had high awareness and knowledge about cervical cancer but they had barriers to practice on vaccination and screening of cervical cancer. Subjective barriers based on personal feeling while objective barriers are influenced by environmental factors. Subjective factors include fear of diagnosis and result, less knowledge about cervical cancer, healthy self-esteem, ignorance of symptoms and socio-economic problems. Objective barriers include distance from local health facility, cost for practices, limited availability of services and other logistics problems. Therefore, health educational programs should be extended to eliminate the barriers such as healthy self-esteem, and cost for cervical cancer services. Increasing information dissemination and counseling will help to protect the barriers of the women's practice on vaccination and screening of cervical cancer. Women require knowledge on the significance of vaccination and regular screening. This can be attained by using multiple strategies that will reach women at their convenience and in accordance with age, educational status, occupation and income. Based on the findings, some recommendations can be made to promote knowledge and practice on vaccination and screening of cervical cancer among women as follows:

(1) There is need for the service factors such as Ministry of Health and Sports, NGOs and INGOs to enhance education sessions on cancer of cervix at the health facilities according to the socio-economic status such as age, marital status educational status, occupation and income to promote knowledge about cervical

cancer and cervical cancer examination. This is because, there was a few interviewees obtained their information from the health personnel. Moreover, this study found that the women believed and followed their suggestions from health personnel rather than information from others.

(2) There is require to explore new avenues of disseminating information like health talks to young women in schools and colleges, outreaches in market places and health briefs at the health facilities when the women are waiting to be seen by a doctor, because these are the places where most of the women populated.

(3) Awareness campaigns and education programs to enlighten the general public about cancer of cervix to put more emphasis on signs and symptoms, ways of transmission and risk factors, and vaccination and screening programs because half of the women have poor knowledge about cervical cancer in this study.

(4) Media such as televisions and radio stations that most of the people listen to would facilitate creation of awareness and encourage more women to seek for the vaccination and screening services regardless of their health status.

5.3 Limitations and Further Research

The study had some limitations. As a cross-sectional study requires respondents to remember information retrospectively, recall and social desirability bias are the potential limitations of this study. To reduce the social desirability bias, the details about the aim of the study were shared with the respondents. In addition, procedures such as supervision and pretest of the data collection tool were utilized to minimize the bias. This study relied on self-reported practice of vaccination and screening, and unable to check or link medical records, therefore, the rates of practice might be different from actual rates.

Further studies should be performed to address other barriers and motivators of health knowledge and preventive practice. Studies to explore the disparity between high awareness and low practices should be conducted. For the disparity, a longitudinal cohort would be recommended to explore the factors such as government long-term plan, and community participation to eliminate cervical cancer among women better rather than a cross-sectional survey. Research is recommended that will need to look at the socio-cultural factors and service-related factors affecting uptake of vaccination and screening.

Further investigation is needed on organizational issues such as knowledge, attitude and practice of service providing. Moreover, this study was conducted among only women in urban area; hence it could not generalize for all Myanmar women. So, future studies are necessary to look both rural and urban areas. This study did among community side, so that researches on provider's side are expected in the future studies.

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APPENDICES

Appendix A

The Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Socioeconomic Factors

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Age

Table (A-1) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Age

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Age	under 30	Count	64	17	4	85
		% within age	75.3%	20.0%	4.7%	100.0%
		% within signs and symptoms knowledge level	7.2%	6.6%	8.3%	7.2%
	30-65	Count	257	139	62	458
		% within age	56.1%	30.3%	13.5%	100.0%
		% within signs and symptoms knowledge level	74.3%	83.2%	86.1%	78.3%
	65+	Count	25	11	6	42
		% within age	59.5%	26.2%	14.3%	100.0%
		% within signs and symptoms knowledge level	7.2%	6.6%	8.3%	7.2%
Total		Count	346	167	72	585
		% within age	59.1%	28.5%	12.3%	100.0%
		% signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-2) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Age

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.926	4	.018
Likelihood Ratio	13.102	4	.011
Linear-by-Linear Association	7.084	1	.008
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Marital Status

Table (A-3) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Marital Status

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Marital status	married	Count	244	122	51	417
		% within marital status	58.5%	29.3%	12.2%	100.0%
		% within signs and symptoms knowledge level	70.5%	73.1%	70.8%	71.3%
	single/ widowed/ divorce	Count	102	45	21	168
		% within marital status	60.7%	26.8%	12.5%	100.0%
		% within signs and symptoms knowledge level	29.5%	26.9%	29.2%	28.7%
Total		Count	346	167	72	585
		% within marital status	59.1%	28.5%	12.3%	100.0%
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-4) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Marital Status

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.361[a]	2	.835
Likelihood Ratio	.364	2	.834
Linear-by-Linear Association	.090	1	.764
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Number of Children

Table (A-5) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Number of Children

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Number of children	None	Count	79	30	18	127
		% within number of children	62.2%	23.6%	14.2%	100.0%
		% within signs and symptoms knowledge level	22.8%	18.0%	25.0%	21.7%
	1-3	Count	215	110	33	358
		% within number of children	60.1%	30.7%	9.2%	100.0%
		% within signs and symptoms knowledge level	62.1%	65.9%	45.8%	61.2%
	3^+	Count	52	27	21	100
		% within number of children	52.0%	27.0%	21.0%	100.0%
		% within signs and symptoms knowledge level	15.0%	16.2%	29.2%	17.1%
Total		Count	346	167	72	585
		% within number of children	59.1%	28.5%	12.3%	100.0%
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-6) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Number of Children

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.148[a]	4	.016
Likelihood Ratio	11.403	4	.022
Linear-by-Linear Association	2.690	1	.101
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Education

Table (A-7) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Education

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Education	High/ Graduate/ Post graduate	Count	162	102	31	295
		% within education	54.9%	34.6%	10.5%	100.0%
		% within signs and symptoms knowledge level	46.8%	61.1%	43.1%	50.4%
	Illiterate/ Read and write/ Primary/ Middle	Count	184	65	41	290
		% within education	63.4%	22.4%	14.1%	100.0%
		% within signs and symptoms knowledge level	53.2%	38.9%	56.9%	49.6%
Total		Count	346	167	72	585
		% within education	59.1%	28.5%	12.3%	100.0%
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-8) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Education

	Value	df	Asymptotic Significance(2-sided)
Pearson Chi-Square	10.943	2	.004
Likelihood Ratio	11.016	2	.004
Linear-by-Linear Association	.709	1	.400
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Occupation

Table (A-9) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Occupation

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Occupation	Own business/Causal worker	Count	36	39	7	82
		% within occupation	43.9%	47.6%	8.5%	100.0 %
		% within signs and symptoms knowledge level	10.4%	23.4%	9.7%	14.0%
	Government personnel/ private personnel/ Government health personnel/ private health personnel	Count	157	66	39	262
		% within occupation	59.9%	25.2%	14.9%	100.0 %
		% within signs and symptoms knowledge level	45.4%	39.5%	54.2%	44.8%
	Dependent/ retired	Count	153	62	26	241
		% within occupation	63.5%	25.7%	10.8%	100.0 %
		% within signs and symptoms knowledge level	44.2%	37.1%	36.1%	41.2%
Total		Count	346	167	72	585
		% within occupation	59.1%	28.5%	12.3%	100.0 %
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0 %	100.0 %

Table (A-10) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Occupation

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.920[a]	4	.001
Likelihood Ratio	17.581	4	.001
Linear-by-Linear Association	3.989	1	.046
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Family Income

Table (A-11) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Family Income

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Income	less than 300000	Count	259	103	56	418
		% within income	62.0%	24.6%	13.4%	100.0%
		% within signs and symptoms knowledge level	74.9%	61.7%	77.8%	71.5%
	300000-600000	Count	72	49	9	130
		% within income	55.4%	37.7%	6.9%	100.0%
		% within signs and symptoms knowledge level	20.8%	29.3%	12.5%	22.2%
	600000+	Count	15	15	7	37
		% within income	40.5%	40.5%	18.9%	100.0%
		% within signs and symptoms knowledge level	4.3%	9.0%	9.7%	6.3%
Total		Count	346	167	72	585
		% within income	59.1%	28.5%	12.3%	100.0%
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-12) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Family Income

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.723[a]	4	.003
Likelihood Ratio	15.916	4	.003
Linear-by-Linear Association	2.669	1	.102
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Having Health Personnel in Family Member

Table (A-13) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Having Health Personnel in Family Member

			Signs and symptoms knowledge level			Total
			poor	moderate	high	
Having health personnel in family member	Yes	Count	25	16	7	48
		% within health personnel in family member	52.1%	33.3%	14.6%	100.0%
		% within signs and symptoms knowledge level	7.2%	9.6%	9.7%	8.2%
	No	Count	321	151	65	537
		% within health personnel in family member	59.8%	28.1%	12.1%	100.0%
		% within signs and symptoms knowledge level	92.8%	90.4%	90.3%	91.8%
Total		Count	346	167	72	585
		% within health personnel in family member	59.1%	28.5%	12.3%	100.0%
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-14) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Having Health Personnel in Family Member

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.081[a]	2	.583
Likelihood Ratio	1.067	2	.587
Linear-by-Linear Association	.919	1	.338
N of Valid Cases	585		

Relationship between Knowledge on Signs and Symptoms of Cervical Cancer and Type of Cancer History

Table (A-15) Cross-tabulation for Knowledge on Signs and Symptoms of Cervical Cancer and Type of Cancer History

			signs and symptoms knowledge level			Total
			poor	moderate	high	
Type of caner history	cervical	Count	17	13	6	36
		% within Type of cancer	47.2%	36.1%	16.7%	100.0%
		% within signs and symptoms knowledge level	4.9%	7.8%	8.3%	6.2%
	other	Count	114	56	31	201
		% within Type of cancer	56.7%	27.9%	15.4%	100.0%
		% within signs and symptoms knowledge level	32.9%	33.5%	43.1%	34.4%
	none	Count	215	98	35	348
		% within Type of cancer	61.8%	28.2%	10.1%	100.0%
		% within signs and symptoms knowledge level	62.1%	58.7%	48.6%	59.5%
Total		Count	346	167	72	585
		% within Type of cancer	59.1%	28.5%	12.3%	100.0%
		% within signs and symptoms knowledge level	100.0%	100.0%	100.0%	100.0%

Table (A-16) Chi-Square Tests for Knowledge on Signs and Symptoms of Cervical Cancer and Type of Cancer History

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.820	4	.213
Likelihood Ratio	5.747	4	.219
Linear-by-Linear Association	4.845	1	.028
N of Valid Cases	585		

Appendix B

The Relationship of Knowledge on Risk Factors of Cervical Cancer and Socioeconomic Factors

Relationship between Knowledge on Risk Factors of Cervical Cancer and Age

Table (B-1) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Age

			Risk factors knowledge level			Total
			poor	moderate	high	
Age	under 30	Count	66	12	7	85
		% within age	77.6%	14.1%	8.2%	100.0%
		% within risk factors knowledge level	16.4%	9.8%	11.5%	14.5%
	30-65	Count	312	97	49	458
		% within age	68.1%	21.2%	10.7%	100.0%
		% within risk factors knowledge level	77.6%	79.5%	80.3%	78.3%
	65^{+}	Count	24	13	5	42
		% within age	57.1%	31.0%	11.9%	100.0%
		% within risk factors knowledge level	6.0%	10.7%	8.2%	7.2%
Total		Count	402	122	61	585
		% within age	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-2) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Age

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.267	4	0.180
Likelihood Ratio	6.274	4	0.180
Linear-by-Linear Association	3.981	1	0.046
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Marital Status

Table (B-3) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Marital Status

			Risk factors knowledge level			Total
			poor	moderate	high	
Marital status	married	Count	282	91	44	417
		% within marital status	67.6%	21.8%	10.6%	100.0%
		% within risk factors knowledge level	70.1%	74.6%	72.1%	71.3%
	single/ widowed/ divorce	Count	120	31	17	168
		% within marital status	71.4%	18.5%	101%	100.0%
		% within risk factors knowledge level	29.9%	25.4%	27.9%	28.7%
Total		Count	402	122	61	585
		% within marital status	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-4) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Marital Status

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.926	2	.629
Likelihood Ratio	.940	2	.625
Linear-by-Linear Association	.475	1	.491
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Number of Children

Table (B-5) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Number of Children

			Risk factors knowledge level			Total
			poor	moderate	high	
Number of children	None	Count	86	27	14	127
		% within number of children	67.7%	21.3%	11.0%	100.0%
		% within risk factors knowledge level	21.4%	22.1%	23.0%	21.7%
	1-3	Count	255	75	28	358
		% within number of children	71.2%	20.9%	7.8%	100.0%
		% within risk factors knowledge level	63.4%	61.5%	45.9%	61.2%
	3^+	Count	61	20	19	100
		% within number of children	61.0%	20.0%	19.0%	100.0%
		% within risk factors knowledge level	15.2%	16.4%	31.1%	17.1%
Total		Count	402	122	61	585
		% within number of children	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-6) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Number of Children

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.683	4	.030
Likelihood Ratio	9.544	4	.049
Linear-by-Linear Association	1.991	1	.158
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Education

Table (B-7) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Education

			Risk factors knowledge level			Total
			poor	moderate	high	
Education	High/ Graduate/ Post graduate	Count	207	67	21	295
		% within education	70.2%	22.7%	7.1%	100.0%
		% within risk factors knowledge level	51.5%	54.9%	34.4%	50.4%
	Illiterate/ Read and write/ Primary/ Middle	Count	195	55	40	290
		% within education	67.2%	19.0%	13.8%	100.0%
		% within risk factors knowledge level	48.5%	45.1%	65.6%	49.6%
Total		Count	402	122	61	585
		% within education	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-8) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Education

	Value	df	Asymptotic Significance(2-sided)
Pearson Chi-Square	7.414	2	.025
Likelihood Ratio	7.515	2	.023
Linear-by-Linear Association	2.980	1	.084
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Occupation

Table (B-9) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Occupation

			Risk factors knowledge level			Total
			poor	moderate	high	
Occupation	Own business/Causal worker	Count	59	17	6	82
		% within occupation	72.0%	20.7%	7.3%	100.0%
		% within risk factors knowledge level	14.7%	13.9%	9.8%	14.0%
	Government personnel/ private personnel/ Government health personnel/ private health personnel	Count	170	59	33	262
		% within occupation	64.9%	22.5%	12.6%	100.0%
		% within risk factors knowledge level	42.3%	48.4%	54.1%	44.8%
	Dependent/ retired	Count	173	46	22	241
		% within occupation	71.8%	19.1%	9.1%	100.0%
		% within risk factors knowledge level	43.0%	37.7%	36.1%	41.2%
Total		Count	402	122	61	585
		% within occupation	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-10) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Occupation

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.056	4	.399
Likelihood Ratio	4.094	4	.393
Linear-by-Linear Association	.223	1	.636
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Family Income

Table (B-11) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Family Income

			Risk factors knowledge level			Total
			poor	moderate	high	
Income	less than 300000	Count	285	87	46	418
		% within income	68.2%	20.8%	11.0%	100.0%
		% within risk factors knowledge level	70.9%	71.3%	57.4%	71.5%
	300000-600000	Count	90	29	11	130
		% within income	69.2%	22.3%	8.5%	100.0%
		% within risk factors knowledge level	22.4%	23.8%	18.0%	22.2%
	600000+	Count	27	6	4	37
		% within income	73.0%	16.2%	10.8%	100.0%
		% within risk factors knowledge level	6.7%	4.9%	6.6%	6.3%
Total		Count	402	122	61	585
		% within income	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-12) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Family Income

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.254	4	.869
Likelihood Ratio	1.312	4	.859
Linear-by-Linear Association	.396	1	.529
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Having Health Personnel in Family Member

Table (B-13) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Having Health Personnel in Family Member

			Risk factors knowledge level			Total
			poor	moderate	high	
Having health personnel in family member	Yes	Count	29	15	4	48
		% within health personnel in family member	60.4%	31.3%	8.3%	100.0%
		% within risk factors knowledge level	7.2%	12.3%	6.6%	8.2%
	No	Count	373	107	57	537
		% within health personnel in family member	69.5%	19.9%	10.6%	100.0%
		% within risk factors knowledge level	92.8%	87.7%	93.4%	91.8%
Total		Count	402	122	61	585
		% within health personnel in family member	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-14) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Having Health Personnel in Family Member

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.454	2	.178
Likelihood Ratio	3.159	2	.206
Linear-by-Linear Association	.445	1	.505
N of Valid Cases	585		

Relationship between Knowledge on Risk Factors of Cervical Cancer and Type of Cancer History

Table (B-15) Cross-tabulation for Knowledge on Risk Factors of Cervical Cancer and Type of Cancer History

			Risk factors knowledge level			Total
			poor	moderate	high	
Type of caner history	cervical	Count	23	9	4	36
		% within Type of cancer	63.9%	25.0%	11.1%	100.0%
		% within risk factors knowledge level	5.7%	7.4%	6.6%	6.2%
	other	Count	135	43	23	201
		% within Type of cancer	67.2%	21.4%	11.4%	100.0%
		% within risk factors knowledge level	33.6%	35.2%	37.7%	34.4%
	none	Count	244	70	34	348
		% within Type of cancer	70.1%	20.1%	9.8%	100.0%
		% within risk factors knowledge level	60.7%	57.4%	55.7%	59.5%
Total		Count	402	122	61	585
		% within Type of cancer	68.7%	20.9%	10.4%	100.0%
		% within risk factors knowledge level	100.0%	100.0%	100.0%	100.0%

Table (B-16) Chi-Square Tests for Knowledge on Risk Factors of Cervical Cancer and Type of Cancer History

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.067	4	.900
Likelihood Ratio	1.049	4	.902
Linear-by-Linear Association	.847	1	.357
N of Valid Cases	585		

Appendix C

The Relationship of Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Socioeconomic Factors

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Age

Table (C-1) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Age

			Prevention, Vaccination and Screening knowledge level			
			poor	moderate	high	Total
Age	under 30	Count	63	18	4	85
		% within age	74.1%	21.2%	4.7%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	16.0%	10.2%	26.7%	14.5%
	30-65	Count	299	149	10	458
		% within age	65.3%	32.5%	2.2%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	75.9%	84.7%	66.7%	78.3%
	65+	Count	32	9	1	42
		% within age	76.2%	21.4%	2.4%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	8.1%	5.1%	6.7%	7.2%
Total		Count	394	176	15	585
		% within age	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-2) Chi Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Age

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.341	4	.119
Likelihood Ratio	7.371	4	.118
Linear-by-Linear Association	.001	1	.981
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Marital Status

Table (C-3) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Marital Status

			Prevention, Vaccination and Screening knowledge level			Total
			poor	moderate	high	
Marital status	married	Count	279	131	7	417
		% within marital status	66.9%	31.4%	1.7%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	70.8%	74.4%	46.7%	71.3%
	single/ widowed/ divorce	Count	115	45	8	168
		% within marital status	68.5%	26.8%	4.8%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	29.2%	25.6%	53.3%	28.7%
Total		Count	394	176	15	585
		% within marital status	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-4) Chi Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Marital Status

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.335	2	.069
Likelihood Ratio	4.889	2	.087
Linear-by-Linear Association	.101	1	.750
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Number of Children

Table (C-5) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Number of Children

			Prevention, Vaccination and Screening knowledge level			Total
			poor	moderate	high	
Number of children	none	Count	82	41	4	127
		% within number of children	64.6%	32.3%	3.1%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	20.8%	23.3%	26.7%	21.7%
	1-3	Count	240	108	10	358
		% within number of children	67.0%	30.2%	2.8%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	60.9%	61.4%	66.7%	61.2%
	3^+	Count	72	27	1	100
		% within number of children	72.0%	27.0%	1.0%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	18.3%	15.3%	6.7%	17.1%
Total		Count	394	176	15	585
		% within number of children	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-6) Chi Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Number of Children

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.191	4	.701
Likelihood Ratio	2.469	4	.650
Linear-by-Linear Association	1.742	1	.187
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Education

Table (C-7) Cross-tabulation for Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Education

			Prevention, Vaccination and Screening knowledge level			Total
			poor	moderate	high	
Education	High/ Graduate/ Post graduate	Count	180	107	8	295
		% within education	61.0%	36.3%	2.7%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	45.7%	60.8%	53.3%	50.4%
	Illiterate/ Read and write/ Primary/ Middle	Count	214	69	7	290
		% within education	73.8%	23.8%	2.4%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	54.3%	39.2%	46.7%	49.6%
Total		Count	394	176	15	585
		% within education	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-8) Chi Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Education

	Value	df	Asymptotic Significance(2-sided)
Pearson Chi-Square	11.163	2	.004
Likelihood Ratio	11.231	2	.004
Linear-by-Linear Association	8.931	1	.003
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Occupation

Table(C-9) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Occupation

			Prevention, Vaccination and Screening knowledge level			
			poor	moderate	high	Total
Occupation	Own business/ Causal worker	Count	41	39	2	82
		% within occupation	50.0%	47.6%	2.4%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	10.4%	22.2%	13.3%	14.0%
	Government personnel/ private personnel/ Government health personnel/ private health personnel	Count	185	69	8	262
		% within occupation	70.6%	26.3%	3.1%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	47.0%	39.2%	53.3%	44.8%
	Dependent/ retired	Count	168	68	5	241
		% within occupation	69.7%	28.2%	2.1%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	42.6%	38.6%	33.3%	41.2%
Total		Count	394	176	15	585
		% within occupation	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-10) Chi Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Occupation

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.581	4	.006
Likelihood Ratio	13.735	4	.008
Linear-by-Linear Association	5.626	1	.018
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Family Income

Table(C-11) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Family Income

			Prevention, Vaccination and Screening knowledge level			Total
			poor	moderate	high	
Income	less than 300000	Count	290	119	9	418
		% within income	69.4%	28.5%	2.2%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	73.6%	67.6%	60.0%	71.5%
	300000-600000	Count	79	48	3	130
		% within income	60.8%	36.9%	2.3%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	20.1%	27.3%	20.0%	22.2%
	600000+	Count	25	9	3	37
		% within income	67.6%	24.3%	8.1%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	6.3%	5.1%	20.0%	6.3%
Total		Count	394	176	15	585
		% within income	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-12) Chi-Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Family Income

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.627	4	.071
Likelihood Ratio	6.938	4	.139
Linear-by-Linear Association	2.556	1	.110
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Having Health Personnel in Family Member

Table (C-13) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Having Health Personnel in Family Member

			Prevention, Vaccination and Screening knowledge level			Total
			poor	moderate	high	
Having health personnel in family member	Yes	Count	28	18	2	48
		% within health personnel in family member	58.3%	37.5%	4.2%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	7.1%	10.2%	13.3%	8.2%
	No	Count	366	158	13	537
		% within health personnel in family member	68.2%	29.4%	2.4%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	92.9%	89.8%	86.7%	91.8%
Total		Count	394	176	15	585
		% within health personnel in family member	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-14) Chi-Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Having Health Personnel in Family Member

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.111	2	.348
Likelihood Ratio	1.998	2	.368
Linear-by-Linear Association	2.107	1	.147
N of Valid Cases	585		

Relationship between Knowledge on Prevention, Vaccination and Screening of Cervical Cancer and Type of Cancer History

Table (C-15) Cross-tabulation for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Type of Cancer History

			Prevention, Vaccination and Screening knowledge level			Total
			poor	moderate	high	
Type of caner history	cervical	Count	12	21	3	36
		% within Type of cancer	33.3%	58.3%	8.3%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	3.0%	11.9%	20.0%	6.2%
	other	Count	122	73	6	201
		% within Type of cancer	60.7%	36.3%	3.0%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	31.0%	41.5%	40.0%	34.4%
	none	Count	260	82	6	348
		% within Type of cancer	74.7%	23.6%	1.7%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	66.0%	46.6%	40.0%	59.5%
Total		Count	394	176	15	585
		% within Type of cancer	67.4%	30.1%	2.6%	100.0%
		% within Prevention, Vaccination and Screening knowledge level	100.0%	100.0%	100.0%	100.0%

Table (C-16) Chi-Square Tests for Knowledge on Prevention, Vaccination, Screening and Treatment Methods of Cervical Cancer and Type of Cancer History

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	33.141	4	.000
Likelihood Ratio	31.041	4	.000
Linear-by-Linear Association	30.170	1	.000
N of Valid Cases	585		

Appendix D

Appendix D (Table D-1) Parameter Estimates for Signs and Symptoms Knowledge of Cervical Cancer

Signs and Symptoms knowledge level			B	Std. Error	Wald	df	S
moderate		Intercept	-2.365	.411	33.126	1	
	Age	> 65	.820	.496	2.727	1	
		30-65	.849	.316	7.205	1	
	Marital status	Married	-.051	.263	.038	1	
	Number of children	> 3	.545	.385	2.008	1	
		1-3	.423	.310	1.862	1	
	Education	High/university/graduate/post graduate	.423	.220	3.684	1	
	Occupation	Own business/ Causal worker	.831	.306	7.382	1	
		Government or private services	.097	.222	.193	1	
	Family income	> 600000	1.041	.411	6.405	1	
		300000-600000	.388	.234	2.742	1	
	Having health personnel in family	Having health personnel in family	.036	.360	.010	1	
	Cancer history	Cervical	.435	.404	1.160	1	
		Other cancer	-.027	.214	.015	1	
high		Intercept	-3.270	.654	24.982	1	
	Age	> 65	1.361	.746	3.328	1	
		30-65	1.331	.565	5.549	1	
	Marital status	Married	.433	.350	1.534	1	
	Number of chi Children	> 3	.303	.442	.472	1	
		1-3	-.629	.390	2.605	1	
	Education	High/university/graduate/post graduate	.036	.298	.015	1	
	Occupation	Own business/ Causal worker	.386	.512	.568	1	
		Government or private services	.491	.302	2.646	1	
	Income	> 600000	.914	.523	3.055	1	
		300000-600000	-.557	.400	1.946	1	
	Having health personnel in family	Having health personnel in family	.216	.479	.203	1	
	Cancer history	Cervical	.649	.530	1.502	1	
		Other cancer	.394	.284	1.934	1	

a. The reference category is: poor.

b. This parameter is set to zero because it is redundant

Appendix D (Table D-2) Parameter Estimates for Risk Factors Knowledge of Cervical Cancer

Risk actors knowledge level[a]			B	Std. Error	Wald	df	Si
Moderate		Intercept	-2.185	.442	24.493	1	.
	Age	> 65	1.309	.503	6.767	1	.
		30-65	.561	.348	2.607	1	.
	Marital status	Married	.466	.294	2.521	1	.
	Number of children	> 3	-.349	.403	.751	1	.
		1-3	-.407	.321	1.611	1	.
	Education	High/university/graduate/post graduate	.255	.232	1.200	1	.
	Occupation	Own business/ Causal worker	-.013	.351	.001	1	.
		Government or private services	.429	.239	3.225	1	.
	Income	> 600000	-.285	.484	.345	1	.
		300000-600000	.056	.259	.046	1	.
	Having health personnel in family member	Having health personnel in family	.633	.353	3.213	1	.
	Cancer history	Cervical	.260	.429	.368	1	.
		Other cancer	.037	.228	.027	1	.
high		Intercept	-2.137	.572	13.934	1	.
	Age	> 65	.385	.687	.314	1	.
		30-65	.158	.451	.122	1	.
	Marital status	Married	.511	.374	1.873	1	.
	Number of Children	> 3	.262	.467	.316	1	.
		1-3	-.745	.424	3.084	1	.
	Education	High/university/graduate/post graduate	-.566	.332	2.903	1	.
	Occupation	Own business/ Causal worker	.348	.540	.415	1	.
		Government or private services	.503	.317	2.515	1	.
	Income	> 600000	-.008	.589	.000	1	.
		300000-600000	-.170	.374	.205	1	.
	Having health personnel in family member	Having health personnel in family	-.098	.577	.029	1	.
	Cancer history	Cervical	.126	.590	.046	1	.
		Other cancer	.217	.302	.516	1	.

a. The reference category is: poor.

b. This parameter is set to zero because it is redundant.

Appendix D (Table D-3) Parameter Estimates for Prevention, Vaccination, Screening and Treatment Methods Knowledge of Cervical Cancer

Prevention, Vaccination and Screening knowledge level[a]			B	Std. Error	Wald	df
Moderate		Intercept	-1.944	.392	24.567	
	Age	> 65	.150	.507	.087	
		30-65	.591	.306	3.723	
	Marital status	Married	.363	.267	1.850	
	Number of children	> 3	-.353	.365	.934	
		1-3	-.306	.292	1.103	
	Education	High/university/graduate/post graduate	.408	.214	3.621	
	Occupation	Own business/ Causal worker	.617	.299	4.261	
		Government or private services	-.122	.216	.318	
	Income	> 600000	-.308	.429	.515	
		300000-600000	.165	.233	.501	
	Having health personnel in family member	Having health personnel in family	.147	.343	.184	
	Cancer history	Cervical	1.810	.399	20.580	
		Other cancer	.608	.203	8.951	
high		Intercept	-3.519	.951	13.691	
	Age	> 65	-.538	1.307	.170	
		30-65	-.722	.694	1.082	
	Marital status	Married	-1.432	.664	4.650	
	Number of children	> 3	-.622	1.329	.219	
		1-3	1.104	.803	1.890	
	Education	High/university/graduate/post graduate	.129	.601	.046	
	Occupation	Own business/ Causal worker	-.145	.953	.023	
		Government or private services	.171	.610	.078	
	Income	> 600000	1.360	.777	3.059	
		300000-600000	.403	.731	.304	
	Having health personnel in family member	Having health personnel in family	.833	.825	1.020	
	Cancer history	Cervical	2.625	.814	10.402	
		Other cancer	.764	.603	1.606	

a. The reference category is: poor.

b. This parameter is set to zero because it is redundant.

Appendix D (Table D-4) Parameter Estimates for Vaccination of Cervical Cancer

		B	S.E.	Wald	df	S
Step 1[a]	**Age**			6.218	2	
	30-65	1.633	.747	4.785	1	
	< 30	1.214	.804	2.282	1	
	Married	-.235	.284	.685	1	
	Number of children			2.680	2	
	> 3	-.479	.424	1.273	1	
	1-3	.080	.321	.061	1	
	High/university/graduate/post graduate	-.055	.238	.054	1	
	Occupation			1.340	2	
	Own business/causal worker	-.330	.354	.871	1	
	Government or private services	-.223	.235	.902	1	
	Income			6.625	2	
	> 600000	.830	.403	4.233	1	
	300000-600000	.503	.257	3.833	1	
	Having health personnel in family member	-.387	.439	.778	1	
	Type of cancer history			5.098	2	
	Cervical	.881	.393	5.035	1	
	Other cancer	.060	.231	.068	1	
	Constant	-2.793	.781	12.784	1	

a. Variable(s) entered on step 1: AGEF, MARITALF, CHILDF, EDUF, OCCUF, INCOMEF, HP, Ty

Appendix D (Table D-5) Parameter Estimates for Screening of Cervical Cancer

		B	S.E.	Wald	
Step 1[a]	**Age**			2.973	
	> 65	1.561	.986	2.506	
	30-65	1.234	.758	2.648	
	Married	.682	.516	1.742	
	Number of children			.255	
	> 3	-.238	.689	.119	
	1-3	.017	.558	.001	
	High/university/graduate/post graduate	.677	.378	3.206	
	Occupation			1.207	
	Own business/causal worker	-.479	.619	.598	
	Government or private services	.184	.379	.235	
	Income			.314	
	> 600000	.370	.672	.303	
	300000-600000	-.001	.426	.000	
	Having health personnel in family member	-.602	.768	.614	
	Type of cancer history			7.537	
	Cervical	1.433	.534	7.194	
	Other cancer	.549	.375	2.148	
	Constant	-5.044	.907	30.895	

a. Variable(s) entered on step 1: AGEF, MARITALF, CHILDF, EDUF, OCCUF, INCOMEF, HP, Ty

Research Questionnaire
Determinants of Cervical Cancer Awareness, Knowledge and Practice among Women in Taungoo

This survey is conducted for Ph.D Thesis. The results obtained from the survey will be used only for academic purpose and nothing else beyond this.

1. Questionnaire number **……..**
2. Ward No. **……**
3. Household No. **……**
4 Interviewer's name **……**
5. Date ……

Socio-economic Information

6. Age at last birthday ……..

7. What is your marital status?
1. Single **Skip to Q – 15**
2. married
3. Divorced
4. Widowed

8. How many years have you been married?
……

9. The age at first marriage?
…….

10. Have you ever been pregnant?
.☐ Yes ☐ No **Skip to Q – 15**

11. How many times do you have pregnancy?
……..

12. The age at the first pregnancy.
……..

13. Do you have own children?
☐ Yes ☐ No **Skip Q – 15**

14. Number of children (alive).
……..

15. Highest education.

1. Illiterate
2. Only read and write
3. Primary
4. Middle
5. High
6. University/ Graduate/Post graduate
7. Other (specify) …….

16. Occupation.

1. Dependent
2. Government employee (non- health sector)
3. Private employee (non-health sector)
4. Government Health personnel
5. Private Health personnel
6. Own business
7. Odd jobs
8. Retired
9. Other (specify) ……

17. Number of wage earners in your family?

……

18. Monthly family income.(Kyats)

. ……..

19. Is there any health personnel in your family?

☐ Yes ☐ No

20. Is there any person who suffers cancer in your family, surrounding and including you?

☐ Yes ☐ No **Skip to Q – 23**

21. If yes, describe the relationship that person with you. (you can choose more than one)

☐ Family member
☐ Relatives
☐ Neighbors
☐ friends
☐ Myself
☐ Other (Specify) …….

22. Can you tell the type of cancer that person suffered or those persons (If more than one)?

…… …….. …… ……

Cervical Cancer Awareness and Knowledge Information

23. Can you tell the name of the most female cancer?
……..

24. Have you ever heard of cervical cancer?
☐ Yes ☐ No **skip Q - 31**

25. At what age, did you hear about cervical cancer?
…….

26. Where did you hear about cervical cancer? (you can choose more than one)
- ☐ Family members (Health personnel)
- ☐ Family members (Non health personnel)
- ☐ Relatives, friends
- ☐ Other health personnel
- ☐ Radio, TV
- ☐ Journals, Magazines, Newspapers, Pamphlets
- ☐ Internet
- ☐ NGOs, INGOs
- ☐ Awareness programs (program's name ……|)
- ☐ Other (specify) ……

27. Which age is the most likely to develop cervical cancer?
1. any age
2. 15 to 49 years
3. 50 to 69 years
4. Over 70 years
5. Other (specify) ……

28. What part of the woman's body does cervical cancer affect?
1. ……
2. Don't know

29. Do you think the following may or may not be warning signs for Cervical Cancer?

	Signs and Symptoms	Yes	No	Don't know
1	Vaginal bleeding between regular periods			
2	Menstrual periods that are heavier or longer than usual			
3	Persistent vaginal discharge that smells unpleasant			
4	Pain and virginal bleeding during or after sex			
5	Persistent diarrhea is not its sign and symptom			
6	Persistent pelvic pain			
7	Persistent lower back pain			
8	Persistent blood in the stool or urine			
9	Virginal bleeding after Menopause			
10	Unexplained weight loss			
11	Abnormal discharge per vagina, serous, pus, mucus			
12	Pain and tenderness in pelvic organs			

30. The following may or may not increase a woman's chance of developing cervical cancer. Do you Think that each of these can increase a woman's chance of developing cervical cancer?

	Risk Factors	Yes	No	Don't know
1	Infection with HPV (human papillomavirus)			
2	Smoking any cigarette			
3	Having a weakened immune system (e.g. because of HIV/AIDS, immunosuppressant drugs or having a transplant)			
4	Long term use of the contraceptive pill			
5	Sexual intercourse, marriage and child bearing under the age of 18 years			
6	Having many sexual partners			
7	Having many children			
8	Having a sexual partner with many previous partners			
9	Not going for regular smear (Pap) tests			
10	Appearance of viral warts in sexual organ of both sex			
11	Having multiple marriage			

Cervical Cancer Prevention and Screening Knowledge Information

31. Have you ever heard of vaccine for cervical cancer?

☐ Yes ☐ No (**Skip Q- 45**)

32. At what age did you hear about cervical cancer vaccine?

……..

33. Where did you hear about cervical cancer vaccine? (you can choose more than one)

☐ Family members (Health personnel)
☐ Family members (Non health personnel)
☐ Relatives
☐ Other health personnel
☐ TV, Radio
☐ Journals, Magazines, Newspapers, Pamphlets
☐ Internet
☐ NGOs, INGOs
☐ Awareness programs (program's name ……|)
☐ Other (specify) ……

34. Which age of woman should be received the vaccine for cervical cancer? (you can choose more than one)

☐ Aged 9-14 years
☐ Aged 15 years and above
☐ Any age
☐ Other (specify) …….

35. How many times in a woman's life should she be received the vaccine for cervical cancer?

☐ 2 times ☐ 3 times ☐ Other (specify)……

Cervical Cancer Vaccination Information

36. Have you ever been received cervical cancer vaccine?

☐ Yes ☐ No **(Skip Q- 44)**

37. How many times did you receive cervical cancer vaccine?

☐ One **(Skip Q- 57)** ☐ Two
☐ Three ☐ Other (specify) ……..

38.. When did you take the first time vaccination of cervical cancer?

……

39. Where did you go for the first time vaccination of cervical cancer?

1. Government Hospital
2. Health care center
3. Traditional medicine clinics / hospital
4. Ward administration office
5. Private Hospital
6. Can't remember
7. Others …….

40. Why did you go there for the first time vaccination of cervical cancer?

……

41. When did you take the last time vaccination of cervical cancer?

……

42. Where did you go for the last time vaccination?

1. Government Hospital
2. Health care center
3. Traditional medicine clinics / hospital
4. Ward administration office
5. Private Hospital
6. Can't remember
7. Others …….

43. Why did you go there for the last time vaccination? **(Skip Q-45)**

……

44. Why don't you take cervical cancer vaccination? (You can choose more than one.)

- ☐ Little understanding of cervical cancer
- ☐ Not knowing where go to for taking cervical cancer vaccination
- ☐ Not suggested by anyone
- ☐ Lack of convenient time for vaccination
- ☐ Long distances to a health facility
- ☐ I am healthy (I can't suffer Cervical Cancer)
- ☐ It is expensive
- ☐ I am not informed/knowledge cervical cancer
- ☐ I haven't just decided
- ☐ I afraid the pain of
- ☐ Others ……

Cervical Cancer Screening Knowledge Information

45. Have you ever heard of cervical cancer screening?

☐ Yes ☐ No **(Skip Q- 50)**

46. If yes, where did you hear about the screening? (You can choose more than one)

- ☐ Family members (Health personnel)
- ☐ Family members (Non health personnel)
- ☐ Relatives, Friends
- ☐ Other health personnel
- ☐ Radio, TV
- ☐ Journals, Magazines, Newspapers, Pamphlets
- ☐ Internet
- ☐ NGOs, INGOs
- ☐ Awareness programs (program's name ……|)
- ☐ Other (specify) ……

47. How many times should a woman be done the screening for premalignant cervical cancer?

- ☐ Once every year
- ☐ Once every three years
- ☐ Once every five years
- ☐ Don't know
- ☐ Others ……

48. Which age of woman should be screened for cervical cancer? (You can choose more than one)

- ☐ Women aged above 30 years
- ☐ Women aged 30 to 65 years
- ☐ Women aged 65 years and above
- ☐ Any age
- ☐ Don't know
- ☐ Other (Specify) …….

49. Can you mention any of the screening methods for premalignant cervical cancer?(You can choose more than one)

- ☐ Visual Inspection of the cervix with Acetic Acid (VIA test)
- ☐ Pap Smear test (Pap test)
- ☐ Don't know
- ☐ Other (Specify) …….

50. Do you think, cervical cancer can be prevented through the following methods? (You can choose more than one)

- ☐ Not smoking and avoiding secondhand smoke
- ☐ Using a condom if one is sexually active
- ☐ Vaccination with HPV vaccine
- ☐ Routine Screening for cervical cancer
- ☐ Avoiding long term use of contraceptive methods
- ☐ Don't know
- ☐ Other (Specify) …….

.

51. How can someone with cancer of the cervix be treated? (You can choose more than one)

- ☐ Herbal remedies
- ☐ Surgery
- ☐ Specific drugs given by hospital
- ☐ Radiotherapy
- ☐ Don't know
- ☐ Other (Specify) ……

Cervical Cancer Screening Information

52. Have you ever been screened for cervical cancer?

☐ Yes ☐ No **(Skip Q-63)**

53. If **yes, w**hat sign of cervical cancer do you notice?

…….

54. How many times did you screened for cervical cancer?

1. One **(Skip Q-59)**
2. Two
3. Three
4. Other (specify) ……

55. Which age was the first time of cervical cancer screening done?

…….

56. Where did you go for the first time of cervical cancer screening?

1. Government Hospital
2. Private Hospital
3. Health care center
4. Traditional medicine clinics / hospital
5. Can't remember
6. Other (Specify)…….

57. Why did you go there for the first time of cervical cancer screening?
……..

58. Which method did you screen?
1. Visual Inspection of the cervix with Acetic Acid (VIA test)
2. Pap Smear test (Pap test)
3. Don't know
4. Other (Specify) …….

59. Which age was the last time screening done?
…….

60. Where did you go for the last time of cervical cancer screening?
1. Government Hospital
2. Private Hospital
3. Health care center
4. Traditional medicine clinics / hospital
5. Can't remember
6. Other (Specify)…….

61. Why did you go there for the last time of cervical cancer screening?
……..

62. Which method did you screened?
1. Visual Inspection of the cervix with Acetic Acid (VIA test)
2. Pap Smear test (Pap Smear test)
3. Don't know
4. Others (Specify) …….

63. **If No,** Why don't you screen cervical cancer? (You can choose more than one).
- ☐ Little understanding of cervical cancer
- ☐ It may be painful
- ☐ Fear of a vaginal exam
- ☐ Not knowing where go to for screening
- ☐ Not suggested by anyone
- ☐ Lack of convenient clinic time
- ☐ Long distances to a health facility
- ☐ I feel shy
- ☐ I am healthy
- ☐ I am afraid a screening test would reveal cervical cancer
- ☐ It is expensive
- ☐ I am not informed/knowledge cervical cancer

☐ I haven't just decided
☐ Other (Specify) …….

64. Attitude of the respondent on cervical cancer

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Cervical cancer is highly prevalent disease and a leading cause of deaths in Myanmar.					
2	Any adult woman including you can acquire cervical cancer.					
3	Cervical cancer cannot be transmitted from one person to another.					
4	Vaccination and screening helps in prevention of cervical cancer.					
5	Vaccination and screening causes no harm to the client.					
6	Vaccination and screening are not expensive.					
7	Every woman should be vaccine and screened for cervical cancer.					
8	If you had a symptom that you thought might be a sign of cervical cancer, you will visit a health center.					
9	Cancer of the cervix can be cured.					
10	If you were offered a free cervical cancer screening, you will be willing to be screen.					

65. If Q-64-9 answered No, Why don't think cervical cancer can be cured?
……..

66. If Q-64-10 answered No, Why don't you have willing to vaccine and screen cervical cancer? (You can choose more than one).

☐ Little understanding of cervical cancer
☐ It may be painful
☐ Fear of a vaginal exam
☐ Not knowing where go to for screening
☐ Not suggested by anyone
☐ Lack of convenient clinic time
☐ Long distances to a health facility

- ☐ I feel shy
- ☐ I am healthy
- ☐ I am afraid a screening test would reveal cervical cancer
- ☐ I am not informed/knowledge cervical cancer
- ☐ I haven't just decided
- ☐ Other (Specify) …….

67. What would be the best place to reach women with cervical cancer messages?

1. Health center
2. Local women' group
3. Awareness program
4. Media (TV, Radio, Newspapers, Journals, Magazines, Internet, etc..)
5. NGOs,INGOs
6. Markets
7. Don't know
8. Others ……

68. Is there any other suggestions you would be willing to share about cervical cancer in your community?

……
…….
……
…….
……
……..

Thanks for your time and participation.