MODELLING THE FACTORS AFFECTING WOMEN TO UPTAKE PAP TEST

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Masters/Mphil/PhD Dissertation under my supervision.

Name of the supervisor: Senior Prof. T S G Peiris

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Abstract

Cervical cancer is a leading cause of deaths among women worldwide. But the condition is preventable and can be detected prior to the symptoms appear through regular screening of pap test. Although screening facilities are available freely, the non-uptake of pap test by the women in vulnerable ages remains very high. Purpose of the study is to determine the level of knowledge and practice on cancer of cervix and screening and the influential factors for uptake of pap test amongst women (> 35 years) in Jaffna. A random sample of size 225 from Tamil community was selected and a structural questionnaire was used to obtain the necessary data. Irrespective of different variables only 64% were aware of the pap test and 87% of women in Jaffna district have never uptaken the pap test. Furthermore, 47% were unaware of any one of the signs and symptoms while 29% were unaware of the risk factors. The χ^2 analysis found that age category, income category, educational level, the knowledge on signs and symptoms, heard of cervical cancer screening, knowledge on signs and symptoms, heard of cervical cancer screening, knowing the possibility of detection, awareness of health facilities for screening services, and knowledge of cervical cancer screening, status of use of contraceptives, and family engagement are significant on uptake of pap test. When all factors are considered simultaneously, it was found that, education level, total monthly income, knowledge of detection before symptoms, participation of awareness program, knowledge of cancer screening, use of contraceptives are significantly positively influence on the odd ratio of not being up taking the pap test. The predictive power of the fitted model is 88%. The odds of not up taking the pap test by women is 254 times higher for those who have primary education compared to those who have tertiary education and above. The corresponding figure for those have secondary education is 76. The odds of not up taking the pap test is 6 times higher for women whose total family income lesser 25, 000/= compared to the women whose family income is higher than 50, 000/= . The odds of not up taking the pap test by those who are not using contraceptives is 5.7 times higher than that of who are taking oral contraceptives. The inferences derived in this study need to be used effectively for the benefit of women in Jaffna district.

Keywords: *Binary Logistic Model, Cervical cancer, Knowledge of Cancer Screening, Odd Ratio, Pap Test, Uptake, Women*

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LIST OF ABBREVIATIONS

ACOG	- American College of Obstetrics and Gynecology
ANOVA	- Analysis of Variance
ASR	- Age standardized rate
CCS	- Cancer of Cervix and Screening
DES	- Di Ethyl Stilbestrol
FHB	- Family Health Bureau
HPV	- Human Papilloma Virus
MOH	- Medical officer of health
OR	- Odds Ratio
STIs	- Sexually Transmitted Infections
UK	- United Kingdom
USA	- United States of America
WHO	- World Health Organization
W – WC	- Well Women Clinic

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The most precious wealth of a person's life is health (Kelley, 2002). When someone is suffering of any kind of an illness, they can't enjoy their lives. Good health means not only the absence of disease in the body but a complete physical, mental, social as well as spiritual well-being of an individual. Thus, first of all they should be healthily fit enough to face for the life challenges.

Among the common set of diseases of which people are suffering of majorly, cancer has recorded at the top level (Chan, 2010). Cancer has become the second leading cause for deaths globally, and is responsible for an estimated 9.6 million deaths in 2018 (Akaza, 2019). Globally, about 1 in 6 deaths is due to cancer. Approximately 70% of deaths from cancer occur in low- and middle-income countries. During 2012 and 2014, the mortality rate due to cancer has increased by approximately 6%, implying that cancer is becoming a major impact for increasing mortality in the world (Akaza, 2019).

During the period 2012 – 2014, different types of cancers have been recorded such as Lung cancer (1.76 million deaths), Stomach cancer (783 000 deaths), Liver cancer (782 000 deaths), Colorectal cancer (862 000 deaths), Breast cancer (627 000 deaths), Cervical cancer (275 000 deaths) etc (Akaza, 2019).

Out of all cancer deaths, about 70% occurred in low- and middle-income countries. Deaths from cancer worldwide has been projected as continue to rise to over 13.1 million in 2030 (Houts, Lenhard & Varricchio, 2019). Among these different cancer types, cancer of the cervix has become a serious burden on the reproductive health of women worldwide, despite the fact that it is preventable.

1.2 Cervical Cancer

Cervical cancer happens when cells change in a woman's cervix, which connects her uterus with her vagina. This cancer can affect the deeper tissues of her cervix and may spread to other parts of her body (metastasize), often the lungs, liver, bladder, vagina, and rectum. Most cases of cervical cancer are caused by infection with Human Papilloma Virus (HPV), which is preventable with a vaccine. Cervical cancer grows slowly, so there's usually time to find and treat it before it causes serious problems.

Cervical cancer is a type of cancer that occurs in the cells of the cervix - the lower part of the uterus that connects to the vagina. Various strains of the HPV, a sexually transmitted infection, play a role in causing most cervical cancer. When exposed to HPV, the body's immune system typically prevents the virus from doing harm. In a small percentage of people, however, the virus survives for years, contributing to the process that causes some cervical cells to become cancer cells.

The risk of developing cervical cancer can be done by having screening tests and receiving a vaccine that protects against HPV infection. The Pap test is a procedure that collects cells from the cervix so that they can be looked at closely in the lab to find cancer and pre-cancer.

1.3 Types of Cervical Cancer

According to World Health Organization (WHO, 2018), the main types of cervical cancer are:

- **Squamous cell carcinoma:** This type of cervical cancer begins in the thin, flat cells (squamous cells) lining the outer part of the cervix, which projects into the vagina. Most cervical cancers are squamous cell carcinomas.
- **Adenocarcinoma:** This type of cervical cancer begins in the column-shaped glandular cells that line the cervical canal.

Sometimes, both types of cells are involved in cervical cancer. Very rarely, cancer occurs in other cells in the cervix. Furthermore, according to WHO, the common risk factors for cervical cancer are as follows.

- **Many sexual partners:** The greater your number of sexual partners; and the greater your partner's number of sexual partners; the greater your chance of acquiring HPV.
- **Early sexual activity:** Having sex at an early age increases your risk of HPV.
- **Other sexually transmitted infections (STIs):** Having other STIs — such as chlamydia, gonorrhea, syphilis and HIV/AIDS — increases risk of HPV.
- **A weakened immune system:** More likely to develop cervical cancer if immune system is weakened by another health condition and if have HPV.
- **Smoking:** Smoking is associated with squamous cell cervical cancer.
- **Exposure to miscarriage prevention drug:** If the mother took a drug called diethylstilbestrol (DES) while pregnancy, may have an increased risk of a certain type of cervical cancer called clear cell adenocarcinoma.

1.4 Impact of Cervical Cancer

Cervical cancer is the second most common cause of cancer-related deaths among adult women globally. The cervical cancer has also become one of the most prevalent cancer & potentially fatal disease among women and consequently main cause of mortality in less developed countries. To support this, it has been reported that out of 570 000 new cases of cervical cancer, there were 311 000 deaths from cervical cancer worldwide in 2018, accounting for 7.5% of all the cancer deaths in females" (Arbyn et al., 2020).

Furthermore, at least 370,000 new cervical cancer cases are identified in each year, and 80% of these are from developing nations. One of the main reasons for sharply higher occurrence of cervical cancer in developing countries is the lack of effective screening programs aimed at detecting pre-cancerous conditions and not treating them prior they progress to cancer ("Cervical Cancer Screening in Developing Countries," 2017).

1.5 Situation of Cervical Cancer in Sri Lanka

As a developing nation, Sri Lanka is also one of the country which should give a sound attention for the cervical cancer due to the fact that cervix cancer has recorded as the second top most leading cancer type among women (Lanka, 2019). The Figure 1.1 clearly indicates that 8.8% of the cancer affected females suffer from cervical cancer, which is a considerable proportion.

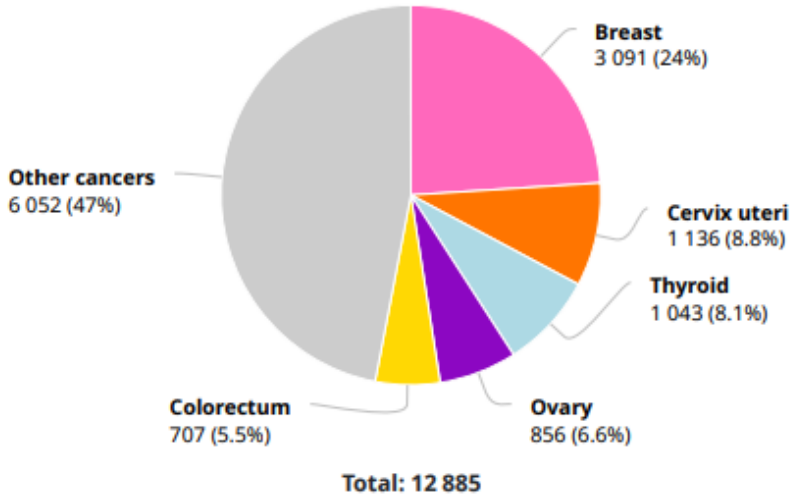

Figure 1.1: Leading cancer sites of Females, 2018

Source: Cancer Incidence Data: Sri Lanka Year 2018 (Lanka, 2019)

1.6 Annual Trend in Cervix Cancer

Cervical cancer is most frequently diagnosed in women above age 35 years with the average age at diagnosis being 50. It rarely develops in women younger than 20 years too. Many older women do not realize that the risk of developing cervical cancer is still present as they age. In comparing mortality rates in cancers, it is considered age standardized rates than crude rates.

The age-standardized mortality rate (ASR) is a weighted average of the age-specific mortality rates per 100,000 persons, where the weights are the proportions of persons in the corresponding age groups. The annual trend of ASR is shown in Fig 1.2.

Considering about the distribution of the cervical cancer, it is seen that there is a little decrement since 1985, which is not actually a satisfactory level of reduction.

$$\text{ASR} = \frac{Number\ of\ Deaths\ among\ women\ in\ one\ year}{Number\ of\ women\ in\ the\ population\ at\ mid\ yer} \times 100\ 000 \qquad (1.1)$$

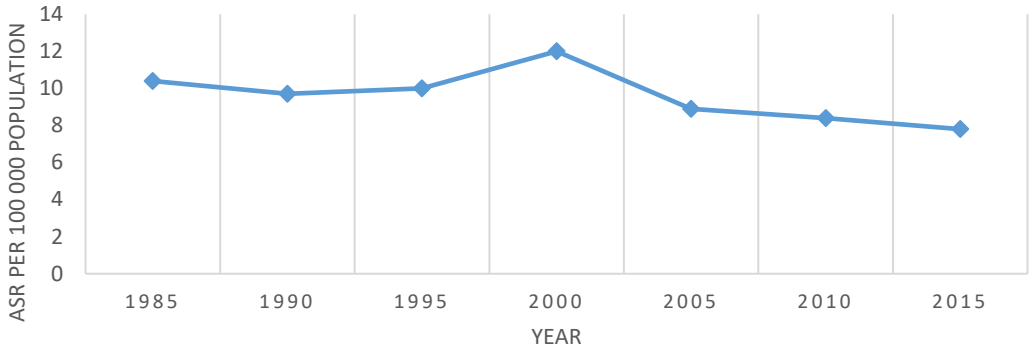

Figure 1.2: Distribution of cervix cancer, 1985 – 2015

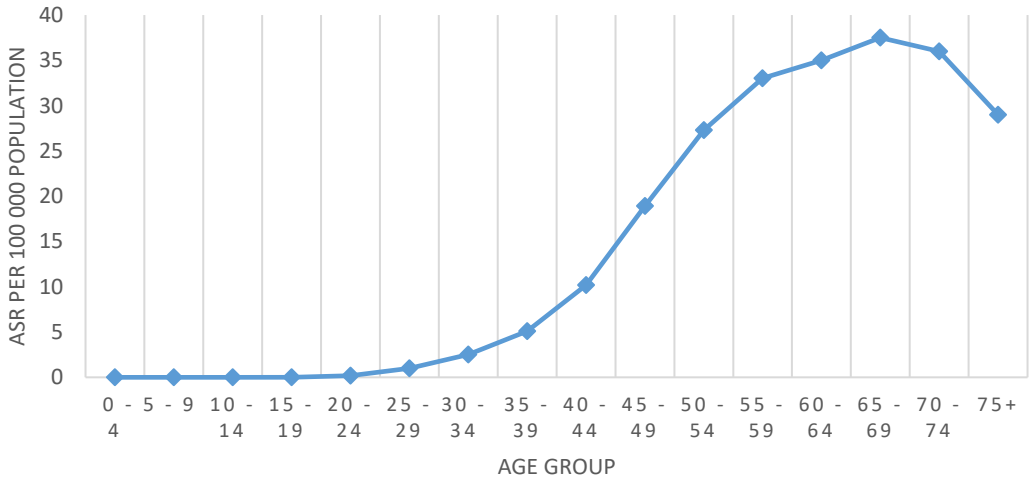

Figure 1.3: Age wise distribution of cervix cancer, 1985 – 2015

The Figure 1.3 clearly indicates that the cervical cancer is a type of a cancer for which the women in the ages above 35 are highly victimized and vulnerable of. If it is detected early and treated appropriately it can be prevented. As Figure 1.3 exhibits, ages above 35 are recorded as highly exposed and potential group for cervical cancer among females.

1.7 Screening of Cancer Persons

The method available for the detection and identifying the cancers is undergoing a screening test. Pap smear test is the currently available screening test for the early detection of cervical cancer. The chance of a woman having cervical cancer some time during her life is a little less 1 in 8. The chance of dying from cervical cancer is about 1 in 36, implying that the cervical cancer death rates have been going down. This is probably due to the early detection and thus because of the better treatment. Right now there are more than three million cervical cancer survivors in the United States ("Cancer Facts & Figures 2011," 2011).

In Sri Lanka, the pap screening test is freely catered through the "Suwanari" Clinical Services by the government hospital network. "Suwanari" Health Services were specifically started by the Family Health Bureau(FHB) with the intention of uplifting women health. Basically, the women over the age 35 are specially focused in these clinical services. This service was first commenced in 1996, covering all the MOH (Medical officer of health) areas island widely. There are 700 "Suwanari" clinics functioning countrywide covering 341 MOH areas which are known as "Well Women Clinical Services (W – WC services)" later on.

In addition, this test can be undergone at all gynecological clinics in the hospital system. Those tests are also provided by the private sector hospital too. Most of these cases lead to death due to late start of treatments causing late detection. However, if it is diagnosed early, can be prevented with appropriate treatment. For detecting the risk and vulnerability, all the women in potential risky age range must be excited to confront the pap smear test. This was the main expectation of establishing W – WC services. All the women of age 35 years and above are necessary to participate these free clinical services and get registered for these services. It is considered as the responsibility of the team of health officers those who are specially trained for these clinical services. As per the national level recommendation, 15 000 of the population should covered by one W – WC services (Rathnayake, Halyale, Tharanga, Prabodika Herath, & De Silva, 2018).

Though all the W – WC services and gynecological clinics provide the pap smear screening freely for Sri Lankan women, only less than 5% at risk are undergoing the pap screening. The Health Ministry points out that the early detection could prevent the cervical cancer and therefore should urge the women to have a pap smear at least once a 3 year (Ranasinghe, Ranasinghe, Rodrigo, Seneviratne, & Rajapakse, 2013). Atapattu (2014) highlighted that if the women properly face for the screening programmes; the cancer burden can be significantly reduced among females in Sri Lanka.

1.8 Distribution of Awareness about Pap Test in Sri Lanka

Though W-WCs normally provide their services free, it should be pointed out the percentage of women who are aware of W-WCs and Pap Test are highly varied among districts (Table 1.1).

Table 1.1: District wise distribution of women on knowledge of well-women clinical services and cervical cancer screening

District	% of women who are aware of	
	W-WC	PAP Test
Colombo	70.1	73.5
Gampaha	78.9	83.7
Kalutara	84.4	79.1
Kandy	72.4	80.5
Matale	84.5	68.3
Nuwara Eliya	55	74.7
Galle	83.8	80.6
Matara	78.2	77.8
Hambantota	83.3	79.7
Jaffna	**13.6**	**22.4**
Mannar	18	*
Vavuniya	28.3	62.7

Table 1.1: District wise distribution of women on knowledge of well-women clinical services and cervical cancer screening (Continued)

District	% of women who are aware of	
	W-WC	PAP Test
Kilinochchi	19.2	*
Batticaloa	26.9	59.9
Ampara	60.7	76.9
Trincomalee	35	57.4
Kurunegala	85.8	78.4
Puttalam	71.9	75.6
Anuradhapura	76.2	77.9
Polonnaruwa	81.3	72
Badulla	58.9	66.2
Moneragala	89.5	87.7
Ratnapura	72	78.6
Kegalle	69.6	89.4

*An asterisk indicates that the figures are unavailable

Source: Sri Lanka Demographic and Health Survey, 2016 (*SLDHS 2016 Report Final Full 10 Oct 2017.pdf*, 2017)

Furthermore, it is apparent that, proportions of women those who undergo the pap screening test is not sufficient. The annual report on family health, 2017 reported that only 34% of the Sri Lankan women in vulnerable ages (Above 35) screened yet, even after several years of introduction which is not a sufficient proportion (Figure 1.4). However, the percentage of PAP test used, has been increased over the years, irrespective of age of women and district.

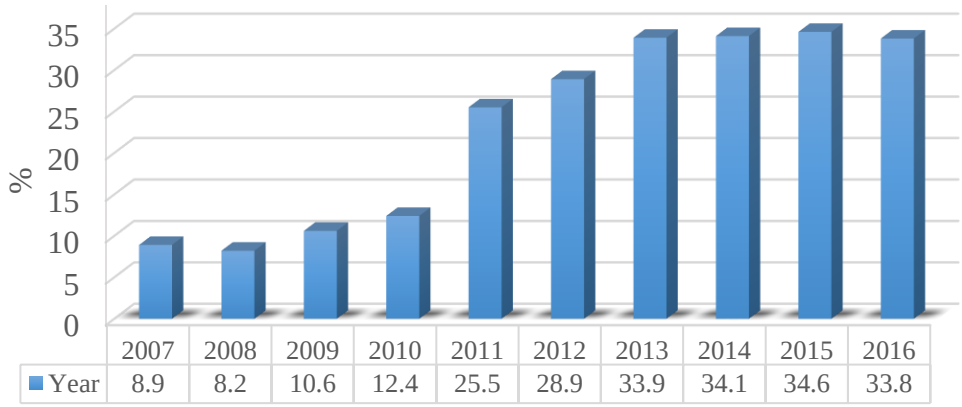

Figure 1.4: Percentage of 35-year age cohort screened with pap, 2007 – 2016

Source: Annual Report of the Family Health Bureau, 2017

1.9 Research Problem

As discussed above, cervical cancer is one of the leading causes of deaths among females due to cancers. This disease become fatal if they are not prevented by prior detection & had early treatments. With the intention of prevention, Sri Lankan FHB introduced and established W – WC services since 1996 scattered over a network of 341 MOH areas. Majorly the women above the 35 are specifically focused by these clinical services and every woman above age 35 can be diagnosed through these clinical services freely. This situation is very serious in the Northern Province and in particularly in Jaffna.

Thus, the problem will arise to evaluate the level of knowledge and practices on cervix cancer and screening techniques and the influential factors effect on women to uptake the pap test.

1. 10 Research Objectives

On the view of the above explanation, the objectives of this study are,

- To analyze the level of knowledge on cervix cancer
- To analyze the level of knowledge and practices related to cervical cancer screening
- To identify the factors affecting women to uptake the pap test

1.11 Significance of the Study

The significance of carrying out this study among female in Jaffna is to reveal the level of knowledge among females there due to the fact that Jaffna recorded as the district (Table 1.1 above) in which the least proportions of women are aware of W-WCs and tested for the pap smear. Further this study can be used as a baseline guide to identify gaps and improve their knowledge and practices on cervical cancer screening and make them to perform a better role in communicating these preventive health behaviors to their younger female generation. This is due to the fact that females just passed adolescence will be the future leaders of the society and will be the future mothers in the community.

1.12 Outline of Dissertation

This dissertation is organized into five chapters**.** Chapter 1 provides an introduction to the knowledge and practices on cervical cancer screening methods. The research problem, objectives etc are also discussed. Chapter 2 contains review of literature. In Chapter 3, the methodology used for conducting the study is discussed along with the research model and hypotheses framed for the study. The results of the survey conducted as a part of the research study is presented and analyzed descriptively in chapter 4. The chapter 5 characterized of formulation of statistical models. Finally, chapter 6 contains the discussion of the findings, conclusions of the study and recommendations.

CHAPTER 2

LITERATURE REVIEW

This Chapter discusses past work carried out by researchers in Sri Lanka and other countries related to the factors associated for up taking cancer screening, which include socio-demographic and structural factors influencing cervical cancer screening, benefits of screening and barriers to be screened for cervical cancer. The review also includes literature on awareness, knowledge, attitudes, practices and cultural beliefs influential of being screened by cancer screening services.

2.1 Cervical Cancer

Cervical cancer develops in the lining of the cervix, the lower part of the womb that enters the vagina. This condition usually develops over a time. Normal cervical cells may gradually undergo changes, to become pre- cancerous and cancerous (Garrey, 2014). Worldwide, cervical cancer accounts for approximately 12% of all cancers in women.

The Pap test, also called a Pap smear is the primary screening tool for the detection of cervical cancer and it is a simple, effective and non-dangerous method. It tests for the presence of precancerous or cancerous cells in the cervix. The Pap test is primarily a preventative rather than a diagnostic tool since it is designed not only to detect cancer but more importantly to detect non- infectious abnormalities that could develop into cancer (Bakheit & Haroon, 2004). Though recently, two tests have been found in addition to the Pap test as the Pap - Net and the Thin-Prep, the Pap smear test is probably the most widely used cervical cancer screening test yet (Karnaki, 2019).

2.2 Importance of Early Detection and Prevention of Cervical Cancer

Prevention is better than cure. Due to the fact that the cervical cancer is the most common cause of cancer related death in developing countries, undergoing prevention methods is crucially needed to prevent morbidity and mortality (Aggarwal, 2017). The World Health Organization (WHO) (2019) also has identified screening coverage as being crucial for providing effective early detection of the cervical cancer. Thus, this section presents empirical evidentially how the early diagnosis is practically being important in reducing the prevalence of high morbidity and mortality due to cervical cancer.

There has been a dramatic decrease in the incidence and mortality rate from cervical cancer in developed countries in the past five decades due to the use of Pap smear test for early detection and treatment of cervical cancer (Reis et al., 2012). In Sweden cervical cancer screening programs and inclusion of the Pap smear test for early detection of precancerous cells have proven to significantly reduce the incidence of cervical cancer since its implementations in the 1960s (Olsson et al., 2014). Black (2019) found a 70% reduction in cervical cancer incidence over the past fifty years among most of the female population due to free and affordable cervical cancer screening programs in British Columbia.

According to the American College of Obstetrics and Gynecology (ACOG) (2019), the incidence of mortality from invasive cervical cancer has dropped to more than 50% for the past thirty years in the USA. It is also observed that survival rate is close to 95% respectively with 5years post diagnosis (Nguyen et al., 2019).

2.3 Causes of Cervical Cancer

The causes of cervical cancer are largely speculative as for many other forms of cancers. Behavioral causes are probably the most important determining factors in the causation of this disease as evident from different patterns of cervical cancer mortality across the world (Figure 2.1). The suspected causes mentioned in unison in this section in order to develop an understanding of the disease.

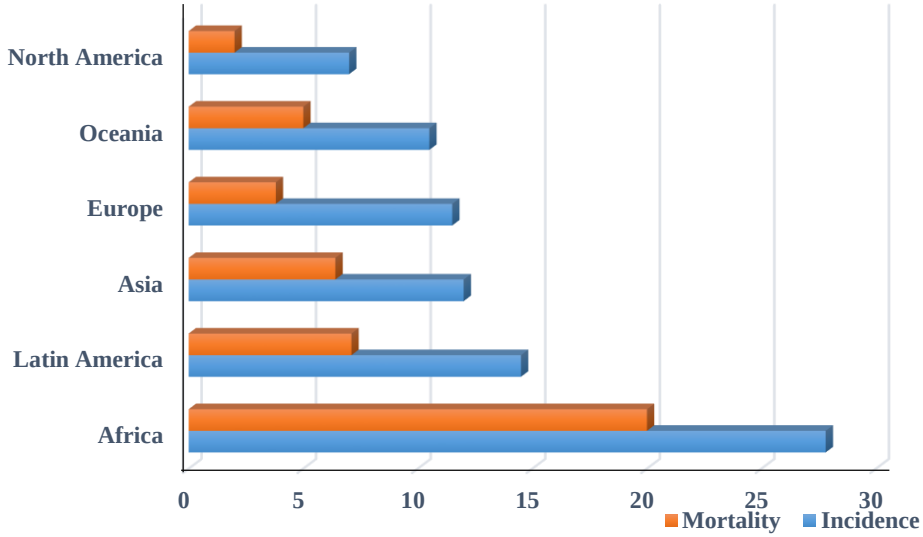

Figure 2.1: Age-standardized incidence and mortality rates for cervical cancer in different world regions

Source: (Chopra et al., 2019)

Sexual Behavior

The number of a woman's sexual partners plays a significant role in the etiology of cervical cancer (Mera, 1997; WHO, 2019; Ghim et al., 2002). The risk for cervical cancer is higher(OR = 3) in women who report 10 or more partners than those who report fewer partners (Brinton, 1992; WHO, 2019; Slattery et al., 1990; McKie, 1995). Increased susceptibility to cervical cancer has also been observed among those women who begin sexual activity before the age of 15. They have about twice the risk (OR = 2) compared to women who become sexually active after 15 (WHO, 1986; Brinton, 1992).

Preoccupation with sexual aspects of cervical cancer may lead to its stigmatization of a disease for promiscuous women. Researchers have expressed the concern that this will result in reduced participation in screening (Braun & Gavey, 1998). This concern has been confirmed as some studies have shown that lack of promiscuity is given as a reason for not attending regular Pap tests (Reis et al., 2012).

Male Sexual Behavior

Wives of men who have had many sexual partners are found to have higher levels of cervical cancer. This indicates that sexual practices of husbands or male partners are also important for women (Brinton, 1992; WHO, 1986). Studies that compared the sexual and behavioral preferences of husbands of women diagnosed with cervical cancer showed that these men had more sexual partners than controls, and had more sexually transmitted diseases (Castellsague et al., 2003; Buckley, Harris et al., 1981; Zunzunegu et al., 1986; Munoz et al., 1996). More recently a study in Denmark showed that the most significant risk factors for cervical cancer were a history of genital warts and non-use of condoms in the male partner of the women (Kjaer et al., 1997). Lower rates of cervical cancer are reported among women whose husbands used condoms (Brinton, 1992).

Contraceptive Methods

Women who used oral contraceptive methods for more than four years have been found to have an elevated risk of developing cervical cancer as opposed to women who used barrier methods of contraception (WHO, 1986; Brinton, 1992; Kjaer, 1997). These differences are attributed to different exposures of the cervix to seminal fluids, sperm and viruses such as the genital warts virus, and genital herpes (Reller et al., 2001; Mera, 1997; Brinton, 1992).

Cigarette Smoking

Cigarette smoking is suspected as an independent cause of cervical cancer (Mera, 1997; Brinton, 1992; Winkelstein, 1990; Kjaer, 1998). Long-term or frequent users of tobacco have been reported to have a two-fold risk of cervical cancer (Brinton, 1992).

Dietary Factors

Dietary practices may contribute to cervical cancer development, although studies have failed to show a clear relationship between the two (Brinton, 1992). Risk factors identified are consumption of fat, protein and alcohol. Diets poor in vegetables and fiber seem also connected to an elevated risk of developing cervical cancer (Brannon & Feist, 1992). Recently, studies showed that reduced risk for cervical cancer was

associated with high intake of vitamins A, C and E, as well as beta-carotene (Slattery, et al., 1990; Dine, 2017; Brinton, 1992).

Viral Infection

The most probable cause for cervical cancer according to epidemiological studies is some sexually transmitted agent that can be passed on from male to female or vice versa (Engelhart et al., 1970; Mera, 1997; Brinton, 1992; Brannon & Feist, 2010). The suspected agents include chlamydia, spermatozoa, herpes simplex virus, bacterial vaginosis, syphilis, and gonorrhea (Brinton, 1992; Engelhart et al., 1970). The virus that is most suspected to cause cervical cancer is the HPV. Munoz and Bosch (1992) reviewed the literature on the topic and concluded that there is "compelling evidence" suggesting a causal relationship between HPV infection and cervical cancer. other researchers have pointed out that not all types of the HPV initiate cancer. Some are of lower risk and produce only abnormal changes while others can produce malignancy (Mera, 1997). A recent study in Denmark showed that infection with the HPV in adolescence is associated with increased risk of cervical cancer compared with such an infection later in life (Kjaer, 1998). Epidemiologists agree that the HPV alone cannot account for initiating cervical cancer, other risk factors may operate independently of the suspected virus (Brinton, 1992; Mera, 1997).

2.4 Influence of Knowledge and Awareness

A study conducted by Hislop et al. (2004) to assess the knowledge of Pap smear and risk factors for cervical cancer among 512 Chinese immigrant women in Canada revealed that, the average summary score of knowledge about risk factors was 52% and knowledge level was significantly associated with the women’s educational level and the gender of the doctor providing routine care. Among them 74% received a pap test and 56% reported having received it within last two years. Women with the highest knowledge were more likely to have received Pap test. The average knowledge level was low about risk factors of cervical cancer. A descriptive statistical analysis and bonferroni correction was used to adjust for the multiple comparisons in assessing between-group differences.

A descriptive and chi square analysis were carried out to determine the belief about risk factors of cervical cancer among 1940 women in London through a face-to-face interview, found that knowledge has been poor, although there was evidence of public awareness of a link between sexual activity and the risk of cervical cancer. The most common single response was 'don't know' (88%), 41% mentioned factors relating to sex, but only 14% were aware of a link with sexual transmission, 1% named HPV. Women who were more educated had significantly better knowledge of the established risk factors (Waller et al., 2004). Another study conducted to assess the level and accuracy of public understanding of HPV in the United Kingdom, showed that, out of a sample of 1032 women, only 30% had heard of HPV. Even among those who had heard of HPV, knowledge was generally poor and less than 50% were aware of the link with cervical cancer. There was also confusion about whether condom or oral contraceptives could protect against HPV infection. (Waller et al., 2003).

A study conducted in Australia to get to know about the knowledge of women on cervical cancer and risk factors reported that the knowledge of early detection of cervical cancer and screening methods were good. Out of a sample of 400, more than ¾ of the women were not well known of the risk factors for cervical cancer implying that awareness and knowledge were very limited. The experience on pap smear test was significantly associated with good knowledge of cervical screening, but not with knowledge of HPV. ANOVA and T tests were used as data analysis techniques (Pitts & Clarke, 2002).

Marteau (2002) conducted a cross-sectional descriptive study on 722 women to compare smokers' & nonsmokers' perceptions of risk factors of cervical cancer and attitudes towards cervical screening. Results of the logistics regression analysis showed that, smokers perceived their relative risk of heart disease to be greater than that of non-smokers but they did not perceive their risks of cervical cancer to be greater. Smokers held fewer positive attitudes towards cervical screening than non-smokers.

A study, which was done Kerala in India, to determine the risk factors of cervical cancer among 3450 cervical cancer women revealed that the mean age of the women

who has infected was 39.5 and 68% of women were under the age of 50. The significant risk factors found based on logistics regression were increasing age, increasing parity, illiteracy and poor sexual hygiene (Varghese et al., 1999).

Hoque (2010) conducted a study to find out the level of awareness about the cervical cancer screening among 215 South African university students. The study has undergone descriptive summary measures, Chi-square tests and a binary logistic regression to find the significant predictor for doing Pap smear test. The study found that only 33% of the participants heard of screening for cancer of cervix and 33% knew that screening for cancer of cervix can prevent it.

A community based study done among 633 women using multi stage sampling in Ethiopia revealed that only 47% of its participants had no knowledge of risk factors of cancer of cervix, 40% knew nothing about the symptoms, 36% didn't have any ideas about preventive measures, 34% did not know of treatment options and 64% knew it can be prevented (Getahun et al., 2013).

In a study conducted among 254 cervix cancer patients in Nigeria, 82% of the patients knew nothing about such a cancer of cervix before. Correspondingly 20%, 30% and 10% held the belief that it was as result of menstrual recurrence, lower abdominal and due to the irregular menses. A majority of the women (98%) held the view that the illness was treatable, 12% did not view it as anything of concern and a paltry (9%) knew it was cancer and hence a terrible disease. Descriptive statistics, chi squared and t-tests, Kruskal Wallis, Mann-Whitney and Spearman correlation were used where applicable in this study (Ajayi & Adewole, 1998). Comparably similar findings reported from Tanzania and Kenya showing the knowledge about the illness among patients to be very low (Gichangi et al.,2003 & Kidanto et al., 2002).

2.5 Influence of Attitude and Practices

In a study done in rural India showed that 85% of the interviewed were willing to take the check up for cancer of cervix as they felt it would benefit them in the long run and 63% were willing to be screened. Those who have heard regarding cancer of cervix and screening have good attitude regarding cervical screening than those who have not heard about it (Bansal et al.,2015).

A study conducted by McFarland (2003) in Botswana to study about knowledge and perceptions on cervical cancer and Pap smear screening revealed the existence of both negative and positive kind of beliefs among rural areas such as, for negative “cervical cancer screening is only for commercial sex workers" and for positive beliefs like “pap smear decrease early death”. Data were collected using a demographic questionnaire and semi-structured interview guide. Data analysis included descriptive statistics for demographic data and content analysis for interview data. Good attitude was strongly linked with increase in chances of undertaking screening services and accordingly there was five times chance of increase. Another study in Tanzania suggested that 79% of study participants were agreed that cervical cancer screening can prevent cervical cancer and also on similar study in Kenya 87% of respondents agreed (Gichangi et al., 2003).

Mutyaba, Mmiro & Weiderpass(2006) found that a very few proportions of female are undertaking screening for cancer of cervix in Africa. The study conducted among 310 women using a self-administered questionnaire from a rural to find out the facts for not screening done. Descriptive statistical analysis and chi square tests revealed feeling healthy, absence of symptoms, negligence, intrusive examination, lack of interest, unpleasant procedure and feeling young for the test have led for not undertaking the screening. 25% of the sample was uncomfortable of taking test from a male service provider. In another comparable research in a Hospital in Tanzania regarding screening practice experience on the cervix cancer found as the reasons levelled for not taking Pap test among them was not being aware of places that offer the test (55% of the respondents), poor attitude for exam (13%), fearing of procedure (10%) and scared of positive result (7%) (Urasa & Darj, 2011).

A logistic regression analysis carried out based on the data gathered from face to face interview method in UK to explore beliefs about the risk factors for cervical cancer among 1940 women found that more educated people had better knowledge on the established risk factors. The patterning of risk factor awareness varied across age. The most common single response was 'don't know' of the cervix cancer risk factors (38%); 41% of respondents mentioned factors relating to sex; but only 14% were aware of a link with sexual transmission and fewer than 1% named HPV (Waller et al., 2004).

Byrd et al. (2004) examining beliefs, attitudes, and personal characteristics that correlated with self-reported cervical cancer screening among Mexican women found that 69% had a Pap test and 56% had a test in the last year. 80% of women were sexually active and of these, 63% were using birth control measures. Respondents understood the seriousness of cervical cancer; their susceptibility to cervical cancer and the benefits of Pap testing, however, only 61% agreed that youngest women whom they know have pap tests. The perception that the test would be painful and not knowing where to go for the test were negatively associated with ever having a pap test.

A cross sectional survey investigated the health behaviors, knowledge, beliefs and attitudes about cervical screening and cancer among 98 (selected using snowball sampling) Hong Kong Filipino domestic workers revealed that the majority of women had previously heard about cervical smear (78%) and 53% reported never having taken cervical smear. The women who had a prior cervical smear had significantly more knowledge about cervical smear and cervical cancer than those who never had a cervical smear (Holroyd et al., 2003).

A factor analysis undergone along with correlation analysis and Cronbach coefficient of consistency to measure 490 young women's attitude about communication with providers regarding pap smear reported that knowledge of the pap smear and HPV, intention to return for follow up pap smears, positive attitudes about pap follow up were significantly associated with good communication (Kahn et al., 1999).

A random digit dial telephone survey has done among 2239 women in Texas to examine knowledge, attitude and screening behavior about breast and cervical cancer. The logistic regression models found that knowledge was significantly related to age, education, income, language, preference and recent screening history (Ramirez et al., 2000).

The knowledge, behavior and beliefs of cervical cancer screening were assessed by face to face interviews among 96 adult women in New Orleans. Three fourth (75%) of the women interviewed could not correctly explain what a pap test is used for and few were aware that it is one of the most commonly occurring cancer in females. Most of them believed that their risk of cervical cancer was low, less than 50% reported ever having had a pap test and cited not having a gynecologist. Logistic regression analyses were performed and found that cost and fear of the test as significant reasons for not ever having had the test done (Ma et al., 2012).

Neilson & Jones (1998) done a study to assess the knowledge of women (187) regarding cervical cancer and cervical screening in Scotland using a mix of qualitative and quantitative data. Results showed that, there was a lack of knowledge with regard to both the screening itself and the possible causes of cervical cancer. The majority of women showed preference for a female professional to take the smear. The main reasons cited for non-compliance were the fear and dislike of the test itself.

2.6 Influence of Socioeconomic & Demographic Factors

A case control (34 cases and 23 controls) study conducted in Uganda to reveal the factors influential for the cervical cancer found that cancer of cervix is significantly high among women in the middle and old age categories. Among the women that were single (OR=2.1; 95% confidence interval, CI=1.1–3.9) and uneducated women (OR=1.7; 95% CI=1.1–2.5) indicated high positivity with cancer of cervix (Schmauz et al, 1989).

Globally there is high chances of getting cancer of cervix among women that are socioeconomically disadvantaged (Brinton, 1992). A study done in Mexico based on

National Data Base of Health using correlation and multivariate analysis revealed that cancer of cervix has a significant association to the number of child birth, wanting social conditions as well as poor standards of hygiene (Palacio-Mejía et al., 2003).

A study performed among women from different socioeconomic circumstances to assess the knowledge of cervical cancer screening and utilization of screening facilities in Urban, South Africa found that majority of patients from lower socio-economic circumstances with multiple risk factors were not aware of cervical screening or facilities available for this purpose. However, in spite of knowledge of cervical screening and availability of such services, the majority of women (87%) from higher social and educational background did not undergo cervical screening. Among women from higher socio-economic groups, the level of knowledge about the pap test was better but the knowledge of the Pap test was not aged dependent **(**Wellensiek et al., 2002).

Twin et al. (2002) performed a study among 923 Hong Kong Chinese women to identify factors related to knowledge, behaviors and fear of cervical & breast cancer and revealed that the knowledge and attitudes about cancer varied with age, education, type of health insurance, English speaking ability and place of birth. The study based on a two-phase design of quantitative and qualitative data found that language barriers found to be a significant barrier of awareness about the screening tests.

Kangmennaang et al.(2015) in a study on investigating the disparities in cervical cancer screening among Namibian women revealed that insured women (OR=1.89) and women who had access to health information through education and contact with a health worker (OR=1.41) were more likely to undertake screening comparing to uninsured women and those without contact with health personnel. The authors concluded that for a large-scale increase in cervical cancer screening in Namibia a universal health insurance scheme that ensures equity and empower women to demand health services should be adopted.

Cervical cancer has been observed to be high among women who have married early (Brinton, 1992). Perceived barriers to cervical cancer screening has been attributed to

many factors such as: lack of knowledge about cervical cancer, language skills, cultural beliefs and attitudes, lack of access to health services, characteristics of health professionals, fear, cost, personal reasons and lack of female health professionals (De Abreu et al., 2013; Garcés-Palacio & Scarinci, 2012; Gauss et al., 2013; Olsson et al., 2014).

2.7 Studies in Sri Lanka

A cross-sectional survey was conducted among 219 female health care workers including public health midwives (68.9%) based on a self-administered questionnaire selected from 6 districts in Sri Lanka using convenient sampling method. Most (76.7%) were married, and a family history of cancer was reported by 24.2%. Only 76.3% knew that a Pap smear detects precancerous stage of cervical cancer. Among 169 married workers, 73.4% never had a Pap smear and only 17.2% had got it done within the preceding 5 years. Among the reasons for not doing a pap smear within 5 years, 47% believed it as not necessary, 17.3% due to fear/dislike, 23.2% as not having symptoms, 3% had not known about it and 3% not known about availability of services. The study findings suggest that the knowledge and practices on cervical cancer screening among female health care workers need to be improved. The study recommends considering the role that health care workers play in communicating health behaviors to the general public, strengthening health education interventions for this group of females is essential (Nilaweera et al., 2012)

Warnasekara et al. (2018) assessed the use of WWC screening services for cervical and breast cancer prevention in a sample of females attending a larger religious festival in Sri Lanka. Of the 3,116 women studied, although 1,895 (60.8%) were aware of the WWC services, only 578 (18.5%) had ever used it. Awareness of cervical cancer was 2,609 (83.7%). Of the 217 professionals or associate professionals in the study sample, 190 (87.6%) were aware of the WWCs compared to only 58.8% among the 2,899 women falling under the categories of other occupations and housewives. Clinic attendance was also significantly higher amongst professionals and associate professionals compared to women in other occupational categories and housewives (40.1% versus 16.9%). The study finally recommended that new strategies are needed

to improve awareness and participation in this program in order to address the low use of WWC services.

2.8 Summary of Chapter 02

Most studies have found that there is a positive relationship between risk perception and cervix screening behavior. Cervical cancer can affect women emotionally, socially and physically. Not sufficient studies were reported to understand the barriers that influence women's decision whether or not to seek and utilize screening. Some studies have also found that the knowledge of cervix cancer and screening methods are influenced by education and employment of the women. Women's awareness and perception of cancer screening significantly influence their ability to seek and receive screening. This review acquired many information on the increased mortality rate relating to cervical cancer among women due to lacking of screening. However, not much studies have been carried out in Sri Lanka, and in particularly for women in Jaffna district.

CHAPTER 3

MATERIALS AND METHODS

This chapter presents the methods and procedures used to attain the objectives of this study. It comprises of the study design, target population, sample size & sampling procedure, measurement of variables, data collection methods & procedures and data analysis techniques.

3.1 Study Design

As this study performs to evaluate the level of awareness on cervical cancer screening and the factors affects the women to confront the screening test; the women in ages above 35 (due to the facts that women over the age 35 are specially focused by the W – WC services and are considered as the highly risky age groups) have considered for this study. This study carried out among female in Jaffna district due to the fact that Jaffna recorded as the district (Table 1.1 above) in which the least proportions of women are aware of W-WCs and tested for the pap. A questionnaire based cross sectional survey was performed among 225 women selected based on a random sampling technique from Jaffna Divisional Secretariat who met the study's inclusion criteria.

3.2 Population and Sample Size

The population in this study is the women of the age above 35 years who are living in Jaffna district. The sample size was determined using the equation (3.1) (Charan & Biswas, 2013).

$$n = \frac{\lambda^2_{\alpha/2}\, p\,(1-p)}{\delta^2} \quad (3.1)$$

Where,

$\lambda_{\alpha/2}$= critical value at a given level of confidence

δ = margin of error at alpha level

p = expected proportion

As the proportion is not known, we can take p = 0.5, the maximum value. It was assumed that the margin of error is 0.05, at 95% confidence interval. Then the minimum sample size is 385. However, considering the resources and time, it was decided to take a sample of size 225.

3.3 Sampling Procedure

The ratio of three communities in Jaffna is as follows. Tamil: Sinhalese: Muslims = 99.00:0.06:0.04. When the sample size of 225 was allocated among three races, according to proportional basis it would be Tamil: Sinhalese: Muslim = 224:1.3: 0.7. Therefore, it was decided not to consider both Sinhalese and Muslim women due to obvious reasons, and all 225 was randomly selected among Tamil women. Accordingly, the sampling unit is a woman in Jaffna having age greater than 35 years.

Thus, the sampling procedure adopted was simple random sampling.

3.4 Data Collection

For this study, the required primary data were collected through the use of an interviewer administered structured questionnaire. This was administered individually to ensure confidentiality. The questionnaire was developed from questionnaires that had been used in similar previous studies.

The questionnaire was pre tested from five persons and their feedback and input were used to develop the final questionnaire. Finally, the questionnaire was structured according to the objectives of the study seeking to obtain information on four main

areas namely, (i) Socio-Demographic factors, (ii) Knowledge related factors (iii) Factors related to knowledge on Cervical Cancer Screening & (iv) Factors related to Attitude and Practice on Cervical Cancer Screening. A copy of the questionnaire is given in Appendix 1.

The following criteria is used to assess the knowledge and attitude based on the questions.

Assessment of Knowledge

The knowledge of cervical cancer was assessed using the set of questions in "Section B and C". They were multiple choice questions carried a total of 18 correct responses. Each correct response was given a score of 1 and a wrong response a score of 0. Based on the scores, knowledge has categorized in to 3 levels as follows.

i.	13 – 18	Good knowledge
ii.	6 – 12	Satisfactory knowledge
iii.	0 – 5	Poor knowledge

Assessment of Practice

The practice was assessed by looking on the respondent's action towards screening in the past years. Those who ever screened within the past three years were regarded as having regular practice, those who ever screened but more than three years ago from the time of data collection were regarded as having irregular practice and those who never screened were regarded as having no practice on screening. Thus, the variable is constructed as a categorical variable of 3 categories.

i. Regular Practice
ii. Irregular Practice
iii. No Practice

3.5 Conceptual Frame Work

The conceptual frame work of this study is illustrated in Fig. 3.1. This section discusses about the variables used in the analysis. The dependent variable of the study is, uptake of screening which has assessed as a binary outcome (0 – Ever gone for screening and 1 – Never gone for screening). The independent variables were grouped into four categories such as knowledge related factors, socio demographic factors, facility related factors and other. An overview of the independent variables used in the analysis is presented in Figure 3.1 below.

Due to the fact that the drivers of screening uptake were evaluated as a binary outcome, the relationship between multiple explanatory variables and dichotomous dependent variable and probability estimates of the occurrence of an event (screening uptake) has examined by fitting binary logistics models.

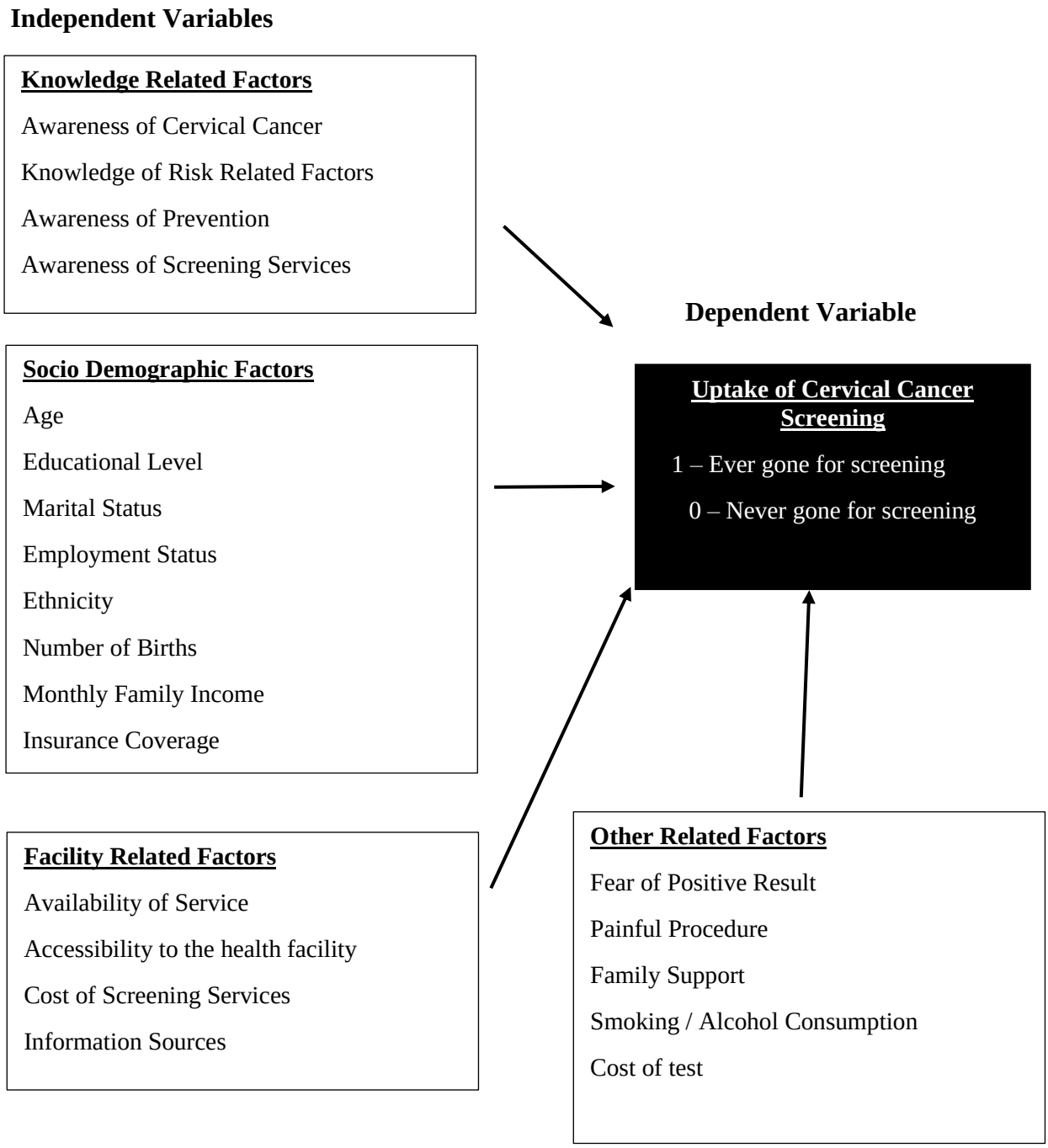

Figure 3.1: Conceptual Framework of the study

3.6 Statistical Analysis

Descriptive statistics, data presentation methods, chi square tests and an independent samples T test were used to achieve the first two objectives of the study. Descriptive statistical techniques were used to describe, display, and summarize data in meaningful way by identifying the distribution and central tendency of the data. Binary logistics regression analysis was used to identify the factors affecting women to uptake the pap test.

3.6.1 Independent Samples T Test

The independent t-test is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups (Gerald, 2018).

H_0: The population means from the two unrelated groups are equal

H_1: The population means from the two unrelated groups are unequal

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \qquad (3.2)$$

Where,

$\overline{x_1}$ = Mean of first sample

$\overline{x_2}$ = Mean of second sample

n_1 = Sample size of first sample

n_2 = Sample size of second sample

s_1 = Standard deviation of first sample

s_2 = Standard deviation of second sample

3.6.2 Chi Square Test Statistic

Chi-square statistics (χ^2) is best method to test the association between two categorical variables. In otherworld to test is the independence between two categorical variables. This test is also known as test of goodness of fit and test of independence (Ugoni & Walker, 1995). The two hypotheses are:

H_o : No Association exists between the attributes

H_1 : An Association exists between the attributes

The test statistic is:

$$x^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{\left(O_{ij} - E_{ij}\right)^2}{E_{ij}} \qquad (3.3)$$

Where,

O_{ij} – Observed value of ijth event

Ei_i – Expected value of ijth event

3.6.3 Binary Logistic Regression Model

The binary logistic regression analysis is used in this study to predict the relative likelihood of up taking pap test against the non - up taking pap test in order to determine the risk factors associated with up taking of cervical cancer screening test.

The goal of using the binary logistic regression in this study is to describe the association between uptake of pap test (uptake or not) and explanatory variables which describe the characteristics of up taking pap test by identifying the best fitted model. Mohammed (2013) claimed that, parameters obtained from each explanatory variables in the model is used to estimate the odds ratio. The dependent variable (y) denotes its binary categories as 1 and 0. Thus this study code y = 0 (Ever Screened) and y = 1 (Never Screened).

The specific form of the binary logistic regression model is defining as:

$$logit\ (p) = ln\left(\frac{p}{1-p}\right) = \beta_0 + \sum_{i=1}^{n} \beta_i x_i \tag{3.4}$$

Thus;

$$p = \frac{e^{\beta_0 + \sum_{i=1}^{n} \beta_i x_i}}{1 + e^{\sum_{i=1}^{n} \beta_i x_i}} \tag{3.5}$$

The logit transformation of the odds dependent variable is 1; from 3.5,

Where,

β_0 - Model constant

β_i - Parameter estimates for independent variables

x_i - Independent variables ($i = 1,2, \ldots \ldots n$)

p - Probability ranges from 0 to 1

$ln\left(\frac{p}{1-p}\right)$: The natural logarithm ranges $-\infty$ to + ∞

When there is only one independent variable, the probability p=p(y) can be obtained from (3.6).

$$\text{p(y)} = \frac{1}{1 + e^{-(b_0 + b_1 X_{1i})}} \tag{3.6}$$

where, b_0 - Coefficient of the constant and b_1 - Coefficient for the respective variable

3.6.3.1 Log - Likelihood Statistic

The log-likelihood statistic is calculated by,

$$Log - Likelihood = \sum_{i=1}^{N} [Y_i \ln(P(Y_i)) + (1 - Y_i) \ln(1 - P(Y_i))] \tag{3.7}$$

This statistic indicates the unexplained information remain in the model after the model has been fitted. The large value of the log-likelihood statistic indicates the poor fitting and more unexplained observations (Agresti, 2009).

3.6.3.2 Cox & Snell Pseudo R^2 and Nagelkerke Pseudo R^2

Both Cox & Snell R^2 and Nagelkerke R^2 indicate that the percentage of variance of dependent variable explained by the model.

$$\text{Cox \& Snell Pseudo } R^2 = 1 - \left[\frac{-2LL_{null}}{-2LL_k}\right]^{\frac{2}{n}} \qquad \text{(Agresti, 2009) (3.8)}$$

Nagelkerke R^2 is used to revise if the Cox & Snell R^2 value reached 1.

$$\text{Nagelkerke Pseudo } R^2 = \frac{1-\left[\frac{-2LL_{null}}{-2LL_k}\right]^{\frac{2}{n}}}{1-(-2LL_{null})^{\frac{2}{n}}} \qquad \text{(Agresti, 2009) (3.9)}$$

3.6.3.3 Hosmer Lemeshow Test

This statistic is used to check the goodness of fit of the logistic model. It measures whether the observed data match with the expected data which are computed under hypothetical model. This is also a lack of fit statistics and the equation is given by,

$$H = \sum_{g=1}^{n} \frac{(O_g - E_g)^2}{N_g \pi_g (1-\pi_g)} \qquad \text{(Agresti, 2009)(3.10)}$$

3.6.3.4 Wald Statistic

This statistic also called as Wald Chi-square test which used to determine the explanatory variables of the model are significant.

It follows a standard normal distribution with the null hypothesis that $\beta_1 = 0$. The formula is given by,

$$W = \frac{\hat{\beta}_1}{SE\ (\hat{\beta}_1)}$$ (Agresti, 2009) (3.11)

Where,

$\hat{\beta}_1$- Estimated value of the parameter

$SE\ (\hat{\beta}_1)$ - Standard error of estimated parameter

3.6.3.5 Odds Ratio (OR)

The OR or Exp (B) is an indicator of, when the change in odds resulting from one unit of predictor variable change.

The equation of the odds ratio can be written as,

$$Odds = \frac{P(event)}{P(no\ event)} \quad (3.12)$$

Calculate first set of odds using equation 3.6.

$$P(event\ Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_1)}} \quad (3.13)$$

$$P(no\ event\ Y) = 1 - P(event\ Y)$$

When the predictor variable/variables has changes by 1 unit, the value of X = 1. To calculate the proportion of change in odds define as,

$$\Delta odds = \frac{odds\ after\ a\ unit\ change\ in\ the\ predictor}{original\ odds} \quad (3.14)$$

$\Delta odds$ is define as OR or Exp(B), and can use to interpret the change in odds. If this odds ratio value is greater than 1, then it indicates as the predictor increase. OR value is less than 1, indicates as the predictor decreases (Agresti, 2009).

CHAPTER 4

EXPLORATORY DATA ANALYSIS

This chapter focuses on exploratory data analysis of the data which was gathered through the questionnaire. The data pertaining to the own knowledge, attitudes and practices of the respondents concerning the cervical cancer and screening are presented according to the questionnaire findings. Frequency tables and other types of descriptive figures such as bar and pie charts were developed for the different variables.

4.1 Distribution of Social and Demographic Characteristics of the Respondents

This section presents the results on the background distinctiveness of the respondents. These comprise age of the respondents, education level, employment status, marital status, total monthly income and the number of deliveries made. The results on the background characteristics are as presented in Table 4.1.

Table 4.1: Socio Demographic Characteristics

Characteristic		Percentage (%)
Age	35 – 44 years	42.7
	45 – 59 years	29.8
	≥ 60 years	27.6
Religion	Hindu	38.2
	Catholic	61.8
Level of Education	Primary of Less	42.2
	Secondary	46.7
	Tertiary	11.1
Employment Status	Employed/Self Employed	27.6
	Peasant/Minor Worker	25.8
	Unemployed	40.4
	Retired	6.2
Marital Status	Single	4.9
	Ever Married	95.1
Total Monthly Family Income	< 25 000 Rs	23.1
	25 000 – 50 000 Rs	56.9
	≥ 50 000 Rs	20
Number of Deliveries	None	5.3
	1 – 3	75.1
	4 & above children	19.6

4.1.1 Age category

The results in Table 4.1 indicates that majority (42.7%) of the respondents were between 35 - 44 years of age category. 27.6% of the respondents were aged above 60 years representing the eldest age group among the respondents.

4.1.2 Religion

With regards to the respondents' distinctiveness on religion, almost 60% of the respondents were Catholics and only 40% were Hindus.

4.1.3 Level of Education

The percentage of respondents having educational level primary or below is 42.2% while the percentage of respondents having tertiary education (11.1 %) is significantly lower than the other both categories.

4.1.4 Employment Status

Of the respondents', 27.6% were employed whereas 6.2% were employed and currently retired. 40.4% were unemployed, 25.8 % were minor workers.

4.1.5 Marital Status

On their marital status, 4.9 % were single and majority were ever married representing 95.1% of the respondents.

4.1.6 Total Monthly Income

Of the respondents, majority (57%) are coming from families whose total monthly family income is among 25 000 – 50 000 Rs. Only 20% came from high income families and 23% of the women were from families of having < 25 000 Rs total monthly income

4.1.7 Number of deliveries

Number of child births also have been found to be a significant factor leading for the uptake of the screening services as per the empirical evidences. Of this sample 75% of the women have given birth to children in between (1- 3). 5% were not given birth while 20% had being came up with children 4 and more.

4.2 Knowledge in Cervical Cancer

In terms of knowing on cervical cancer, a very high percentage (82%) have heard and known about the existence of a cancer type called cervical cancer as shown in the Table 4.2. The percentage of women who have not heard about cervical cancer is 18%.

Table 4.2: Distribution of Knowing About Cervical Cancer

		Frequency	Percentage (%)
Heard of Cervical Cancer	Yes	184	81.8 %
	No	41	18.2 %
Total		225	100 %

4.2.1 Source of Information

Figure 4.1 presents the channels through which cervical cancer awareness has been disseminated. For the respondents those who were aware of the cervical cancer, the source of contributing factors to awareness creation were:
family, friends and neighbors (24.4 %) > radio and television (22.7%,) > community health workers (19.1%) > awareness programs (15.6%).

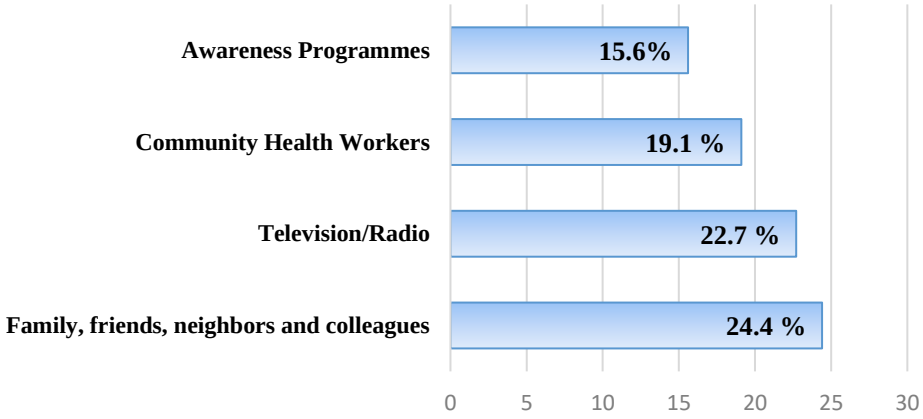

Figure 4.1: Source of Information of Cervical Cancer

Thus, from the above findings it can be concluded that knowing from family, friends and neighbors was the main sources of information to the women on the cervical cancer followed by mass media such as television and radio. Results further

suggested that the impact from awareness programmers is low and thus government should take special attention to improve and expand the role of awareness programs in this regard.

4.2.2 Knowledge on Signs and Symptoms of Cervical Cancer

The respondents those who were aware about the cervical cancer were further asked about the signs and symptoms of cervical cancer. The findings in the Figure 4.2 revealed that, majority of the respondents (47%) did not know all of the symptoms as shown in Fig. 4.2. It should be noted that only 17% is known well about the signs and symptoms. Thus, it can be concluded that 83% of women are not aware about the correct symptoms.

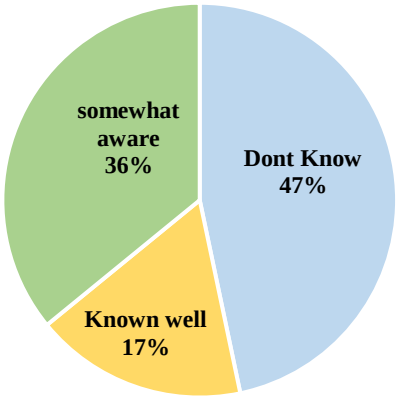

Figure 4.2: Level of knowledge on Signs and Symptoms

As presented in Figure 4.3, majority of women (46.7 %) of the respondents is aware of cervical cancer is characterized by vaginal foul-smelling discharges. Other signs that were reported to be aware were as vaginal bleeding (41.8%), heavy menstrual periods (27.2%) and discomfort or pain during sex (11.4%). These results reveal that knowledge about cervical cancer signs and symptoms was scanty though, greater part of the women was aware of cancer of cervix.

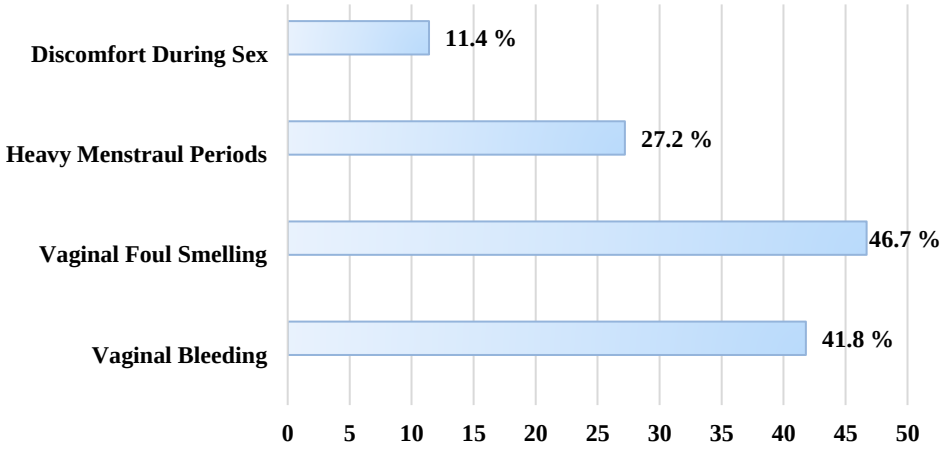

Figure 4.3: Awareness on Signs and Symptoms

4.3 Knowledge on Causes of Cervical Cancer

The respondents were presented with a list and were requested to indicate which of the risk factors listed were associated with cervical cancer. Based on the answers provided it was found that 29% of the respondents were not aware of cervical cancer risk factors as presented in Table 4.3. Concerning about the knowledge on the risk factors their knowledge is satisfactory comparatively to the knowledge on signs and symptoms. Only 20% of the respondents has a correct knowledge on the causes of cervical cancer. Thus, it is clear that 80% of women were not aware or partially aware the causes on cervical cancer.

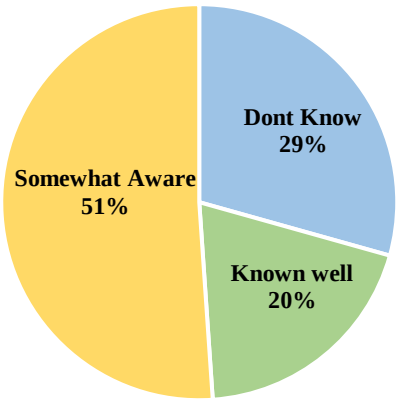

Figure 4.4: Knowledge on Causes of Cervical Cancer

As shown in the Table 4.3, the most common risk factor, “having multiple sexual partners” is known by 79%.

Table 4.3: Recognition of Causes of Cervical Cancer

Risk Factor	Correctly knowing (%)
Having multiple sexual partners	79%
Long-term use of contraceptive pill	56%
Early sexual intercourse	37%
Cigarette smoking	19%
Acquiring HPV Virus	18%

Also 56% were known that long term use of contraceptive pills as a cause of cervical cancer and it was the second most known risk factor of the cervical cancer. Only 18% were known that acquiring HPV Virus causes the cervical cancer. Cancer of the cervix is linked HPV which can be transmitted sexually. Risk factors to HPV infection comprise the number of sexual partners and the sexual partner's number of preceding sexual partners.

Based on the results in Table 4.3 it can be concluded that a majority of the respondents were found to be knowledgeable of multiple partners as a risk factor; however, it is also evident that there is need for intensified education on the risk factors associated with cervical cancer as the knowledge that a virus can be acquired through is insufficiently known.

4.4 Knowledge on Curability of Cervical Cancer

Table 4.4: Knowledge on Curability of Cervical Cancer

Curability	**%**
Yes	56.4 %
No	43.6%

As per the results in the Table 4.4, 56% knew that cervical cancer can be cured, whilst only 44% were thinking that cancer of cervix can't be cured. This show there is some sort of inefficient situation in extension service.

4.5 Knowledge in Cervical Cancer Screening

The respondents those who were aware about the cervical cancer were asked whether they are knowledgeable of the cervical cancer test and screening services offered at different health facilities. The distribution of the responses is shown on table 4.5 below.

Table 4.5: Women's knowledge on availability of Cervical Cancer Screening

Knowledge		%
Heard of Cervical Cancer Screening	Yes	63.6 %
	No	36.4 %

Results in Table 4.5 indicate that a majority, 64% of the respondents were aware of cervical cancer test while 36% on the other hand were found unaware of cervical cancer test.

4.5.1 Information Source

The percentage and cumulative percentage distribution of different information sources related to cervical cancer are shown in Table 4.6.

Table 4.6: Sources of Information Regarding Cervical Cancer

Information Source	**%**	**Cum. %**
Awareness Programs	13.7	13.7
Community Health Workers	24.8	38.5
Family, friends, neighbors and colleagues	31.6	70.1
Television/Radio	29.9	100

From the responses, it is clear that health facilities played a vital role. According to the results in Table 4.6, the health facilities were the major contributors to the knowledge among women about the cervical cancer screening. These findings show the amount of effort employed by the health facilities (Awareness programs and community health workers) to enhance awareness. The health facilities; collectively the awareness programs and community health workers informed 39% of the respondents on cancer screening. Family friends and neighbors had contributed to knowledge creation for 32% of the respondents becoming the second top knowledge creation tool.

4.6 Knowledge on Screening Services and Health Facility

With regard the knowledge on cervical cancer screening services, according to the results as presented in table 4.7, majority of the respondents were found to be aware of the cancer treatment as 70% reported that it is possible to detect cervical cancer through screening /routine checkup before symptoms appear. From the table also, a half (50%) of the respondents were aware that cervical cancer is treatable if detected early. Further, 66% of the women were knowledgeable of the places where they could access cancer screening services in Jaffna. However, 34% were not aware of health facilities that offered such services (Figure 4.5)**.**

Table 4.7: Knowledge on Cervical Cancer Screening Services

Knowledge on Cervical Cancer Screening	**%**	
	Yes	**No**
Possible to detect cervical cancer through screening/routine checkup before symptoms appear	70%	9%
Cancer of cervix treatable if detected early	50%	50%

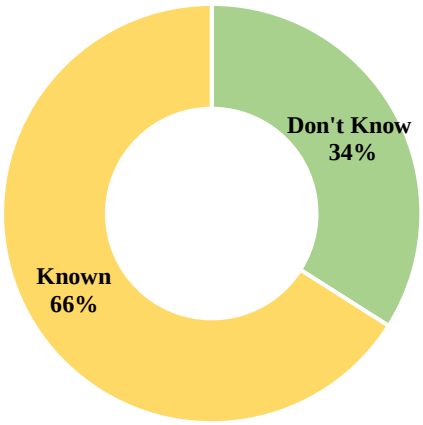

Figure 4.5: Knowledge on Access to Cancer Screening Services in the Study Area

4.6.1 Sources of Health Facilities

The respondents were further asked whether they were aware of some of the health facilities offering cervical cancer screening services. As presented in figure 4.6, among the health facilities cited were; MOH (33%), government and private gynecological clinics (21%) and Suwanari (12%) of the respondents. However, 34% of the participants in the study were not able to cite some of the health facilities offering the services despite their seeking of the services in such hospitals.

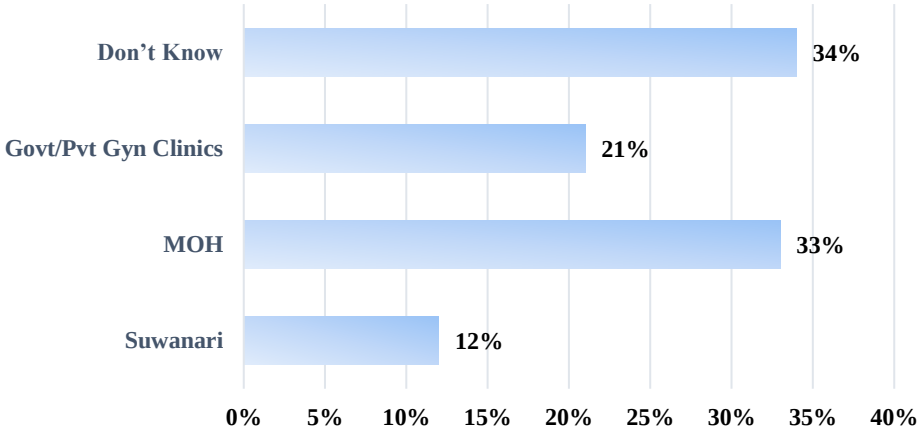

Figure 4.6: Awareness on Health Facilities Offering Cervical Cancer Screening Services in the Study Area

From the above result in figure 4.6, it is evident that expanded screening is a viable option where sufficient infrastructure and health system access exist though their awareness is lacking. Suwanari has specifically established with the purpose of providing these screening services free of charge. But the awareness on that service facility has become very low (12%).

4.7 Knowledge on the Pap Smear Test

With regard to the level of women's knowledge on the recommended frequency within which adult women should undergo checkup for cervical cancer, only 14% were found to be aware as screening every three yearly is recommended; whereas 86% were unaware or not correctly knowing. Only 28% were aware that the screening procedure for cancer of cervix is as "Pap Test". Almost 74% of the women were either unaware or not correctly knowing the procedure for screening of the cancer of cervix implying that knowledge and awareness on the screening pap test is considerably low among the respondents.

Table 4.8: Knowledge on the Pap Smear Test

Knowledge on Pap Smear	**%**		
	Yes	**No**	**Don't Know**
Required frequency of cervical cancer checkups (Correct answer is every 3 yearly)	14%	12%	74%
Known the procedure used for screening as "Pap Test"	28%	17 %	55 %

4.8 Association between Knowledge Level on the Cancer of Cervix and Screening (CCS) with Other Common Factors

4.8.1 Association between CCS and Age

Based on the significant χ^2 statistic in table 4.9, it can be concluded that the age category is significantly associated with the knowledge on the cancer of cervix & screening.

Table 4.9: Knowledge on the CCS by Age

Age Category	Knowledge Level		
	Good	**Satisfactory**	**Poor**
35 - 44	7 (7.2%)	42 (43.8%)	47 (49%)
45 - 59	3 (4.4%)	19 (28.4%)	45 (67.2%)
≥ 60	1 (1.7%)	3 (4.8 %)	58 (93.5%)

$\chi^2 = 39.219$ df = 4 $p < 0.05$

Comparing the distributions separately, it can be seen that percentage of poor knowledge when the age is between 35-44 years or between 45-59 years is significantly lesser than the percentage of having poor knowledge when the age is greater than 60 years. It can also be seen that percentage of poor knowledge on CCS is increasing as age increases.

4.8.2 Association between CCS and Education Level

Table 4.10: Knowledge on the CCS by Education Level

Education Level	Knowledge Level		
	Good	**Satisfactory**	**Poor**
Primary or Less	1 (1.1%)	7 (7.3%)	87 (91.6%)
Secondary	3 (2.9%)	44 (41.9%)	58 (55.2%)
Tertiary	7 (28%)	13 (52 %)	5 (20%)

$\chi^2 = 70.400$ df = 4 $p < 0.05$

Based on the results in Table 4.10, it can be concluded that education level is significantly associated with the knowledge on the cancer of cervix & screening with a 95% confidence as the χ^2 statistic is significant ($p < 0.05$). It can be identified that being poor in knowledge is significantly becoming higher when it comes to low in education. The percentage of poor knowledge on CCS among women having primary or less education level (91.6%) is higher than that for women having educational level secondary or tertiary level. In other words, the percentage of having good knowledge on CCS among women having tertiary education is significantly much higher than that for women having secondary or primary education.

4.8.3 Association between CCS and Employment Status

As χ^2 statistic is significant in table 4.11 ($p < 0.05$), it can be concluded with 95% confidence that the employment level has a significant association with the knowledge on the cancer of cervix & screening. The results in the table 4.11 exhibits becoming poor in knowledge is increased among unemployed (69.2%) and minor (98.3%) compared to that of among employed (35.5 %) and retired (57.1%).

Table 4.11: Knowledge on the CCS by Employment Status

Employment Status	Knowledge Level		
	Good	**Satisfactory**	**Poor**
Unemployed	3 (3.3%)	25 (27.5%)	63 (69.2%)
Minor	1 (1.7%)	0 (0%)	57 (98.3%)
Employed	6 (9.7%)	34 (54.8 %)	22 (35.5%)
Retired	1 (7.1%)	5 (35.7%)	8 (57.2%)

$\chi^2 = 68.461$ df = 6 $p < 0.05$

4.9 Women's Attitude and Practice on Cervical Cancer Screening

4.9.1 Willingness to Consult for Cervical Cancer Screening

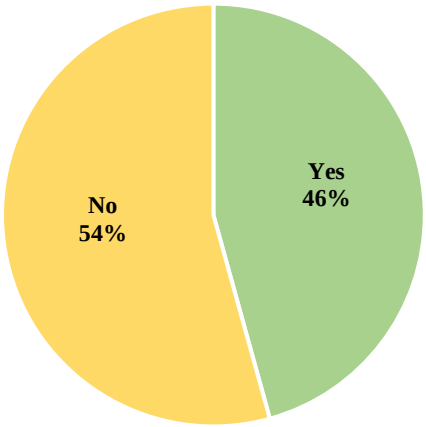

Figure 4.7: Women's Willingness to consult a health care provider

As illustrated in Figure 4.7, 54% of the women do not like to consult a health care provider to know about CCS, nevertheless 46% of the women were willing. This indicates that, a considerable number of women were concerned about their health and willing to undertake the screening services provided with the availability of the services.

4.9.2 Who Should Be Screened for Cervical Cancer

Regarding the women's knowledge on who should be screened, as shown in figure 4.8, most of the women (47.9%) felt that only women with symptoms indicative of cancerous cervix should be screened. 19.7% suggested that only women with promiscuous life cycle need to be screened. 13.7% of the respondents were not aware of who should be screened for cervical cancer. Amongst all only 18.8% were correctly aware and knowledgeable that all women of child bearing age should be screened for cervical cancer. It is evident from the findings that, despite the number of women with knowledge on cervical cancer screening, there is poor knowledge about who is eligible and in requirement for cervical cancer screening.

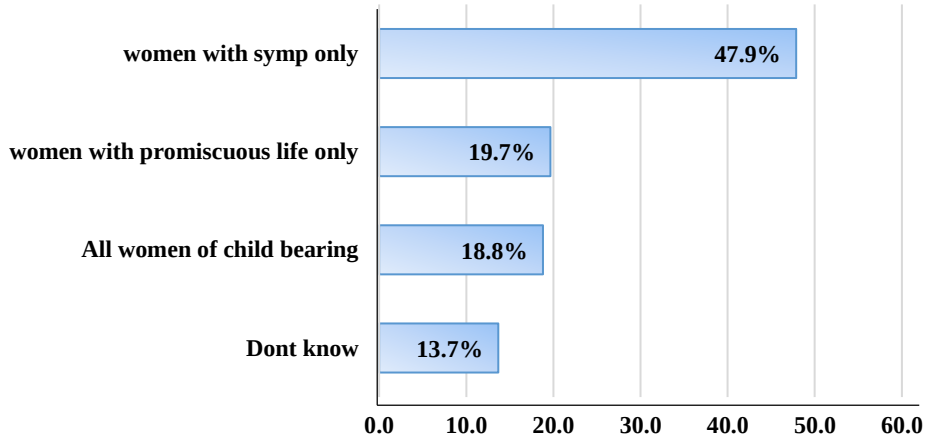

Figure 4.8: Women's Knowledge of who should be screened

4.9.3 Level of Cervical Cancer Screening Uptake and Underlying Reasons

Table 4.12: Level of Cervical Cancer Screening Uptake among Women

Characteristics on Screening Uptake			**%**
Practice of Screening (Ever Been Screened)	Yes	Regular Practice	7.6%
		Irregular Practice	4.9 %
	No		87.5%
The Reason made screening	Friend/family encouragement		28.6%
	Due to health care providers suggested		35.7%
	Don't want to die from cervical cancer		21.4%
	Family history of cervical cancer		14.3%

Findings also revealed that only 12.5% (7.6%+4.9%) of the women who participated in the study had been screened for cancer of the cervix. A highly considerable number of the women (87.5%) had however never been screened. Among those who had been screened, only 7.6 % had undergone the screening for less than 3 years' time as at the time of study. 4.9 % had undergone screening for 3 years earlier the time of study (Table 4.12). Consequently, it revealed that the uptake of the screening services

among the women is not adequate despite their response that majority had heard about the screening.

The Ministry of Health focus is aimed at achieving at least 70% coverage among women above age 35. Going by the result findings only 12.5% of women in the age cluster with the uppermost risk-benefit proportion had been screened at the time of the study, either on regular or irregular basis.

The respondents were further asked on what contributed to their decision to undertake the screening services and the results are summarized in table 4.12. The findings revealed that, of the 35.7% women were encouraged to take up the test by the health care providers. 28.6% were encouraged by the family or friend. Thus, according to the findings, the encouragement majorly from the health care facilities and community health workers influenced their uptake of the screening services.

4.9.4 Knowledge on Cancer of Cervix and Screening among Women Up taken the Pap Test and Not

The Independent Samples T test has used to determine whether there exists a statistical evidence that the associated population means of women those who have and have not up taken the pap test are significantly different with respect to the knowledge on cancer of cervix and screening.

The two-sample t test is conducted to test the null hypothesis that the true group-mean knowledge on cancer of cervix and screening in women those who have up taken and not up taken the pap test is equal.

H_0: $\mu_{\text{Uptaken}} - \mu_{\text{Not\_Uptaken}} = 0$ (The difference of the means is equal to zero)

H_1: $\mu_{\text{Uptaken}} - \mu_{\text{Not\_Uptaken}} \neq 0$ (The difference of the means is not equal to zero)

Since $p < 0.05$ is less than the significance level $\alpha = 0.05$, the null hypothesis is rejected and the result is said to be statistically significant. Hence it can be concluded with a 95% confidence, that the true population means of the women those who have and have not up taken the pap test is significantly different.

Thus, based on the results, can state;

- There is a significant difference in mean scores for between non-Up taken and Up taken. ($t_{32.963} = 4.224$, $p < 0.05$).

Table 4.13: Results of the Independent Samples T test for Pap up taken and non-uptaken

t-test for Equality of Means				
t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
4.224	32.963	.000	3.686	.873

4.9.5 Hindrances to Uptake the Screening Services

Table 4.14: Hindrances to the Women's Uptake of the Screening Services

The Reason for not screening	%
Costly	11.2%
Not know where to get screening	20.7%
No time	12.6%
I am healthy thus not necessary	30.7%
Cervical cancer screening is painful	7.6%
Fear of a positive outcome	11.4%
Lack of female screeners at the health facility	5.8%

Findings as shown in table 4.14 revealed some reasons why women resist screening services. A greater proportion of women had the perception that they were healthy and did not deserve to be screened (30.7%). This affects the uptake levels regardless of their lack of knowledge of their health status.

A number of women 20.7% have no awareness of where to be screened and 11.2% thinks that its costly. This indicates that the women need to be informed of the

screening services and the availability of the services in the area and are open to all the women at no cost.

Some women had tightly scheduled hence they lacked time to visit for the screening (12.6%). According to the findings, 11.4% of the women do not have courage to undergo the screening tests due to the fear of positive outcomes that one might be diagnosed with cancer. Another proportion (7.6%) of the women have the perception that cervical cancer screening is a painful process that would hurt them making them uncomfortable to undertake the screening test.

These results suggest that there were specific gaps in knowledge about the procedure for cervical cancer screening that need to be addressed to overcome the barriers to access. This is especially important since a plenty of the respondents mentioned they feel that they are healthy, fear of exam, painful procedure and fear of positive as the major hindrances.

4.9.6 Knowledge on the Transmission of Cervical Cancer

Table 4.15: Women's Knowledge on the Transmission of Cervical Cancer

Transmission of Cervical Cancer		**%**
Is cervical cancer transmittable?	Yes	4%
	No	28.6%
	Don't Know	67.4%

According to the response given, 4% of the respondents reported that cervical cancer is transmittable. 28.6% were for the view that cervical cancer cannot be transmitted whereas 67.4% were not aware whether the disease is transmittable or not.

4.10 Summary of Chapter 04

The chapter has undergone with the aim of determining the level of knowledge, attitude, practice and the perceived motivations and hindrances for uptake of CCS amongst women among age above 35 in Jaffna. On the level of women's knowledge, most (81.8%) had ever heard of CC. Family, friends and neighbors was the main sources of information to the knowledge on the CC. Knowledge on signs and symptoms was found to be low, with up to 47% of the respondents were not aware of the symptoms. Vaginal foul-smelling discharges has reported as the major symptom of CC (46.7%). On the causes, 29% were unaware of the causes and 79% reported the major cause as having multiple sexual partners. Many knew that (56%) CC can be cured. Among those aware about the CC, a majority, 64% were aware of CC test. Community health workers was the main source of knowledge creation on CCS. 70% of the women reported that cancer can be diagnosed through screening whereas 50% believed that it is treatable if detected early. 66% were aware of the health facilities where they could access CCS services in Jaffna. There was a lack of knowledge on the recommended frequency within which women should undergo checkups. Age, education level and employment status were found to be significantly associated with the women's knowledge on the CCS. It can be seen that percentage of poor knowledge on CCS is significantly increasing as age increases and becoming lower in education. Becoming poor in knowledge is significantly increased among unemployed (69.2%) and minor (98.3%) compared to that of among employed (35.5 %) and retired (57.1%). With regard to the attitude and practices, only 46% of the women were found to be willing to seek frequent advice of health professional as regards cancer of cervix screening. Due to this, a greater proportion (87.6%) of women had not been inspected and only 12.5% had undergone screening for cancer of cervix. Among those who had been screened, 7.6 % had a regular practice and 4.9 % had an irregular practice at the time of study. The findings reveal that there exists a significant difference in knowledge on CCS among women those who have and have not up taken the pap test. Most of the women were encouraged to seek the services by the health care providers. The major reason as to why women do not attend the screening services is thinking that they are healthy and do not deserve to be screened.

CHAPER 05

ASSOCIATION BETWEEN FACTORS AND PAP TEST

The purpose of this chapter is to determine the significantly associated variables for women's uptake of pap test in Jaffna using binary logistics analysis. The dependent variable is whether the women have up taken the pap test. It is a binary variable such that ever being screened = 1 and equals to 0 for never screened. The list of explanatory variables with their levels are shown in Section 5.1.

5.1 Description of the Explanatory Variables

Table 5.1: Independent Variables

Socio and Demographic Characteristics	**Age**	1 – "35 – 44" 2 – "45 – 59" 3 - "≥ 60"
	Religion	1 – "Catholic" 2 – "Hindu"
	Level of Education	1 – "Primary or Less" 2 – "Secondary" 3 – "Tertiary"
	Employment Status	1 – "Employed" 2 – "Retired" 3 – "Peasant/Minor Worker" 4 – "Unemployed"
	Marital Status	1 – "Single" 2 – "Ever Married"
	Total Monthly Family Income	1 – "< 25 000" 2 – " 25 000 – 50 000" 3 - "≥ 50 000"
Knowledge Characteristics related to Cervical Cancer and Screening	Sign and Symptoms	1 – "Don't Know" 2 – "Known"
	Causes	1 – "Don't Know" 2 – "Known"
	Heard of Cervical Cancer Screening	1 – "Yes" 2 – "No"
	Possibility of detection before the symptoms appear	1 – "No/Unaware" 2 – "Yes"
	Treatable if detected early	1 – "No/Unaware" 2 – "Yes

	Aware of health facilities offering cervical cancer screening services	1 – "Yes" 2 – "No"
	Knowledge level on cervical cancer and screening	1 – "Good" 2 – "Satisfactory" 3 – "Poor"
Other	Breast Fed	1 – "No" 2 – "Yes"
	Use of Contraceptives	1 – "None" 2 – "Vaccine" 3 – " Oral pills"
	Health Insurance	1 – "No" 2 – "Yes"
	Family encouragement	1 – "Yes" 2 – "No
	Family history of cervical cancer	1 – "Yes" 2 – "No
	Attended awareness programs	1 – "Yes" 2 – "No

5.2 Association between Socio and demographic characteristics and Screening Uptake

5.2.1 Influence of Age

Table 5.2: Screening Uptake and Age

Variable Categories		**Uptake of Pap Test**	
		Never Screened	**Ever Screened**
Age	**35 - 44**	78 (81.2%)	18 (18.8%)
	45 - 59	57 (85.1%)	10 (14.9%)
	≥ 60	60 (96.8%)	2 (3.2%)
	χ^2= 19.935	df = 2	p < 0.05

As chi square statistic is significant in table 5.2 (p < 0.05), it can be concluded with 95% confidence that age category has a significant association with the uptake of pap test. Thus, it can be confirmed that the percentage of never screened has significantly increased as age becomes higher. By comparing two binomial distributions, it was found that the percentage of never screened among 45 – 59 years (85.1%) is

significantly lower than that of among age higher than 60 years (96.8%) as the p value is 0.003. Similarly, the percentage of never screened among ≤ 60 years also significantly lower than that of among age higher than 60 years (p=0.028). However, no significant difference was found between the corresponding percentages between 30-44 years and 45-49 years of age women. Nevertheless, percentage of ever screened is very low in all categories and thus it can be recommended that it is very important to educate women on PAP test irrespective of the age.

5.2.2 Influence of Religion

The results of chi square analysis in table 5.3 reveal that there is no significant association between the religion and the uptake of pap test at 95% confidence.

Table 5.3: Screening Uptake and Religion

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Religion	**Catholic**	118 (84.9%)	21 (15.1%)
	Hindu	79 (91.9%)	7 (8.1%)
	χ^2= 2.495	df = 1	p = .114

5.2.3 Influence of Education Level

Table 5.4: Screening Uptake and Education Level

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Education Level	**Tertiary**	18 (72%)	7 (28%)
	Secondary	91 (86.7%)	14 (13.3%)
	Primary or Less	88 (92.6%)	7 (7.4%)
	χ^2= 6.968	df = 2	p = .031

The significant χ^2 statistic (p=0.031) in table 5.4 concludes that education level is significantly associated with the uptake of the screening with a 95% confidence. The percentage of never been screened among primary or less educate women (92.6 %) is not significantly different from that of among secondarily educated women when comparing the two binomial distributions. Similarly, with respect to the comparison of two binomial distributions, it was found that percentage of never screened among secondary (86.7%) is also not significantly different that from tertiary educated women (72%). Furthermore, it can be seen that the percentage of not getting screened is becoming higher when it comes to low education levels. Thus, it can be suggested that a special program need to started to educate secondary and primary or less educated women to convince the importance of PAP test.

5.2.4 Influence of Employment Status

Table 5.5: Screening Uptake and Employment Status

Variable Categories		**Uptake of Pap Test**	
		Never Screened	**Ever Screened**
Employment Status	**Employed**	49 (79%)	13 (21%)
	Retired	12 (85.7%)	2 (14.3%)
	Minor	53 (91.4%)	5 (8.6 %)
	Unemployed	81 (89%)	10 (11%)
	χ^2= 8.292	df = 3	p = .040

As χ^2 statistic is significant in table 5.5 (p = .040), it can be concluded with 95% confidence that the employment status has a significant association with the uptake of cancer of cervix screening. The percentage of never screened is the lowest among employed women, compared with retired, minor or unemployed women. This further suggests that more attention need to be given for minor and unemployed women.

5.2.5 Influence of Marital Status

As the chi square statistic in Table 5.6 is not significant (p=0.575), can be concluded with 95% confidence that marital status is not a significant factor on up taking pap test.

Table 5.6: Screening Uptake and Marital Status

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Marital Status	**Single**	9 (81.8%)	2 (18.2%)
	Ever Married	188 (87.9%)	26 (12.1%)

χ^2= .314 df = 1 p = .575

5.2.6 Influence of Total Monthly Family Income

Table 5.7: Screening Uptake and Total Monthly Family Income

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Total Monthly Family Income	**≥ 50 000**	33 (73.3%)	12 (26.7%)
	25 000 – 50 000	114 (89.1%)	14 (10.9%)
	< 25 000	50 (96.2%)	2 (3.8%)

χ^2= 11.540 df = 2 p = 0.003

Based on the significant chi square statistic in table 5.7 (p=0.003), can be concluded with 95% confidence that total monthly family income has a significant association with the uptake of pap test. When compared the respective binomial distributions separately, the percentage of never screened among "< 25 000" income category (96.2%) is significantly higher than that of among "≥ 50,000 category (73.3%) and also the percentage of never screened among "25 000 – 50 000" (89.1%) category is significantly higher than that of among "≥ 50 000" (73.3%). However, no significant difference was found between two lower income groups in comparing their binomial distributions separately.

5.2.7 Influence of Number of Deliveries

The insignificant chi square statistic (p = 0.430) in table 5.8 revealed that the number of deliveries by a woman is not a significant variable on screening uptake.

Table 5.8: Screening Uptake and Number of Deliveries

Variable Categories		Uptake of Pap Test	
		Never Screened	Ever Screened
Number of Deliveries	None	9 (75%)	3 (25%)
	1 - 3	150 (88.5%)	19 (11.2%)
	4 & Above	38 (86.4%)	6 (13.6%)

χ^2= 1.686 df = 2 p = 0.430

5.3 Association between Knowledge Characteristics and Screening Uptake

5.3.1 Influence of Knowledge on Signs and Symptoms

The χ^2 statistic significant in table 5.9 (p = .029) indicates that there exist a significant association among the women's knowledge on signs and symptoms and uptake of pap test. The percentage of never screened among the women who do not know about sign and symptoms (92.5%) is significantly higher than that of women having knowledge on signs and symptoms (83.1%) when the two binomial distributions compared separately.

Table 5.9: Screening Uptake and Knowledge on Signs and Symptoms

Variable Categories		Uptake of Pap Test	
		Never Screened	Ever Screened
Knowledge on Signs and Symptoms	Known	98 (83.1%)	20 (16.9%)
	Don't Know	99 (92.5%)	8 (7.5%)

χ^2= 4.780 df = 1 p = 0.029

5.3.2 Influence of Knowledge on Causes

The insignificant χ^2 statistic in table 5.10 (p = .453) indicates that there doesn't exist a significant association among the women's knowledge on causes for cancer of cervix and uptake of pap test.

Table 5.10: Screening Uptake and Knowledge on Causes

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Knowledge on Causes	**Known**	112 (86.2%)	18 (13.8%)
	Don't Know	85 (89.5%)	10 (10.5%)

χ^2= .563 df = 1 p = .453

5.3.3 Influence of Heard of Cervical Cancer Screening

The results of table 5.11 exhibits that the χ^2 statistic is significant at 95% confidence level. Thus, it can be concluded with 95% confidence that heard of cervical cancer screening is a significantly influential variable on screening uptake. It should be noted that all the women who have not heard cervical cancer screening have never screened for uptake of pap test by confirming the existence of a significant association from having heard of screening priory for the up taking of pap test. It is seen that the percentage of never been screened when not heard (100%) is significantly higher than when it comes to heard of the test already (76.1%) when comparing the two distributions separately. There is still a considerable percentage (76.1%) of not uptaken though they have already known and heard of the pap test.

Table 5.11: Screening Uptake and Heard of Cervical Cancer Screening

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Heard of Cervical Cancer Screening	**Yes**	89 (76.1%)	28 (23.9%)
	No	108 (100%)	0 (0%)

χ^2= 40.291 df = 1 p < 0.05

5.3.4 Influence of Thought on Possibility of Detection Before the Symptoms Appear

Based on the significant chi square statistic in table 5.12 (p = 0.002), it can be concluded with 95% confidence that knowing of the possibility of detecting cancer of cervix before the symptoms appear by screening makes a significant association with the up taking of pap test. The percentage of never screened if women are knowledgeable is significantly lower than the percentage of never screened if not knowledgeable.

Table 5.12: Screening Uptake and Thought on Possibility of Detection Before the Symptoms Appear

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Known the Possibility of Detection Before the Symptoms Appear	**No/Unaware**	131 (92.9%)	10 (7.1%)
	Yes	66 (78.6%)	18 (21.4%)

χ^2= 9.573 df = 1 p = .002

5.3.5 Screening Uptake by Thought on Treatability if Detected Early

The chi square statistic in table 5.13 (p=0.941) is not significant. It can be concluded with 95% confidence that the women's awareness on treatability of cancer of cervix if detected early is not significantly associated with the up taking decision of pap test.

Table 5.13: Screening Uptake and Thought on Treatability if detected early

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Thought on Treatability if detected early	**No/Unaware**	107 (87.7%)	15 (12.3%)
	Yes	90 (87.4%)	13 (12.6%)

χ^2= .005 df = 1 p = .941

5.3.6 Influence of Awareness on Health Facilities Offering Screening Services

The results of the chi square analysis in table 5.14 confirms at 95% confidence, that there is a significant($p < 0.05$) association between knowing of health facilities and up taking of the pap test. The comparison of two respective binomial distributions observed that the percentage of never been screened is significantly increased when women are not knowledgeable (97.6%) of health facilities offering screening services in comparison to those who are known of health facilities (81.6%).

Table 5.14: Screening Uptake and Awareness of Health Facilities Offering Screening Services

Variable Categories		**Uptake of Pap Test**	
		Never Screened	**Ever Screened**
Awareness of Health Facilities Offering Screening Services	**Yes**	115 (81.6%)	26 (18.4%)
	No	82 (97.6%)	2 (2.4%)

$\chi^2 =$ 15.362 df = 1 p = < 0.05

5.3.7 Screening Uptake by Knowledge Level on Cervical Cancer and Screening

Table 5.15: Screening Uptake and Knowledge Level on Cervical Cancer and Screening

Variable Categories		**Uptake of Pap Test**	
		Never Screened	**Ever Screened**
Knowledge Level on Cervical Cancer and Screening	**Good**	4 (36.4%)	7 (63.6%)
	Satisfactory	54 (84.4%)	10 (15.6%)
	Poor	139 (92.7%)	11 (7.3%)

$\chi^2 =$ 20.511 df = 2 p = 0.05

The results in Table 5.5 indicate that the overall knowledge level on cervical cancer and screening is significantly associated with uptake of pap test (p=0.00). The

percentage of never screened among poorly knowledge women (92.7%) is higher than that of among satisfactory knowledge women (84.4%) as well as that of poor knowledge women. However, no significant different was found between poorly and satisfactorily knowledged women when compared their binomial distributions.

5.4 Association between Other Characteristics and Screening Uptake

5.4.1 Influence of Breast Feeding

Table 5.16: Screening Uptake and Breast Feeding

Variable Categories		Uptake of Pap Test	
		Never Screened	Ever Screened
Breast Feed	No	9 (75%)	3 (25%)
	Yes	188 (88.3%)	25 (11.7%)

χ^2= 1.499 df = 1 p = .221

The insignificant chi square statistic in table 5.16 (p=0.221), concludes with 95% confidence that breast feeding is not significantly associated with the up taking decision of pap test.

5.4.2 Influence of Use of Contraceptives

The results of the chi square analysis in table 5.17 confirms at a 95% confidence that, there is a significant(p=.022) association between the use of contraceptives and up taking of the pap test. Comparison of the binomial distributions observed that not been screening is significantly increased of women those who are taking contraceptives than that of using none. Similarly, not up taking the pap test is significantly increased among vaccine users (94.9%) in comparison to oral contraceptive (90.2%) users.

Table 5.17: Screening Uptake and Use of Contraceptives

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Use of Contraceptives	**None**	50 (78.1%)	14 (21.9%)
	Vaccine	37 (94.9%)	2 (5.1%)
	Oral	110 (90.2%)	12 (9.8%)

χ^2= 7.603 df = 2 p = .022

5.4.3 Influence of Having a Health Insurance

The results in Table 5.18 confirm that there is no significant association between the up taking of the pap test and use of contraceptives.

Table 5.18: Screening Uptake and Health Insurance

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Health Insurance	**No**	154 (89%)	19 (11%)
	Yes	43 (82.7%)	9 (17.3%)

χ^2= 1.375 df = 1 p = .241

5.4.4 Influence of Family Encouragement

The chi-square statistic in Table 5.19 is significant($p < 0.05$) confirming that there is a significant association between family encouragement and up taking of the pap test. Unlike other characters so far, we tested, the percentage of never screened women having family encouragement (28.6%) is exceptionally lower.

Table 5.19: Screening Uptake and Family Encouragement

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Family Encouragement	**No**	197 (90.4%)	21 (9.6%)
	Yes	2 (28.6%)	5 (71.4%)

χ^2= 30.872 df = 1 p < 0.05

5.4.5 Influence of Family History of Cervical Cancer

The chi square analysis results in table 5.20 indicates at a 95% confidence that, there is a significant($p < 0.05$) association between family history for cancer of cervix and up taking of the pap test. It is clearly seen by the comparison of two binomial distributions separately, not being screening is significantly increased when there no family history (90.8%) in comparison to those who had family history in relation to cervical cancer (50%).

Table 5.20: Screening Uptake and Family history of Cervical Cancer

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Family History	**Yes**	4 (50%)	4 (50%)
	No	197 (90.8%)	20 (9.2%)

$\chi^2 =$ 35.596 df = 1 p = < 0.05

5.4.6 Influence on Attendance of Awareness Programs

Table 5.21: Screening Uptake and Attendance of Awareness Programs

Variable Categories		Uptake of Pap Test	
		Never Screened	**Ever Screened**
Attended Awareness Programs	**Yes**	26 (65%)	14 (35%)
	No	171 (92.4%)	14 (7.6%)

$\chi^2 =$ 18.075 df = 1 p = < 0.05

The significant chi square statistic($p < 0.05$) in table 5.21 confirms, that there is a significant association between attending to awareness programs and up taking of the pap test. It is observed that the percentage of never been screened is significantly higher among women attend awareness programs than that the of women who have not attended awareness programs.

5.5 Modelling the Up Take of Pap Test via Binary Logistics

5.5.1 Identification of Variables Simultaneously

On the view of the above statistical analyses carried out separately for each variable, it has revealed that, except religion, marital status, number of deliveries, knowledge on causes of cervical cancer, women's knowledge on treatability if detected early, breast feeding and having health insurance; all the other categorical variables related to socio and demographic characteristics, knowledge and attitude characteristics on cervical cancer and screening and other general characteristics have reported individual significant influence on the up taking of pap test. Thus, in order to find the combined impact from the best set of the independent variables out of all the significant variables, binary logistics regression was carried out under forward wald method. The results of the final model are shown in table 5.22. The significance of the Hosmer and Lemeshow test statistic concludes that the fitted model is significant at 5% level.

The results in table 5.22 indicate that the variables, education level, total monthly family income, knowledge on possibility to detect the cancer of cervix before symptoms appear, attending awareness programs, overall knowledge on cancer of cervix and screening and use of contraceptives are significantly associated with up taking of pap test when all the variables are taken into consideration simultaneously.

Table 5.22: Variables in the Equation of the Best Fit Model

Variables	S.E.	Wald	B	df	Sig.	Exp(B)
Education Level		7.706		2	.021	
Education Level(1) - Primary	2.384	5.397	5.539	1	.020	254.299
Education Level(2) - Secondary	2.249	3.718	4.337	1	.054	76.447
Total Monthly Fam Income		9.404		2	.009	
Total Monthly Fam Income(1) - <25 000	.857	4.188	1.754	1	.041	5.780
Total Monthly Fam Income(2) – 25 000 – 50000	.582	.254	.293	1	.614	1.341
Possible detect before symptoms appear(1) – No/Unaware	.834	4.910	1.848	1	.027	6.344
Attended awareness Programs(1) – No	.606	7.427	-1.652	1	.006	.192
Overall Knowledge on Cancer & Screening		9.386		2	.009	
Knowledge_Cate(1) – Poor Knowledge	1.181	2.193	1.749	1	.139	5.752
Knowledge_Cate(2) – Satisfactory Knowledge	.928	9.016	-2.785	1	.003	.062
Contraceptive		13.143		2	.001	
Contraceptive(1) - None	.862	4.078	1.741	1	.043	5.703
Contraceptive(2) - Vaccine	.937	.539	-.688	1	.463	.503
Constant	.202	93.316	-1.951	1	.000	.142

Hosmer and Lemeshow Test Statistic: $\chi_8^2 = 6.507$ (p = .591)

Table 5.23: Classification of the Model

Observed		Predicted		
		Uptake of Pap Test		Percentage Correct
		Never Screened	Ever screened	
Uptake of Pap Test	**Never Screened**	192	5	97.5%
	Ever screened	22	6	21.4%
Overall Percentage				88%

The overall productivity power of the model is 88% (Table 5.23). The probability of correctly classifying "never screened" given that not being screened is .975 against the probability of correctly classifying "ever screened" given that has been screened is .214.

The results in the table 5.24 of the Cox & Snell R Square and Nagelkerke R Square indicate that the explained variation in the dependent variable based on the model varies from 20.1% to 38.1%. Both statistics indicate that the percentage of variance of dependent variable explained by the model.

Table 5.24: Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
118.533	.201	.381

5.5.2 Final Model

Based on the results in table 5.22 the fitted model for the log odds ratio of never screened for PAP test is given by the equation (1).

$$Log\left(\frac{p}{1-p}\right) = -1.951 + 5.539^{\text{Education Level: Primary}} + 4.337^{\text{Education Level: Secondary}} + 1.754^{\text{Total Monthly Fam Income: <25 000}} + 1.848^{\text{Possible detect before symptoms appear: No \ Unaware}} - 1.652^{Awareness\ Programs:No} + 1.749^{\text{Poor Knowledge}} - 2.785^{\text{Satisfactory Knowledge}} + 1.741^{\text{Contraceptive:None}} \quad \text{……..(1)}$$

Using equation (1), the model for odd ratio can be written as;

$$\left(\frac{p}{1-p}\right) = 0.142 + 254.299 * \text{Education Level:Primary} + 76.447 * \text{Education Level:Secondary} + 5.780 * \text{Total Monthly Fam Income: <25 000} + 6.344 * \text{Possible detect before symptoms appear: No \ Unaware} + 0.192 * \text{Awareness Programs:No} + 5.752 * \text{Poor Knowledge} + 0.062 * \text{Satisfactory Knowledge} + 5.703 * \text{Contraceptive:None} \quad \text{…….……. (2)}$$

The model (2) indicates that the variables education level of primary or less and secondary, total monthly fam income of < 25 000, not aware pap test's possibility to detect before symptoms appear, poor overall knowledge on cancer of cervix and screening and non-use of contraceptives are significantly influence positively on the odd ratio of not being screening while, not attended for awareness programs and satisfactory overall knowledge level in cancer of cervix and screening are significantly negatively influence on the odd ratio of not being screening the pap test.

5.5.3 Interpretation Based on Odds Ratio

Based on the theory of logistic model, the odd ratio between two levels in a given factor is given by exponential value of the corresponding parameter, In SPSS all levels within a factor is tested with respect to the last level of that factor. Therefore, based on the results in the last column of Table 5.22 the following conclusions can be derived.

The odds of not up taking the pap test by women those who have educated up to primary and up to secondary are 254 and 76 times respectively higher than that of among women educated up to tertiary when all the other variables in the model are fixed.

The odds of not up taking the pap test is 6 times higher for women whose total family income lesser 25, 000/= compare to the women whose family income is higher than 50, 000/= when all the other variables are fixed. The corresponding value for the group of family income between 25,000 to 50,000 is 1.3.

The odds of not up taking the pap test by those who are unaware of the pap test's possibility to detect cancer of cervix before symptoms appear is 6 times higher than that of who are aware when all the other variables are fixed.

The odds of not up taking the pap test by those who have not attended the awareness programs is 0.192 times that of those who attended the awareness programs when all the other variables are fixed.

The odds of not up taking the pap test by whose overall knowledge on cancer of cervix and screening is poor is 5.8 times higher than that of among good know ledged when all the other variables are fixed.

The odds of not up taking the pap test by those who are not using contraceptives is 5.7 times higher than that of who are taking oral contraceptives when all the other variables are fixed.

5.6 Summary of Chapter 05

When the effect of explanatory variables were considered individually; age, education level, employment status, total monthly family income, knowledge on signs and symptoms, heard of cervical cancer screening, knowledge on possibility of detection before the symptoms appear, awareness of health facilities offering screening services, overall knowledge level on cervical cancer and screening, use of contraceptives, family encouragement, family history of cervical cancer and attendance of awareness programs were found to have a significant association with up taking of the pap test except religion, marital status, number of deliveries, knowledge on causes of cervical cancer, women's knowledge on treatability if detected early, breast feeding and having health insurance. When all the factors considered simultaneously also, education levels, total monthly family income, awareness on possibility to detect the cancer of cervix before symptoms appear via pap test, status of attending awareness programs, knowledge on cancer of cervix and screening and use of contraceptives have significantly contributed to not being up taken the pap test.

CHAPTER 06

CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS

Based on the statistical analyses carried out in Chapter 4 and 5, the following conclusions and recommendations are given along with few suggestions.

6.1 Conclusions

- The study determined the level of knowledge and practice on cancer of cervix and its screening and the influential factors for uptake of pap test amongst women among age above 35 in Jaffna district. The knowledge of cancer of cervix and screening among the interviewed was considerably high but the up taking was found to be low.
- About 80% of the women have heard of the cervical cancer and the main source is family, friends and neighbors.
- When all the factors considered simultaneously the significant factors influential on uptake of pap test are education levels, total monthly family income, awareness on possibility to detect the cancer of cervix symptoms, status of attending awareness programs, knowledge on cancer of cervix and screening and use of contraceptives.
- Based on the above factors a binary logistic model was able to develop to predict the probability of not up taking pap test by a woman above 35 years in Jaffna for a given combination of levels of the above factors.
- The overall predictive power of the model is 88%.
- The odds of not up taking the pap test by women those who have educated up to primary and up to secondary are 254 and 76 times respectively higher than that of among women educated up to tertiary when all the other variables in the model are fixed.
- The odds of not up taking the pap test is 6 times higher for women whose total family income lesser 25, 000/= compare to the women whose family income is higher than 50, 000/= when all the other variables are fixed.

- The odds of not up taking the pap test by those who are unaware of the pap test's possibility to detect cancer of cervix before symptoms appear is 6 times higher than that of who are aware when all the other variables are fixed.
- The odds of not up taking the pap test by those who have not attended the awareness programs is 0.192 times that of those who attended the awareness programs when all the other variables are fixed.
- The odds of not up taking the pap test by whose overall knowledge on cancer of cervix and screening is poor is 5.8 times higher than that of among good know ledged when all the other variables are fixed.
- The odds of not up taking the pap test by those who are not using contraceptives is 5.7 times higher than that of who are taking oral contraceptives when all the other variables are fixed.
- The inferences obtained in this study can be effectively used for better planning.

6.2 Recommendations

- Ministry of Health should enhance education on cancer of cervix at the health facilities especially lower cadre facility to promote responsiveness towards cancer of cervix and cervical cancer screening.
- Similar studies can be carried out for other areas as well.
- 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.
- Mass media and community health volunteers would facilitate creation of awareness and encourage more women to seek for the screening services regardless of their current health status.
- Women should be equipped with knowledge on the significance of early and regular screening. Should implement multiple strategies that will reach women at their convenience such as during their visit in the health facilities, religious places etc.

- Should take efforts to promote cervical cancer screening among women, informing their susceptibility and encouraging the belief that regular screening can detect the pre-cancerous stage, hence enabling early treatment and prevention of cancer development.

6.3 Suggestions

- Implementation of Women's health education programs regularly starting from the school ages of girls.
- Conducting Health related educational program by medical professional to create an inward emphasis on screening among women
- Mass media should be effectively utilized for conducting program on women's health awareness.
- Strategies can be attained to reach women at their convenience such as during their visit in the health facilities, religious places etc to share the awareness on requirement of regular screening.

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