**Title: Factors Associated with VIA (Visual Inspection with Acetic Acid) Positivity in Cervical Cancer Screening among Women in a Hill Track Area of the North-Eastern Part of Bangladesh: Insights from a Cervical Cancer Screening Service**

**CHAPTER I**

**INTRODUCTION**

**1.1 Introduction**

Cervical cancer (CC) is a condition characterized by the uncontrolled proliferation of normal cervical cells originating from the squamous-columnar junction (Jain & Limaiem, 2023). It is primarily attributed to persistent infection with the human papillomavirus (HPV), which can lead to precancerous cervical intraepithelial neoplasia (CIN) and eventually progress to CC (Burd, 2003). Among the many HPV types, HPV16 and HPV18 stand out as the most prominent culprits, responsible for approximately 70% of CC cases and around 50% of CIN3 cases (Ahmed et al., 2017). Infection with these HPV types typically occurs at the age of 25-30 or roughly a decade after initial sexual intercourse (Burd, 2003).

Cervical cancer constitutes a significant global public health concern, particularly in low-income countries, where it stands as the second most frequently diagnosed cancer and the third leading cause of cancer-related deaths among women (Sung et al., 2021). At its early stages, an abnormal Pap test result or a positive VIA are the most common findings in patients with cervical cancer (CC) (Hailemariam et al., 2020). Once confirmed, CC cases can be managed through surgical interventions or radiotherapy (Huang & O’Sullivan, 2013). On a global scale, cervical cancer ranks as the fourth most common cancer, accounting for 6.6% of all female cancer cases (Huang & O’Sullivan, 2013). Among women aged 25 to 65 years, CC leads to a loss of 2.4 million weighted Years of Life Lost (YLL) in developing countries, in contrast to 0.3 million YLL in developed countries (Hailemariam et al., 2020).

In advanced stages, cervical cancer is associated with low survival rates following surgery or radiotherapy, inflicting emotional stress on families and significant income loss (Pfaendler et al., 2015). Every year, an estimated 530,000 new cases of cervical cancer are diagnosed worldwide, with over 270,000 women succumbing to the disease; a staggering 85% of these cases occur in developing countries with limited access to CC screening (WHO, 2023).

In 2020, there were approximately 10.0 million cancer-related deaths and 19.3 million new cases reported globally. While 23.4% of all cancer cases were diagnosed in Europe, Asia and Africa witnessed higher mortality rates compared to their incidence rates (Sung et al., 2021). Of all cancer cases, 13% were linked to infections, with HPV being responsible for 690,000 out of a total of 2.2 million new cases (de Martel et al., 2017). Among cancers affecting women, cervical cancer remains a major public health issue, ranking as the fourth most common cause of both cancer incidence and mortality on a global scale (Arbyn et al., 2020).

In Bangladesh, cervical cancer is the second most common cancer of female (12%). The number of new cases was 8,068 (10.6 per 100,000 women) and deaths was 5.214 (7.1 per 100,00 women) in 2018. The prediction was that without any intervention a total of 505,703 women in Bangladesh will die from cervical cancer by the year 2070 and the number will rise to 1,042,859 by 2120 (Uddin et al., 2023).

Numerous risk factors have been identified in association with cervical cancer. These include a woman's age (typically between 40 and 49 years), a history of multiparity (having given birth more than twice), early initiation of sexual intercourse (prior to the age of 20), engagement in multiple sexual partnerships, HIV infection, cigarette smoking, low educational attainment, limited socioeconomic resources, and prolonged usage of combined oral contraceptive pills (Bezabih et al., 2015). Several studies have indicated the prevalence of cervical precancerous and cancerous conditions detected through Visual Inspection with Acetic Acid (VIA), among other screening methods (Poli et al., 2015). Moreover, certain investigations have addressed the referral process for cases with suspected cervical abnormalities, with a primary focus on high-grade lesions, although not specifically on invasive cervical lesions. These studies have primarily examined the rate of positive results without delving into the accuracy of these positive results in identifying actual invasive diseases. A subset of studies has explored histopathological analyses of abnormal cervix cases, revealing the proportion of confirmed invasive lesions (Donkoh et al., 2019). However, these studies do not establish a direct linkage to previous VIA tests.

Furthermore, various factors influence women's practices related to cancer screening. These factors encompass health service utilization, including aspects such as health insurance coverage, preference for female healthcare providers, recommendations from physicians, and encouragement from healthcare providers. Additionally, the quality, availability, and accessibility of healthcare services play a pivotal role in influencing these practices (Narcisse et al., 2023).

**1.2 Justification of the Study**

Cervical cancer can be prevented by early identification of precancerous lesions through regular Pap smear screening and the subsequent treatment of these lesions before they progress into cancer. It has been demonstrated that prevention, early diagnosis, and treatment measures contribute to a reduction in mortality from cervical cancer (Aggarwal, 2014).

The challenges of cervical cancer screening in developing countries encompass various factors, including limited access to healthcare services and laboratories, the absence of comprehensive screening programs, limited or non-existent awareness among both the general population and healthcare workers, as well as restricted or absent access to diagnostic facilities and laboratories, and issues with referral and follow-up systems. Analysis of population-based surveys reveals that, on average, cervical cancer screening coverage in developing countries stands at 19%, in stark contrast to the 63% coverage observed in developed nations (Catarino et al., 2015).

VIA is also feasible to implement in lower-tier healthcare facilities. Furthermore, VIA provides immediate results, facilitating the connection between screening and treatment. This 'see and treat' approach encourages prompt treatment adherence following diagnosis and mitigates the risk of women being lost within the referral system. When combined with cryotherapy (the freezing of precancerous cervical lesions), ideally within a single-visit approach (SVA), VIA proves to be an effective and efficient strategy for the secondary prevention of cervical cancer in low-resource settings. Competent clinicians and nurses can proficiently carry out this approach (Légaré et al., 2018). The integration of VIA screening with access to cryotherapy was initiated in Ethiopia through a collaborative effort between the Ethiopian Ministry of Health (FMOH) and Pathfinder1. This service was first introduced in 2009 as part of a single-visit approach to cervical cancer prevention, which was integrated into a comprehensive care package for individuals living with HIV and made available at 14 hospitals.

Numerous barriers to cancer screening have been identified, including a lack of awareness regarding the significance of screening, limited access to healthcare services, discomfort associated with the screening process, apprehension about potential cancer diagnoses, and logistical challenges such as taking time off from work to undergo screening (Jones et al., 2010).

Many women typically present with advanced stages of cervical cancer, resulting in a poor prognosis (Jones et al., 2010). The primary factors contributing to low cervical cancer screening rates are insufficient knowledge about the disease and negative attitudes among clients towards the screening procedure. Additionally, inadequate awareness of available screening methods and a lack of knowledge about cervical cancer have been identified as the most significant obstacles preventing the utilization of cervical cancer screening services (Nwobodo & Ba-Break, 2015). Recent research has emphasized the role of low knowledge levels, which are believed to be a major contributor to the low rates of screening uptake within populations (Alam et al., 2022). Despite the preventability of cervical cancer and the potential to reduce associated mortality through early screening, the challenges faced by both patients and healthcare providers can be mitigated through early detection practices and care (McGraw & Ferrante, 2014). In resource-limited settings, screening is most cost-effective and impactful when targeted at women between the ages of 30 and 49 (Campos et al., 2015). While various factors affect cervical cancer screening, there is limited knowledge about the factors associated with cervical cancer screening among women aged 30 and above in Bangladesh. Therefore, this study aims to identify the factors that influence cervical cancer screening among women aged 18 and above.

Despite the low screening coverage and the substantial disease prevalence, there is limited research available to explain why women, in general, do not utilize these services. It is also challenging to find studies that shed light on the factors influencing women's decisions to forego screening, particularly among those at higher risk (Binka et al., 2019).

Therefore, this study aims to provide a deeper understanding of the perceptions and barriers that discourage women in Bangladesh from undergoing cervical cancer screening. The findings of this study offer insights into the factors that may render women vulnerable to cervical cancer or hinder the early detection of the disease through screening services.

**1.3 Operational Definitions**

**Cervical cancer:** Cervical cancer is characterized by the abnormal growth or proliferation of cells on the cervix, the opening of the uterus (Šarenac & Mikov, 2019).

**Cancer screening:** Cancer screening is a medical procedure conducted to identify the presence of abnormal cells within a specific tissue (Šarenac & Mikov, 2019).

**Utilization of cervical cancer screening:** Individuals who have undergone cervical cancer screening using the VIA test at least once in their lifetime are considered as having utilized screening services, regardless of whether it was done regularly. Those who have never been screened are categorized as not utilizing the service (Jemal et al., 2023).

**Reproductive health:** Reproductive health refers to a state of complete physical, mental, and social well-being concerning all matters related to the reproductive system and its functions and processes. It goes beyond the mere absence of disease or infirmity.

**Divorced:** A person, whether a husband or a wife, who is legally separated from their spouse is considered to be divorced.

* 1. **Research Question (s)**
* What is the rate of cervical cancer screening uptake using VIA?
* What is the rate of VIA test results indicating positivity and negativity?
* What is the rate of VIA status in relation to various socio-economic factors?
* Is there a significant association between VIA status and other socio-economic factors?

**CHAPTER II**

**LITERATURE REVIEW**

Cervical cancer continues to pose a significant public health challenge, being the second most prevalent cancer among women worldwide. Currently, Africa carries the heaviest burden of this disease. Annually, there are approximately 530,000 newly diagnosed cases across the globe, with over 85 percent of these cases being identified at an advanced stage, making curative treatments unfeasible, particularly in developing countries, many of which are located in Africa. An estimated 274,000 or more deaths are attributed to this disease each year. The age-specific incidence varies from 25 to 30 cases per 100,000 individuals, with an average rate of 28.5 per 100,000. The highest incidence typically occurs during the fourth to sixth decades of life (Uddin et al., 2023).

In Yemen, a study conducted in 2012 found that HPV infection (42.3%) is a contributing factor to cervical cancer. The most prevalent symptoms reported included vaginal bleeding (77.2%), pelvic pain (43.9%), and menstrual disturbances (35.1%). Screening (59%) and HPV vaccination (18%) were identified as methods for preventing cervical cancer (Azzani et al., 2023).

In England, a study demonstrated that while there was some awareness of sexual behavioral risk factors for cervical cancer, such as 'having many sexual partners' (20%), very few individuals were able to identify HPV as the primary cause (1%). Notably, heredity, which is not considered a risk factor for cervical cancer, was the second most commonly mentioned factor (Mekonnen & Mittiku, 2023).

Due to the growing burden of cancer on a global scale, the World Health Assembly (WHA) adopted Resolution 58.22 in 2005, which encouraged member states to intensify their efforts against cancer by establishing National Cancer Control Programs (Idowu et al., 2016). In Nigeria, the National Cancer Control Program was established in 2008, aimed at reducing the morbidity and mortality associated with cancer, as well as its socioeconomic consequences. Within the framework of the National Cancer Control Plan, the Federal Ministry of Health (FMOH) introduced a cervical cancer control plan. This plan incorporated early disease detection through screening for cervical cancer and primary prevention through human papillomavirus (HPV) vaccination for girls aged 9 to 15 years (Idowu et al., 2016). The extent of implementation of this plan remains a subject of debate in Nigeria.

Various factors act as barriers influencing community norms and practices that hinder women from engaging in health-seeking activities. Additionally, according to a study by Kamanga et al (2023), the involvement of male medical practitioners in the screening process may contribute to reduced uptake of these services, particularly among Muslim women (Kamanga et al., 2023). Another study highlights the importance of an effective cervical cancer screening program that takes into account all genders, as male spouses play a significant role in motivating their wives to undergo screening. On a similar note, research conducted by Rink et al (2019) reasoned that male leaders can discourage women from participating in screening, regardless of their marital status (Rink et al., 2019).

Previous literature has consistently identified embarrassment as a primary barrier limiting the utilization of screening services, both in developing and developed nations. As noted in a study by Biaggi et al. (2016), women have mentioned that feelings of embarrassment, particularly in the context of antenatal screening, reduce their likelihood of participating in the screening process (Biaggi et al., 2016). The majority of women acknowledged that embarrassment represents a significant barrier that delays the use of screening services. The research underscores that there is limited knowledge regarding specific aspects of screening that may cause embarrassment among women, yet it has a substantial impact on their willingness to undergo screening and adhere to screening protocols.

The research conducted by Sabri & Young, (2022) revealed that some of the underlying factors contributing to feelings of embarrassment include a lack of privacy, discomfort related to sexual aspects, anxiety, and religious considerations (Sabri & Young, 2022). The researchers suggested that this barrier is primarily perceived as a psychosocial obstacle.

Furthermore, economic challenges have a detrimental impact on the utilization of cervical cancer screening programs. Research carried out by Holroyd et al., (2004) demonstrated that due to financial constraints, women tend to prioritize other financial and social responsibilities related to their families over their own health, leading to self-neglect (Holroyd et al., 2004). The results indicated that expenses related to traveling to distant screening centers and screening fees deter many women from making cervical cancer screening a priority.

A cross-sectional study conducted in Tanzania revealed that 50% of the respondents were aware of the risk factors associated with cervical carcinoma. The most frequently mentioned risk factor was having multiple sexual partners. This finding contrasts with the results of a study in Ilala Municipality, Dar es Salaam, where early marriage and having multiple children were the most commonly cited risk factors. In a survey in Niger, twenty-two percent of the respondents could not list any risk factor for cervical carcinoma. Conversely, in a study conducted in Ghana, half of the respondents identified multiple sexual partners as the predominant risk factor, which is consistent with the findings in my study (Runge et al., 2019).

Barriers to cervical cancer screening included concerns about potential pain, lack of available time, the cost of the test, and the fear of receiving an unfavorable diagnosis. Other studies also identified factors hindering screening, such as the fear of discomfort, shyness, cost concerns, and the belief that they were in good health and didn't see the need for screening. These findings underscore the significance of providing information about the importance of cervical cancer screening to alleviate anxiety associated with these barriers. By taking such actions, the practice of cervical cancer screening can be encouraged, leading to a reduction in cervical cancer morbidity and mortality within our community (Srinath et al., 2023).

Regular cervical cancer screening has the potential to prevent most invasive cervical cancers. The general recommendation is for each woman in high-risk demographic groups to undergo screening at least once before considering a subsequent screening. However, in this study, only 13.7% of women had heard about screening, and merely 14.7% had undergone the test. This finding aligns with a study in Nigeria where 73.0% of women were unaware of the test, and only 5.2% had taken the test (Landy et al., 2020).

**CHAPTER III**

**RESEARCH METHODOLOGY**

**3.1 Study Objectives**

**3.1.1 General Objective**

The primary goal of this assessment was to examine the relationship between VIA status and various socio-economic factors in women who had undergone screening.

**3.1.2 Specific Objectives**

* To investigate the rate of cervical cancer screening uptake using VIA.
* To analyze the prevalence of VIA test results indicating positivity and negativity.
* To compare the prevalence of VIA status in relation to various socio-economic factors.
* To identify the factors associated with VIA status among other socio-economic factors.

**3.2 Conceptual Framework**

**Dependent Variable**

**Independent Variables**

* Area of residence
* Geographic location
* Respondent’s Age
* Respondent’s Education
* Respondent’s occupation
* Husband’s occupation
* Husband’s education level
* Parity
* Age at first marriage
* Age at first delivery
* Family income
* Ethnicity

VIA (positive and negative)

**3.3 Study Design**

This study employed a descriptive, cross-sectional study design. The choice of this design was made as it facilitated the collection of data on various variables from participants at a single point in time. A community-based approach was adopted to enable the examination of cervical cancer prevention practices within the community.

**3.4 Target Population & Sample Population**

The target population in a study is the group to which the study aims to extend its findings, often known as the theoretical population. In this particular study, the target population encompasses all women within the reproductive age range of 18 to 49 years. Meanwhile, the study population pertains to the actual sampling frame from which a sample is selected. In this study, the study population consisted of women between the ages of 18 and 49 in Bangladesh who met the specified inclusion and exclusion criteria.

**3.5 Study Site & Area**

**3.6 Study Period**

Data collection was undertaken by three teams, each consisting of four interviewers, one measurer, and a supervisor. The fieldwork commenced on January 19, 2019, and was completed on June 1, 2019. Tablet computers running the Windows 10 operating system were employed for data collection, supported by a Bluetooth application for field operations. This application facilitated the transfer of assignments and completed questionnaires between the supervisor and interviewer tablets.

**3.7 Sample Size**

The sample size was calculated using the formula introduced by Fisher et al. in 1998, with a confidence level of 95 percent. In this calculation, it was assumed that the proportion of the population possessing the desired characteristics was unknown. As a result, for Bangladesh, a figure of 50% was employed as the estimated fraction of individuals exhibiting these preferred prevention practices.

The formula is: n =

Where, n = estimated sample size

Z = 1.96 (in 95% Confidence Interval)

p = prevalence, 50% (0.50),

q = 1- 0.50 = 0.50,

d = permissible error, 5% (0.05)

So, sample size (n) = {(1.96)2\*0.50\*0.50}/ (0.05)2 = 384.16 ≈ 400. The calculated sample size was 384.16 but we collected data as a round figure of 400 respondents.

**3.8 Inclusion Criteria**

The sample consisted of females between the ages of 18 and 49. Additionally, women who were pregnant, had at least one child, and had been residents of the selected area for the previous twelve months were also included in the sample.

**3.9 Exclusion Criteria**

The sample excluded females who were in a condition of extreme frailty or illness, as they lacked the capacity to participate in the research due to their health status.

**3.10 Sampling Technique**

The study employed a multi-stage sampling approach to select both the respondents and the study location. Firstly, a purposive sampling method was used to choose the hill tract region, as it has one of the highest rates of cervical cancer cases. Secondly, the researcher applied simple random sampling to select one union from a pool of 12 unions. Simple random sampling was chosen because it provided each union an equal opportunity to be selected for the study. Specifically, the names of all unions were written on pieces of paper, folded, and one piece was randomly selected. At this stage, the Bandarban district was chosen.

Thirdly, the researcher used the same procedure to select three out of the five wards in the Bandarban district. In this step, the names of all the wards were written on paper, folded, and then three pieces were randomly chosen. The three selected wards were X, Y, and Z Wards.

Fourthly, in each of the three selected wards, one estate or village was chosen through simple random sampling. The names of all estates were written on pieces of paper, folded, and one piece was randomly selected.

Lastly, to sample the households, the investigator employed systematic sampling starting from the administrative offices in the selected estates or villages. Using systematic sampling, the research assistants selected every tenth household from the administrative center. One study respondent per household was selected until the desired sample size was achieved.

**3.11 Data Collection Tools**

The primary researcher and research assistants conducted interviews with the study participants to gather quantitative data. The questionnaire encompassed inquiries pertaining to demographic and socio-economic details, featuring a combination of open-ended and closed-ended questions. The questionnaire was structured into two sections: the first section, labeled as socio-demographic (Section A), and the second section, focusing on cervical cancer prevention practices (Section B).

**3.12** **Data Management & Analysis Plan**

Data collection will involve conducting face-to-face interviews. Prior to initiating data collection, permission will be sought from the respective couples. A comprehensive explanation of the study's purpose will be provided to the respondents. The interviews will be conducted within the slum area. Respondents will receive assurance, from an ethical standpoint, that the content of the interview will remain confidential and will not be disclosed to any unauthorized individuals.

**Data Preparation:** The data will be thoroughly cleaned and prepared for analysis, which includes the identification of missing values, outliers, and any other irregularities within the data.

**Descriptive Statistics:** Descriptive statistics will be calculated for the variables of interest. This will involve determining measures such as the mean, median, standard deviation, and frequency distribution. These calculations will provide insights into the data's distribution and facilitate the identification of outliers or unusual observations.

**Inferential Statistics:** Inferential statistical tests will be conducted to examine the study's hypotheses. These tests may include a chi-square test or logistic regression to assess the association between VIA status and various socioeconomic factors. Additionally, independent samples t-tests or ANOVA may be employed to explore differences in the use of modern family planning methods between urban and rural populations.

**Interpretation of Results:** The results of the statistical tests will be interpreted, taking into consideration elements such as p-values, effect sizes, and confidence intervals. Typically, a p-value below 0.05 is considered indicative of statistical significance, implying that there is less than a 5% probability that the results are due to random chance.

**3.13 Quality Control & Quality Assurance**

Prior to collecting data from the respondents, a friendly and welcoming environment was established, and the research objectives were clearly communicated to the participants. Throughout the data collection process, an effort was made to engage with the respondents in the local Bangla language.

**3.14** **Ethical Considerations**

Written permission will be obtained from the relevant authorities and from the respondents prior to commencing data collection. The investigator will provide the respondents with a detailed explanation of the study's objectives before collecting data.

**3.15** **Expected Outcomes**

We anticipate that there is a noteworthy correlation between VIA status and various socioeconomic factors. Our hypothesis suggests that women with a positive VIA status may be more vulnerable and less likely to fulfill their screening needs when compared to women with a more favorable socioeconomic status.

**3.16** **Work Plan**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Activities** | **Jun**  **2023** | **Jul**  **2023** | **Aug**  **2023** | **Sep**  **2023** | **Oct**  **2023** | **Nov**  **2023** | **Dec**  **2023** | **Jan**  **2023** |
| **Designing the Study** |  |  |  |  |  |  |  |  |
| **Review of Literature** |  |  |  |  |  |  |  |  |
| **Development & approval of proposal** |  |  |  |  |  |  |  |  |
| **Development of Data Collection Tools** |  |  |  |  |  |  |  |  |
| **Pre-testing Questionnaire** |  |  |  |  |  |  |  |  |
| **Data Collection, Entry & Analysis** |  |  |  |  |  |  |  |  |
| **Report Writing** |  |  |  |  |  |  |  |  |
| **Submission & Approval of Thesis** |  |  |  |  |  |  |  |  |
| **Printing, Binding, and Submission** |  |  |  |  |  |  |  |  |

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**APPENDICES**

**APPENDIX-A**

**CONSENT FORM**

Hello, my name is (your name). We are from the North South University (NSU). We are surveying the situation of children, families, and households. I would like to talk to you about your health and other topics. This interview usually takes about 45 minutes. We are also interviewing mothers about their children. All the information we obtain will remain strictly confidential and anonymous. If you wish not to answer a question or wish to stop the interview, please let me know. May I start now?

**APPENDIX-B**

**CONSENT FORM (BENGALI)**

হ্যালো, আমার নাম (আপনার নাম)। আমরা বাংলাদেশ পরিসংখ্যান ব্যুরো (বিবিএস) থেকে এসেছি। আমরা শিশু, পরিবার এবং পরিবারের অবস্থা সম্পর্কে একটি জরিপ পরিচালনা করছি। আমি আপনার স্বাস্থ্য এবং অন্যান্য বিষয় সম্পর্কে আপনার সাথে কথা বলতে চাই। এই সাক্ষাত্কারটি সাধারণত প্রায় 45 মিনিট সময় নেয়। আমরা তাদের সন্তানদের সম্পর্কে মায়েদের সাক্ষাৎকার নিচ্ছি। আমরা প্রাপ্ত সমস্ত তথ্য কঠোরভাবে গোপনীয় এবং বেনামী থাকবে। আপনি যদি কোনো প্রশ্নের উত্তর না দিতে চান বা ইন্টারভিউ বন্ধ করতে চান তাহলে অনুগ্রহ করে আমাকে জানান। আমি কি এখন শুরু করতে পারি?