

Understanding Women's Participation in Visual Inspection with Acetic Acid Screening

The Role of Characteristics, Behavior, and Psychological Factors Among Women of Reproductive Age

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ABSTRACT

The level of community health is shaped by four main determinants: environment, behaviour, health care, and heredity. Visual inspection with acetic acid (VIA) is a simple, low-cost method that can be used for early detection of cervical cancer in primary care settings, yet uptake among women of reproductive age in Indonesia remains suboptimal. This analytic observational case-control study was conducted at Puskesmas Teladan, Medan, in 2025. A total of 102 women of reproductive age were enrolled, comprising 51 women who had undergone VIA (case group) and 51 women who had never undergone VIA but had heard about the test (control group). Data on socio-demographic characteristics (age, education, occupation), behavioural factors (knowledge, attitude, practice), and psychological factors (perception, motivation) were collected using a structured questionnaire and analysed using chi-square tests and multiple logistic regression. In the multivariable model, good knowledge (adjusted odds ratio [AOR] 8.25; 95% confidence interval [CI] 2.32–29.36; $p=0.001$) and high motivation (AOR 15.92; 95% CI 5.35–47.42; $p<0.001$) were independently associated with undergoing VIA, whereas age, education, occupation, attitude, practice, and perception were not statistically significant. Women of reproductive age with better knowledge about VIA and stronger motivation are substantially more likely to undergo VIA screening. Strengthening knowledge and intrinsic motivation through health promotion and counselling at primary health centres and via Posyandu cadres may increase uptake of VIA as an early detection strategy for cervical cancer.

Keywords

Cervical Cancer
Early Detection
Psychological
Characteristics
Spouse of Fertile Age
VIA Test

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Introduction

Public health is influenced by four factors: environment, behavior, health services, and heredity. Therefore, efforts to maintain and improve public health must address these four primary factors simultaneously [1]. Reproductive health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and its functions and processes [2]. One of the problems associated with reproductive health is reproductive cancer [3].

Cervical cancer remains a significant public health challenge globally, particularly in developing countries. According to the World Health Organization [4], more than 500,000 new cases of cervical cancer are detected annually worldwide, with 90% occurring in developing countries. Nearly 260,000 women die from cervical cancer, with approximately 95% of these deaths occurring in developing nations. Without prompt intervention, cervical cancer deaths are projected to increase by nearly 25% in the next decade [4].

In Indonesia, cervical cancer ranks second among the ten most common cancers, with an estimated incidence of 20% according to 2010 data from the Department of Anatomical Pathology. Current estimates from the Indonesian Ministry of Health indicate that the number of new cases of cervical cancer in women ranges from 90 to 100 per 100,000 population, with approximately 40,000 cases occurring annually [5]. The exact incidence remains unknown as no population-based cancer registry has been fully implemented [6]. The WHO reports that VIA can detect high-grade precancerous lesions with a sensitivity of approximately 66–69% and a specificity of 64–98%, while the positive predictive value ranges between 10–20% and the negative predictive value between 92–97% [7]. Despite its availability and cost-effectiveness, uptake remains suboptimal in many regions of Indonesia.

Based on a report from the Disease Eradication and Prevention (P2P) section of the North Sumatra Provincial Health Office in 2022, only 14,716 women underwent VIA examination, of which 14,676 (99.72%) were negative, and 40 (0.27%) were positive [8]. At the Teladan Community Health Center in 2024, VIA visits numbered only 92 (1.52%) out of 6,047 women of reproductive age (WRA), with 3 positive results identified. Interviews revealed that 45% of women attended due to complaints of vaginal discharge, 35% believed

the test would cleanse the vagina, and 25% did not understand the benefits of VIA. Additionally, many women expressed embarrassment about undergoing the examination [9].

According to the Health Belief Model (HBM), an individual's likelihood of taking preventive action depends directly on perceived threat (vulnerability and severity) and considerations of benefits and costs [10]. This theoretical framework guided the investigation of factors influencing VIA uptake among women of reproductive age. Factors examined include characteristics (age, education, occupation), behavior (knowledge, attitude, practice), and psychological factors (perception, motivation).

This study aimed to analyze the relationship between characteristics, behavior, and psychology of women of reproductive age in implementing VIA as early detection of cervical cancer at Puskesmas Teladan, Medan City.

Literature Review

One cause is human Papillomavirus (hPV) infection, which stimulates changes in the behavior of cervical epithelial cells. With the development of molecular and epidemiological advances regarding hPV, cervical cancer is caused by the hPV virus [10]. Many studies with case-control and cohort studies have found a Relative Risk (RR) of the association between hPV infection and cervical cancer between 20 and 70. Risk factors for this cancer are related to oncogenic hPV infection, including early age at first intercourse, multiple sexual partners, smoking habits, and high-risk hPV infection [11].

HPV infection is the leading sexually transmitted infection in the population, with estimated prevalence ranging from 14% to 20% in European countries to 70% in the United States and 95% in the African population [12]. More than 70% of cervical cancers are caused by HPV types 16 and 18. HPV infection has a high prevalence in young people, while cervical cancer typically occurs in those aged thirty or older [13].

Diagnosis is based on history, symptoms, and clinical signs and clinical findings. This clinical examination includes inspection, palpation, colposcopy, endocervical curettage, cystoscopy, IVP (intravenous pyelography), and chest X-ray [14]. Suspicion of metastasis to the bladder or rectum should be confirmed with a plain bone film or bone scan. Cystoscopic and rectoscopy examinations are performed in cases with stage IB2 or higher. Pathological data are obtained from cervical biopsies or surgically removed tissue [15].

Cancer Pathogenesis: the general mechanism by which is that genes are responsible for regulating protein formation through transcription and translation processes and are only expressed when they produce protein. The process of cell growth and differentiation is also no less important because it determines gene expression; both processes are authorized to turn genes on and off [16]. Cancer is triggered by damage to information from proto-oncogenes and suppressor genes that cause protein templates to change from their original program, so that

gene transcription and translation become incorrect, producing abnormal proteins that escape normal regulatory control, resulting in irregular cell growth and uncontrolled cell differentiation. Most gene transformations are caused by carcinogens, especially chemical carcinogens [17].

Factors that cause women to be exposed to HPV are: Getting married or starting sexual activity at a young age (<20 years); Changing sexual partners; Having sex with men who frequently change partners; History of infection in the genital area or pelvic inflammation; Women who have given birth to many children; Women who smoke have a two and a half times greater risk of developing cervical cancer compared to non-smokers; and Women who are passive smokers (who live with families who have a smoking habit) will have a 1.4 (one point four) times increased risk compared to women who live with free air [18]

The division of cervical cancer stages is divided into 1. TNM Stage Classification. According to Desen (2011:500), the TNM classification is divided into: Stage Tis (carcinoma in situ), Stage T1 (cancer limited to the cervix), Stage T2 (cancer invasion beyond the uterus, but has not reached the pelvic wall or has not invaded the lower 1/3 of the vagina), Stage T3 (cancer expansion to the pelvic wall and/or affects 1/3 of the vagina and/or causes hydronephrosis or kidney failure), Stage T4 (cancer invades the bladder mucosa or rectum and/or exceeds the minor pelvis, Stage N0 (without regional lymph node metastasis), Stage N1 (there is regional lymph node metastasis), Stage M0 (without distant metastasis), Stage M1 (there is distant metastasis), Stage 0 (Tis N0M0), Stage I (T1N0M0), Stage II (T2N0M0), Stage III (T3N0M0, T1-3N1M0), Stage IV (T4N0-N1M0, T1-T4N0-M1). Stage classification according to The International Federation of Gynecology and Obstetrics (FIGO) (2008), divided into; Stage 0 (carcinoma in situ eliminated), Stage 1 (carcinoma is still limited to the cervix), Stage 1a (invasion can only be recognized microscopically, the depth of invasion into the stroma is no more than 5mm and the width of the lesion is no more than 7mm), Stage 1a1 (stromal invasion with a depth of <3mm and a width of <5mm), Stage 1a2 (stromal invasion with a depth of >3mm and a width of >5mm), Stage 1b (lesion is limited to the cervix or microscopically more than stage 1a), Stage 1b1 (clinically lesion size is more than <4cm), Stage 1b2 (clinically lesion size >4cm), Stage II (has involved the vagina but has not reached the lower 1/3 or infiltration into the parametrium has not reached the pelvic wall), Stage IIa1 (lesion <4cm from the largest diameter), Stage IIa2 (lesion >2cm from the largest diameter), Stage IIb (infiltration into the parametrium but has not reached the pelvis), Stage III (has involved the lower 1/3 of the vagina or there is extension to the pelvis. Hydronephrosis or impaired renal function is included in this stage unless the kidney disorder can be proven by other causes), Stage IIIa (involvement of the lower 1/3 of the vagina and infiltration of the parametrium has not reached the pelvis), Stage IIIb (extension to the pelvic wall or there is hydronephrosis or

impaired renal function), Stage IV (extension outside the reproductive organs), Stage VIA (involvement of the bladder mucosa or rectal mucosa), Stage IVb (distant metastasis or has left the pelvic cavity). Histopathological classification of stages is

1. Histopathological Type (Grade III cervical intraepithelial neoplasia, Squamous cell carcinoma in situ, Squamous cell carcinoma, Keratin, Nonkeratin, Verrucous, Adenocarcinoma in situ, Endocervical adenocarcinoma in situ, Endometrioid adenocarcinoma, Clear cell adenocarcinoma, Cervical carcinoma adenosquamous, Adenoid cystic carcinoma, Small cell carcinoma, Undifferentiated carcinoma),
2. Histological grade (Gx-Grade cannot be found, G1-Well differentiated, G2-Moderately differentiated, G3-Poor differentiation or undifferentiated) [15].

Visual acetic acid inspection (VIA) is a method of examining the cervix using a cotton swab dipped in 3-5% acetic acid or vinegar without using a microscope. Abnormal areas will turn white (acetowhite) with a clear border, indicating a possible precancerous lesion. If there is no color change, it can be assumed that there is no infection in the cervix [19]. A WHO report states that VIA can detect high-grade precancerous lesions with a sensitivity of around 66-96% and a success rate of 64-98%. The positive predictive value and negative predictive value are between 10-20% and 92-97%, respectively [4].

To address the aforementioned issues, an alternative screening method capable of identifying precancerous cervical lesions has been implemented in Indonesia, namely visual inspection with acetic acid (VIA). The primary objectives of VIA are to reduce morbidity and mortality through the early detection and treatment of cervical abnormalities and to identify precancerous changes occurring in the cervix. Compared with other cervical cancer screening methods, VIA offers several advantages. It is simple, practical, and feasible to perform, can be conducted by trained healthcare providers at various levels of the healthcare system, requires only basic equipment, and is well suited for primary healthcare facilities. In addition, its diagnostic performance is comparable to several other screening methods while providing immediate results, enabling prompt clinical decision-making and treatment when necessary [13].

The VIA procedure begins with providing the woman with a clear explanation of the examination to ensure informed participation while maintaining privacy and comfort throughout the process. The woman is then positioned in the lithotomy position, and the external genitalia and vagina are visually inspected under adequate lighting. A clean speculum is gently inserted to allow visualization of the cervix. Excess cervical secretions, if present, are removed using sterile cotton before a 3–5% acetic acid solution is applied to the cervix with a cotton swab or pipette. After approximately one minute, the cervix is examined for acetowhite changes. The appearance of distinct white areas suggests the presence of precancerous or

neoplastic lesions because acetic acid temporarily dehydrates epithelial cells and coagulates intracellular proteins, making abnormal cells with a high protein content appear white. Conversely, the absence of acetowhite lesions within the transformation zone indicates a negative screening result.

Characteristics are traits with certain characteristics [20]. Factors included in characteristics are age, education, and occupation. Age is an individual's age calculated from birth to their birthday. The older a person becomes, the more mature and capable they are of thinking critically and performing their work effectively. According to Notoatmodjo (2023), age is the number of years counted from birth to the last year a person has been active. A person's age significantly influences knowledge, attitudes, and behavior. The older a person is, the more responsible, orderly, moral, and devoted they are compared to younger people, especially in maintaining their health (in this case, related to conducting a visual acetic acid inspection test or examination for early detection of cervical cancer).

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, the nation, and the state. Work is an activity carried out by research subjects outside or inside the home that results in material or monetary rewards [20]

Jobs are more viewed from the potential for specific exposure and the degree of exposure and the magnitude of the risk according to the nature of the job will also affect the work environment and socio-economic characteristics of employees in certain jobs [1]. Behavior is an organism's actions or deeds that can be observed and even studied. Behavior is not the same as attitude. Attitude is simply a tendency to act toward an object in a way that indicates liking or disliking that object [21]. Knowledge is the result of knowing, and this occurs after a person senses a particular object. Sensing occurs through the five human senses: sight, hearing, smell, taste, and touch. Most human knowledge is acquired through the eyes and ears. Knowledge, or the cognitive domain, is very important in shaping a person's actions (overt behavior) [1]. Attitude is a crucial concept in social psychology, addressing the elements of attitudes, both individual and group. Numerous studies have been conducted to define attitudes, the processes by which attitudes are formed, and their change. Numerous studies have also examined attitudes, their effects, and their role in character formation, intergroup relationships, and the choices made based on the environment and its influence on change.

Action comes from the word act. Action is something that is done; for example, doing a job or activity, the woman smokes, meaning the woman is doing an act of smoking, or the actions of our representatives are very detrimental to our interests. Actions carried out to

overcome something: for example, to avoid the occurrence of cervical cancer, women maintain the cleanliness of their genitals or do not have sexual relations under the age of 20 years [1].

Behavioral changes began to be studied in individuals through a psychological approach. Behavior changes due to stimuli in physical, psychological, and social forms, which can involve one limited material and involve many people (groups or communities). Human behavior can be seen from 3 aspects, namely physical, psychological, and social aspects. According to Blum [22], human behavior is a reflection of various psychological aspects such as knowledge, perception, desire, will, interest, attitude, and motivation.

Perception is the experience of objects, events, or relationships obtained by summarizing information and displaying messages. Perception is an experience generated through the senses of sight, hearing, smell, and so on [1]. Motivation is a person's interaction with the situation they face. Within a person, there are needs or desires for objects external to them, and then how that person connects these needs with the external situation to fulfill those needs. Therefore, motivation is a person's reasoning for acting to fulfill their needs [1].

Based on the literature review above, researchers can formulate a theoretical basis relevant to the research objectives. According to the Health Belief Model (HBM), an individual's likelihood of taking preventive action depends directly on the outcome of two health beliefs: the perceived threat of injury or illness and considerations of benefits and costs.

The first assessment is the perceived threat of an impending risk. This refers to the extent to which a person believes a disease or illness is a real threat to them. The assumption is that as the perceived threat increases, preventive behavior will also increase. This assessment of perceived threat is based on perceived vulnerability, which is the likelihood that people will develop a health problem given their condition; and perceived severity, which is how serious the disease will be if they develop their health problem or leave it untreated. The second assessment is a comparison of the benefits and costs of the behavior in an effort to decide whether to take preventive action.

Based on the theoretical basis, the conceptual framework of the research entitled the relationship between characteristics (age, education, occupation), behavior (knowledge, attitude, action), and psychology (perception, motivation) of PUS mothers to carry out VIA tests as early detection of cervical cancer in the Teladan Community Health Center work area, Medan City is as follows. See Fig. 1.

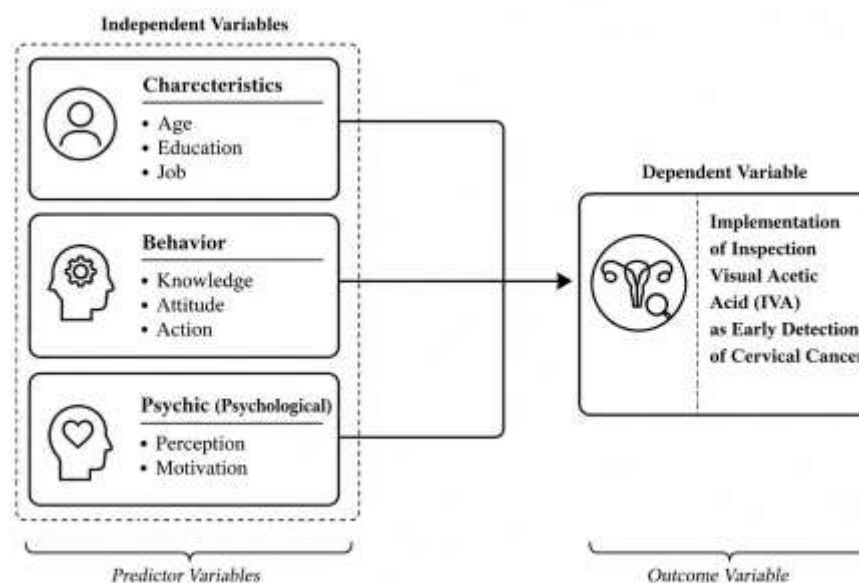


Fig. 1. Research Conceptual Framework

There is a relationship between the characteristics (age, education, and occupation), behavior (knowledge, attitude, and action), and psychological factors (perception and motivation) of PUS mothers with the implementation of VIA as an early detection of cervical cancer in the Teladan Community Health Center working area, Medan City.

Material and Methods

This study is an observational analytical study with a case-control design, aimed at analyzing the relationship between the characteristics, behavior, and psychology of fertile-age mothers in carrying out VIA examinations as early detection of cervical cancer by comparing PUS mothers who have not carried out VIA examinations and those who have carried out VIA examinations at Teladan Community Health Center, Medan City [23]

This research was conducted in the working area of the Teladan Community Health Center, Medan Kota District, Medan City, considering that the results of VIA examination coverage were still low and the Teladan Community Health Center was one of four Community Health Centers that conducted VIA examinations among 39 Community Health Centers in Medan City. This research was conducted from data collection to the results seminar, namely from May to June 2025.

The population is divided into 2 (two) groups, namely the case population and the control population. The case population is all married women who have had a VIA examination. The control population is all married women who have heard about the VIA examination and have never had a VIA examination. The PUS population is 6230 people (2489 people from Teladan Barat, 775 people from Mesjid, 864 people from Pasar Baru, 1031 people from Pusat

Pasar, 1071 people from Pandauhulu) located in the working area of the Teladan Community Health Center, Medan City [24].

The study included 102 women of reproductive age residing in the catchment area of Puskesmas Teladan, divided equally into 51 cases (ever had VIA) and 51 controls (had heard about VIA but never screened). The case-control design with group matching on age allowed comparison of women with and without VIA experience while controlling for basic age differences.

Most respondents in both groups were aged 36–49 years, had completed at least senior high school, and were not formally employed, which explains why age, education, and occupation did not emerge as significant predictors of VIA uptake in the multivariable analysis.

The sample group in this study consists of 2 (two) groups, namely the case group and the control group. The sampling technique used for sample drawing is the fixed disease sampling technique, which is a selection procedure based on the disease status or case of the subject, while the exposure status of the subject varies according to the fixed disease status of the subject [25]. The case group was selected according to the requirements and is considered representative, with the criteria being married women, residing in the Teladan Community Health Center working area, and having undergone a VIA examination. Meanwhile, the number of control groups is the same as the case group, with the criteria being married women, having heard about the VIA examination within the last 5 years, having never undergone a VIA examination, living close to the case group, and willing to be respondents. The control group was selected after matching groups based on age to obtain a control group that matches the characteristics of the case group. To determine the size of the paired sample using the formula from Lemeshow (1997), as follows:

$$\frac{Z_{1-\alpha/2}^2 \left\{ \frac{1}{[P_1^*(1 - P_1^*)]} + \frac{1}{[P_2^*(1 - P_2^*)]} \right\}^2}{[\ln(1 - e)]^2} \quad (1)$$

Where:

N: Minimum sample size

Z: Standard normal distribution value (Z table) at $\alpha = 0.05 \bullet 1.960$

P1: Proportion of exposed in case group

P2 : Proportion exposed in the control group (0.3)

e: Desired (defined) level of relative precision = 0.5

OR: Odds ratio, using OR = 2.0, for OR Knowledge

$$P_1^* : \frac{(OR)P_2^*}{(OR)P_2^* + (1 - P_2^*)} \quad (2)$$

$$P_1^*: \frac{2.0 \times 0.3}{(2.0 \times 0.3) + 0.7} = 0.46$$

So, the calculation of the sample size in this study is as follows:

$$\frac{(1.960) \left(\frac{1}{0.46 \times 0.54} + \frac{1}{0.3 \times 0.7} \right)}{[\ln(1 - 0.5)]^2}$$

$n = 50.6 \rightarrow$ rounded up to 51 samples

From the calculation of this formula, in this study the minimum sample is 51 people each for the case group and the control group.

Results and Discussions

Based on the results of the study on the age of respondents, it shows that in the case group, the majority were aged 36-49 years, namely 28 people (54.9%), likewise in the control group, the majority of respondents were aged 36-49 years, namely 36 people (70.6%). More details can be seen in the following table.

Table 1. Distribution of Respondents by Age

Age Group	Case (n=51)	Control (n=51)	p-value
15-35 years	23 (45.1%)	15 (29.4%)	0.151
36-49 years	28 (54.9%)	36 (70.6%)	
Total	51 (100%)	51 (100%)	

The results of the study showed that the respondents in the case group were mostly highly educated, 42 people (82.4%), while in the control group, most respondents were highly educated, 30 people (41.2%). This can be seen in the following table.

Table 2. Distribution of Respondents Based on Education

Education Level	Case (n=51)	Control (n=51)	p-value
Higher (Senior High School, College)	42 (82.4%)	30 (58.8%)	0.116
Low (Elementary, Junior High School)	9 (17.6%)	21 (41.2%)	
Total	51 (100%)	51 (100%)	

Based on the results of the study on respondents' employment, it was shown that in the case group, the largest number of respondents were unemployed, at 36 (70.6%), while in the control group, the largest number of respondents were also unemployed, at 41 (80.4%). Further details can be seen in the following table.

Table 3. Distribution of Respondents Based on Occupation

Occupation	Case (n=51)	Control (n=51)	p-value
Unemployed	36 (70.6%)	41 (80.4%)	0.357
Employed	15 (29.4%)	10 (19.6%)	
Total	51 (100%)	51 (100%)	

Based on the research results, there were differences in the knowledge categories of respondents in the case and control groups. In the case group, the majority of respondents (46

respondents) had good knowledge, while in the control group, the majority of respondents (54.9%) had poor knowledge. For more details, see the following table.

Table 4. Distribution of Respondents Based on Knowledge

Knowledge	Case (n=51)	Control (n=51)	p-value
Good	46 (90.2%)	23 (45.1%)	0.0001*
Poor	5 (9.8%)	28 (54.9%)	
Total	51 (100%)	51 (100%)	

Based on the research results based on the predetermined categories, there were differences in the attitudes of respondents in the case and control groups. In the case group, the majority of respondents had a positive attitude (41 respondents (80.4%)), while in the control group, the majority of respondents' attitudes were in the negative category (36 respondents (70.6%)). For more details, see the following table.

Table 5. Distribution of Respondents Based on Attitudes

Attitude	Case (n=51)	Control (n=51)	p-value
Positive	41 (80.4%)	15 (29.4%)	0.151
Negative	10 (19.6%)	36 (70.6%)	
Total	51 (100%)	51 (100%)	

Based on the research results and the predetermined categories, there were differences in the actions of respondents in the case and control groups. In the case group, the majority of respondents had positive actions, namely 41 people (80.4%), while in the control group, the majority of respondents' actions were in the negative category, namely 36 people (70.6%). For more details, see the following table.

Table 6. Distribution of Respondents Based on Actions

No	Action	Case		Control	
		f	%	f	%
1	Positive	41	80.4	15	29.4
2	Negative	10	19.6	36	70.6
	Total	51	100.0	51	100.0

Based on the research results and the predetermined categories, there were differences in the perceptions of respondents in the case and control groups. In the case group, the majority of respondents had a favorable perception (43 respondents (84.3%)), while in the control group, the majority of respondents' perceptions were in the unfavorable category (28 respondents (54.9%)). For more details, see the following table.

Table 7. Distribution of Respondents Based on Perceptions

No	Perception	Case		Control	
		f	%	f	%
1	Good	43	84.3	23	45.1
2	Not good	8	15.7	28	54.9
	Total	51	100.0	51	100.0

Based on the research results and the predetermined categories, there were differences in the motivation of respondents in the case and control groups. In the case group,

the majority of respondents had high motivation (40 respondents (78.4%), while in the control group, the majority of respondents had low motivation (43 respondents (84.3%). For more details, see the following table.

Table 8. Distribution of Respondents Based on Motivation

No	Motivation	Case		Control	
		f	%	f	%
1	Tall	40	78.4	8	15.7
2	Low	11	21.6	43	84.3
Total		51	100.0	51	100.0

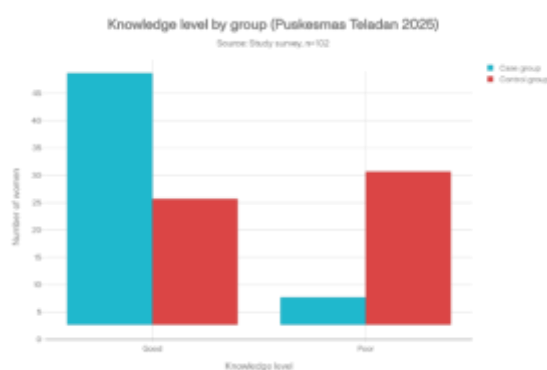


Fig. 2. Knowledge level about VIA among women who have and have not undergone VIA screening (n=102)

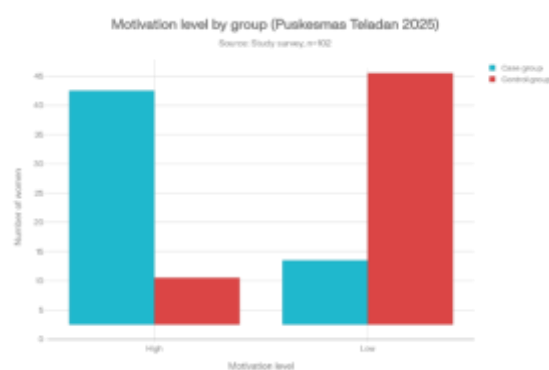


Fig. 3. Motivation to undergo VIA among women who have and have not undergone VIA screening at Puskesmas Teladan, Medan, 2025 (n=102)

The results of the study using the Chi-Square test showed that of the three characteristic variables (age, education, and occupation), three variables had an insignificant relationship, namely the age variable, the education variable, and the occupation variable. The age variable had a p-value of $0.151 > 0.05$, the education variable had a p-value of $0.116 > 0.05$, and the occupation variable had a p-value of $0.357 > 0.05$. More details can be seen in the following table.

Table 9. Cross-tabulation of the Relationship between the Characteristics of PUS Mothers and the Implementation of VIA

Characteristics	Implementation of VIA				p
	Yes (Case)		No (Control)		
	Jlh	%	Jlh	%	
Age					
15-35 years	23	46.0	15	29.4	0.151
36-49 years	28	54.0	36	70.6	
Education					
Tall	42	82.4	30	58.8	0.116
Low	9	17.6	21	41.2	

Characteristics	Implementation of VIA				p
	Yes (Case)		No (Control)		
	Jlh	%	Jlh	%	
Work					0.357
Doesn't work	36	70.6	41	80.4	
Work	15	29.4	10	19.6	
Total	51	100.0	51	100.0	

The results of the study using the Chi-Square test showed that of the 3 behavioral variables (knowledge, attitude, and action), 1 variable had a significant relationship, namely the knowledge variable, because it had a p-value = 0.0001 < 0.05. While the other 2 variables were not related, namely the attitude variable and the action variable, because the attitude variable had a p-value = 0.151 > 0.05, the action variable had a p-value = 0.357 > 0.05. More details can be seen in the following table.

Table 10. Cross-tabulation of the Relationship between the Behavior of Pregnant Women with the Implementation of VIA

Behavior	Implementation of VIA				p
	Yes (Case)		No (Control)		
	Jlh	%	Jlh	%	
Knowledge					
Good.	46	90.2	23	45.0	0.0001*
Not good.	5	9.8	28	55.0	
Attitude					
Positive	41	80.4	15	29.4	0.151
Negative	10	19.6	36	70.6	
Action					
Positive	39	76.5	13	25.49	0.357
Negative	12	23.5	38	74.51	
Total	51	100.0	51	100.0	

The results of the study using the Chi-Square test showed that of the two psychological variables (perception and motivation), all had a significant relationship because they had a significance value (p) < 0.05. The perception variable had a p-value of 0.0001 < 0.05, and the motivation variable had a p-value of 0.0001 < 0.05. More details can be seen in the following table.

Table 11. Cross Tabulation the Psychological Relationship of PUS Mothers with the Implementation of VIA

Psychic	Implementation of VIA				p
	Yes (Case)		No (Control)		
	Jlh	%	Jlh	%	
Perception					
Good	43	84.4	23	45.0	0.0001*
Not good	8	15.6	28	55.0	
Motivation					
Tall	40	78.4	8	15.6	0.0001*
Low	11	21.6	43	84.4	
Total	51	100.0	51	100.0	

To determine the relationship between characteristics (age, education, occupation), behavior (knowledge, attitude, action), and maternal psychology (perception, motivation) with the implementation of Visual Inspection with Acetic Acid (VIA) as early detection of cervical cancer, a multivariate analysis was carried out simultaneously using multiple logistic regression tests through several steps, namely:

1. Selecting potential variables to be included in the model. Variables selected as candidates or those deemed significant.
2. In this modeling, candidate variables with a p-value <0.25 were entered simultaneously in the multivariate test. From the results of the bVIariate test, the variables used as model candidates in the double logistic test were age, education, knowledge, attitude, action, perception, and motivation because the p-value <0.25 , while the occupation variable was not included in the model candidate because the p-value $= 0.357 > 0.25$.
3. The use of a statistical significance of 0.25 in multiple linear regression tests allows variables that are actually substantively important to be included in the multivariate model.
4. Furthermore, testing was carried out simultaneously with the enter method to identify the most influential factors in PUS mothers by implementing Visual Inspection with Acetic Acid as an early detection of cervical cancer.
5. Testing is conducted in stages. If a variable with a p-value >0.05 is found in the first stage, a second-stage logistic test is performed, only testing variables with a p-value <0.05 .

The results of the multivariate analysis in the first stage showed that of the 8 variables tested, only two variables had a p-value <0.05 , namely knowledge (0.017) and motVIation (0.0001), while the other six variables had a p-value >0.05 , namely age (0.931), education (0.258), occupation (0.256), attitude (0.221), action (0.219) and perception (0.926). Furthermore, variables with a value >0.05 were removed gradually. The results of the first stage test are as follows (Table 12).

Table 12. Results of the First Stage Multiple Logistic Regression Test

Independent Variables	Sig.	Exp (B)
Age	0.931*	0.948
Education	0.258*	2.148
Work	0.256*	2.126
Knowledge	0.017	6.096
Attitude	0.221*	2.385
Action	0.219*	2.362
Perception	0.926*	1.074
MotVIation	0.0001	10.501

In the second stage of testing, the results showed that the variables with a significant influence were knowledge ($p=0.001$) and motivation ($\text{sig.}=0.0001$), with a constant of -2.098. The results of the second stage of the logistic regression test can be seen in Table 13.

Table 13. Results of the Second Stage Multiple Logistic Regression Test

Variables	B	Sig.	Exp(B)/(OR)	95%CI for Exp(B)
Knowledge	2.110	0.001	8.245	2.315-29.359
MotVIAtion	2.768	0.0001	15.924	5.347-47.423
Constant	-2.098			

Of these two variables, the variable with the greatest influence is the motivation variable, and the second is knowledge. The motivation variable has a value of OR = 15.924, meaning that PUS mothers who have high motivation have a 15.9 times higher chance of implementing the Acetic Acid Visual Inspection compared to mothers with low motivation. Meanwhile, the knowledge variable has a value of OR=8.245, meaning that PUS mothers who have good knowledge have an 8.2 times higher chance of implementing Acetic Acid Visual Inspection compared to mothers with poor knowledge.

The percentage correct obtained was 80.4%, meaning that the knowledge and motivation variables can explain the relationship to the implementation of Visual Inspection with Acetic Acid as an early detection of cervical cancer by 80.4%; the remaining 19.6% is influenced by factors not examined in this study, such as distance, information, and others.

The analysis continued by testing the interaction of variables that substantially interacted only, namely knowledge and motivation. The results of the analysis showed that there was no interaction between the knowledge and motivation variables. $p=0.505 > 0.05$. More details can be seen in Table 14.

Table 14. Interaction Testing

Variables	B	Sig.	Exp B	95% CI
Knowledge by Motivation	0.945	0.505	2.572	0.160-41.310
Constant	-1.974	0.000	0.139	

From the results of the multiple logistic regression test (Table 4.21), a multiple logistic regression equation model can be created, namely:

$$\frac{1}{1 + e^{-(-2.098 + 2.110(\text{knowledge}) + 2.768(\text{motivation}))}} \quad (3)$$

From the equation model, it is shown that PUS mothers with good knowledge and high motivation have a 94% chance of carrying out Visual Inspection with Acetic Acid as an early detection of cervical cancer.

Based on the results of the study using multiple logistic regression tests, it was shown that the age of the PUS was not related to the PUS mothers undergoing VIA as an early detection of cervical cancer at Teladan Community Health Center, Medan City ($p=0.931$). Respondents in

the case group were mostly aged 36-49 years (54.0%), likewise in the control group, most were aged 36-49 years (70.6%) [26].

According to the researchers, seen from the results of this study, there is no significant difference in the age of respondents in the case group and the control group, because in the case group the largest number of respondents is aged 36-49 years; likewise in the control group the largest number of respondents is aged 36-49 years. So it can be stated that in the case group and the control group, there is no significant difference in carrying out early detection examinations for cervical cancer using the implementation of VIA [27].

Based on the results of the study using multiple logistic regression tests, it was shown that the education of the PUS was not related to the PUS mothers carrying out VIA as an early detection of cervical cancer at the Teladan Community Health Center, Medan Kota District, Medan City ($p=0.258$). Respondents in the case group were mostly highly educated (high school and college) (82.4%); likewise, in the control group, most were highly educated (58.8%) [9].

Judging from the results of this study, education does not influence PUS mothers to carry out VIA as an early detection of cervical cancer because there is no difference in education level between respondents in the case group and respondents in the control group, most of whom have higher education (high school and college). With a high level of education, respondents in the control group should have carried out VIA examinations as an early detection of cervical cancer because they already understand and comprehend the importance of early detection to prevent cervical cancer.

Based on the results of the study using multiple logistic regression tests, it was shown that the work of PUS was not related to PUS mothers carrying out VIA as an early detection of cervical cancer at the Teladan Community Health Center, Medan Kota District, Medan City ($p = 0.357$). Respondents in the case group were mostly unemployed or housewives (70.6%); likewise in the control group, most were unemployed or housewives (80.4%) [26].

Respondents in this study, both the case group and the control group, were mostly housewives (not working), so there was no visible difference in behavior between the respondents because with the status of not working (housewives), some of them carried out the implementation of VIA examinations in the case group, but in the control group, although most of them were housewives, they did not carry out the implementation of VIA examinations as early detection of cervical cancer [27].

The bivariate test results of the relationship between EFA knowledge and the implementation of VIA as an early detection of cervical cancer obtained a significant value (p) = 0.0001. There was a difference in knowledge between the case group and the control group. Most respondents in the case group had good knowledge (90.2%), while in the control group,

more respondents had poor knowledge (54.9%) compared to those with good knowledge (45.1%) [28].

The results of this study indicate a difference in knowledge between respondents in the case group and those in the control group. In the case group, most respondents were in the good category (90.2%), while in the control group, most respondents were in the poor category (54.9%). Good knowledge will encourage mothers to undergo VIA because they feel that performing VIA as an early examination will prevent or detect cervical cancer early. In contrast, mothers who lack knowledge or information about VIA examinations will not undergo VIA [29].

Based on the results of the study using multiple logistic regression tests, it was shown that the attitude variable did not influence the PUS mothers to carry out VIA as an early detection of cervical cancer at the Teladan Community Health Center, Medan Kota District, Medan City ($p=0.221$). There was a difference in attitude between the case group and the control group. Most respondents in the case group had a positive attitude (19.6%), while in the control group, more respondents had a negative attitude (70.6%) than those with a positive attitude (29.4%) [10].

Based on the results of the study using multiple logistic regression tests, it was shown that the action variable did not affect PUS mothers in carrying out VIA as an early detection of cervical cancer at the Teladan Community Health Center, Medan Kota District, Medan City ($p = 0.219$). There were differences in actions between the case group and the control group. Most respondents in the case group had positive actions (19.6%), while in the control group, more respondents had negative actions (70.6%) than positive actions (24.0%) [30].

Based on the results of the study using multiple logistic regression tests, it was shown that the perception variable did not influence the decision of PUS mothers to carry out VIA as an early detection of cervical cancer at the Teladan Community Health Center, Medan Kota District, Medan City ($p=0.926$) [31]. There was no significant difference between respondents who had a positive perception and respondents who had a less positive perception in carrying out VIA as an early detection of cervical cancer [32].

According to the researcher, if seen from the results of this study, there is no influence on the perception of PUS mothers to carry out VIA as an early detection of cervical cancer that respondents in the case group mostly have a good perception (84.4%), while respondents in the control group the number of respondents who have a good and less good perception is almost the same, namely mothers who have a good perception (45.0%), while those who have a less good perception (55.0%) [33]. The high number of mothers who have a less good perception in the control group causes them to have no desire to carry out VIA [34].

The results of the bivariate test of the relationship between the motivation of PUS and the implementation of VIA as an early detection of cervical cancer obtained a significant value

(p) = 0.0001. There was a difference in motivation between the case group and the control group. Most respondents in the case group had high motivation (78.4%), while in the control group, there were more respondents with low motivation (84.3%) compared to those with high motivation (15.7%). Based on the results of the study using multiple logistic regression tests, the study showed that the motivation of PUS had a significant effect on PUS mothers carrying out VIA as an early detection of cervical cancer at the Teladan Community Health Center, Medan Kota District, Medan City (p = 0.0001). The motivation variable was the most dominant variable influencing mothers in carrying out the VIA examination, with an OR value of 15.924 (95% CI: 5.347-47.423), meaning that PUS mothers with high motivation had a 15.9 times higher chance of carrying out VIA than mothers with low motivation [35].

The primary requirement for community participation is motivation. Without motivation, it is difficult for communities to participate in any program. Motivation must arise from the community itself (intrinsic motivation), and external parties only stimulate it. Therefore, health education (extrinsic motivation) is essential to foster motivation [1].

Conclusion

This study demonstrated that the uptake of visual inspection with acetic acid (VIA) for early detection of cervical cancer among women of reproductive age in the working area of Puskesmas Teladan, Medan, remains suboptimal. Although most respondents were in the 36–49-year age group and had relatively high formal education, socio-demographic characteristics such as age, education, and occupation were not significantly associated with VIA utilisation. These findings indicate that structural or demographic attributes alone are insufficient to explain women's participation in cervical cancer screening. In contrast, behavioural and psychological factors played a decisive role. Women with good knowledge about VIA and cervical cancer were substantially more likely to undergo screening than those with poor knowledge, underscoring the importance of accurate information and cognitive understanding in shaping preventive health behaviour. Likewise, high motivation emerged as the strongest predictor of VIA uptake, suggesting that internal drive, perceived benefits, and readiness to act are critical determinants of screening behaviour in this population. Taken together, the results support the Health Belief Model, whereby perceived threat and perceived benefits, translated into knowledge and motivation, are more influential than background characteristics in determining screening behaviour. Efforts to increase VIA coverage should therefore prioritise structured health promotion, targeted counselling, and motivational interventions delivered through primary health centres and community health volunteers. Strengthening these approaches is expected to improve early detection of cervical cancer, reduce the burden of advanced disease, and ultimately contribute to better reproductive health outcomes for women in this setting.

Limitation and Suggestions

For mothers of PUS to know how to prevent and avoid cervical cancer and to carry out VIA. To be input for Community Health Centers to implement VIA. To develop a policy plan to increase the number of VIA tests and provide education on VIA and cervical cancer for early detection of cervical cancer. It can be used as input in preparing health service plans for health workers in community health centers who are directly involved in implementing VIA, so that it can make a positive contribution in reducing the incidence of cervical cancer. To be an input for the world of reproductive health education.

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Conflict of Interest

The authors declare no conflict of interest.

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