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Analysis of Factors Related to Behavior towards Visual Inspection with Acetic Acid Test among Women of Childbearing Age and Elderly Women

Dewi Novitasari Suhaid[1], Margaretha Kusmiyanti[1]*

[1]STIK Sint Carolus, Jakarta, Indonesia

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CORRESPONDING AUTHOR

Dewi Novitasari Suhaid
Salemba Raya 41, Jakarta
dewinovitasarisuhaid@gmail.com
+628998333211

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A B S T R A C T

Cervical cancer is second leading cause of mortality among women. Cervical cancer is caused by Human Papillomavirus (HPV) infection. 70% of patients with cervical cancer come to health services in advanced staged, even though if symptoms are detected earlier. 43% of cancer disease can be prevented and ⅓ of cases can be cured when the symptoms are detected early. The simplest early detection, which effective and efficient for detection of cervical cancer is Visual Inspection with Acetic Acid (VIA) test. However, almost 50% of patients who were diagnosed cervical cancer never had VIA test before. This study aims to analyze factors related to behavior towards VIA test among women of childbearing age and in elderly women. Case control study was conducted among 181 participants based on the inclusion criteria of women aged >15 years old and married or ever had sexual intercourse. Rasch model test, t-test, chi square test and logistic regression were applied to analyze the data. The analysis results showed that there was a significant relationship between the age at first marriage, marriage frequency and knowledge with behavior towards VIA test. An individual's chance of not having VIA test by criteria of first married age of <20 years old, getting married >1 time, having low motivation and less knowledge was 94%. It can be concluded that knowledge was dominant factor related behavior towards VIA test.

Kanker serviks menduduki peringkat kedua yang menyebabkan kematian bagi penderitanya. Kanker serviks diakibatkan dari infeksi Human PapilomvVirus (HPV). 70% perempuan yang mengalami kanker serviks datang ke fasilitas kesehatan dalam kondisi stadium lanjut, padahal 43% penyakit kanker dapat dicegah dan ⅓ kasus dapat sembuh jika gejala diketahui secara dini. Deteksi dini yang paling sederhana, efektif dan efisien untuk mendeteksi kanker serviks salah satunya melalui dengan pemeriksaan IVA. Namun hampir 50% dari penderita yang terdiagnosis kanker serviks tidak pernah pemeriksaan IVA. Tujuan dilakukannya penelitian ini adalah menganalisis faktor yang berhubungan dengan perilaku pemeriksaan IVA pada perempuan usia subur dan lansia. Penelitian kasus kontrol dilakukan pada 181 orang responden degan kriteria usia >15 tahun, menikah atau pernah berhubungan seksual. Uji Rasch model, uji t, chi square dan regresi logistik digunakan untuk menganalisis kesimpulan dari hasil penelitian. Hasil analisis menunjukkan bahwa terdapat hubungan yang bermakna antara usia pertama menikah, frekuensi menikah, dan pengetahuan dengan pemeriksaan IVA. Peluang seseorang untuk tidak memeriksakan IVA dari kriteria usia pertama menikah <20 tahun, responden yang menikah >1 kali, yang memiliki motivasi dan pengetahuan kurang adalah sebesar 94%. Kesimpulan penelitian adalah pengetahuan merupakan faktor yang paling dominan mempengaruhi perilaku pemeriksaan IVA.

Introduction

Cancer is a disease that initially begins with the uncontrolled growth of abnormal cells in certain organs or tissues of the body, which then attack adjacent parts of the body or other organs (WHO, 2018). In 2020, the global incidence of newly detected cancer cases was estimated at 19.21 million cases and the mortality due to this disease was 9.9 million people. 49.3% of new cancer cases were found in Asia, and 58.3% of cancer deaths were also found in Asia (Globocan, 2020a).

Every year, 311.000 women die because of cervical cancer. In this area, 80% of this disease is diagnosed when the woman's condition has entered an advanced stage (WHO, 2020). Globally, cervical cancer is the fourth leading cause of death for women in 2020 after breast cancer, lung cancer and colon cancer. The incidence of cervical cancer is 6.5% with a total of 9 million cases (Globocan, 2020b).

In Indonesia with a total population of 273 million people, cancer was detected in 396.914 people and death caused by cancer reached 234.511 people. Cervical cancer is the second most common type of cancer with an incidence of 17.2% of total new cases. 21.003 deaths of women in Indonesia was due to cervical cancer (Globocan, 2020b).

80% of cervical cancer cases are caused by infection with Human Papillomavirus (HPV) types 16 and 18, which have oncogenes of E6 and E7, and can be transmitted through sexual intercourse. There are 100 identified types of HPV, but only 13 types that cause cervical cancer. When a virus infects the body, it makes two harmful proteins that cause certain genes to become inactive, thereby inactivating the development of tumor-protective genes. Both cause aggressive growth and genetic mutations in uterine lining cells (Andrijono, 2018). Not all abnormal cells become cancerous, but they can develop into a cancer called Cervical Intraepithelial Neoplasia (CIN). This condition is synonymous with dysplasia. The development of cervical cancer can be divided into several stages including: mild dysplasia stage which lasts five years, moderate dysplasia stage which lasts three years, severe dysplasia which lasts one year, followed by cancer stages from stage 0 to stage IV b (Fusco, 2008).

World Health Organization (WHO) states that 43% of cancers can be prevented with a healthy lifestyle and 1/3 of all cases can be cured if the symptoms are recognized early. Early stage of cervical cancer can be diagnosed by cytology through VIA test (WHO, 2020). Almost 50% of cervical cancer patients have never had an VIA test (WHO, 2020). The VIA test is a method for the early detection of a possible cervical cancer using an acetic acid concentration of 3-5%. Visualization by inspection can assess cervical cellular dysplasia. The VIA test was first introduced in March 1924 by Hinselmann. The technique was introduced through a cervical swab containing 3-5% acetic acid and pressed for about a minute to assess changes in the cervix. The concentration of acetic acid affects abnormal epithelial cells and increases the osmotic pressure of the extracellular fluid. Under such condition, hypertonic extracellular fluid attracts intracellular fluid, leading to cell membrane dysfunction and decreasing the distance between epithelial cells. When viewed under light, the collapsing epithelial cells cannot transmit light to the stroma, so they reflect light and appear white (Kemenkes, 2015).

The Precede-Proceed theory introduced by Lawrence Green (1980), states that behavior can be influenced by three determinants including predisposing factors (knowledge, attitudes, culture and

values); supportive factors (healthcare facilities such as hospitals and medications); and driving factors (health care workers and indigenous peoples). The WHO states that these three factors are not the only factors that can change a person's behavior. The presence of violence/coercion, rules and education can also influence behavior change. Influential factors for behavior towards VIA test include age, educational level, employment status, knowledge, family support, and support from healthcare workers (Crosby, 2011; Handayani, Arum, & Setiyawa, 2017).

The increasing phenomenon of cancer prevalence in Indonesia is currently a complicated problem. 1 in 1000 Indonesian women will develop cervical cancer. In fact, 80% of patients come for medication and treatment at an advanced stage, and 94% of them die within two years. Awareness of the importance of cancer prevention is one strategy to overcome this problem. Prevention can be done in two ways, primarily through vaccination and secondarily through early detection or screening. A simple and inexpensive screening method is visual inspection with acetic acid test.

The national target for cervical cancer screening is reaching 34 million women in 2025. Considering that the number of Indonesian women population aged 20-65 was 59.473.500 in 2020, the national target in 2025 will surely be difficult be achievable if the scope of investigation is only 8% per year (Statistics of Indonesia, 2020). Therefore, in order to accelerate the achievement of the national target, efforts must be made to increase coverage of cervical cancer screening. Observing the situation by considering women's risk factors correlated with behavior towards VIA test will help various parties formulate strategies to anticipate and motivate women in order to consciously undertake VIA test.

This study aims to analyze the relationship between age, education, employment status, parity and age at first marriage, marriage frequency, knowledge, motivation and behavior towards VIA test.

Methods

This was a quantitative study with a case-control design. The dependent variable for this study was the behavior towards VIA test. Independent variables of this study included knowledge, motivation, attitudes, age, employment status, parity, age at first marriage, marriage frequency and level of education were identified as confounding variables. The study was conducted from October 2019 to February 2020. The sample size was calculated using the Slovin formula with an absolute accuracy of 5% and a confidence level of 95%, so it was obtained 164 respondents. To avoid possible drop-outs, 10% was added so that the required total sample was 181 respondents, who were assigned into 58 groups who had ever performed VIA test and 123 people who had never performed VIA test.

The study samples were collected in the area of hamlet 003, Tanah Tinggi Village, Johar Baru, Central Jakarta District. Samples were selected used a simple random sampling technique with computerization to select respondents representing 13 neighborhoods in the area of hamlet 003 and were assigned into two categories; those who had ever performed VIA test and those who never had VIA test. The number of populations per neighborhood against the number of samples needed was estimated. The number of samples per neighborhood was as follows: 10-9-13-13-15-11-15-10-13-19-10-16-15-14. Inclusion criteria included women aged >15 years old, married, or ever had sexual intercourse. Exclusion criteria included women with a history of cervical cancer and those who were unwilling to

participate in the survey. Selected respondents who were willing to participate in this study were asked to sign an informed consent form which stated information regarding the study. Then a questionnaire involving personal identity data, 20 questions on knowledge, 20 questions on motivation and 13 questions on attitude was delivered. The questionnaire used have passed the validity and reliability tests at a 95% confidence level, with a Cronbach's alpha values of 0.821 for the questions of knowledge; 0.841 for the questions of motivation and 0.799 for the questions of attitude.

Data processing was conducted systematically. Test for normality of data applied the Liliefor's test. Data with normal distribution were analyzed using the t-test. Data that were not normally distributed were changed into means to generate data in the form of categories and analyzed by the chi-square test. Data were transformed with a measurement scale using a Likert scale through Rasch model analysis to generate data in terms of categories and then were re-analyzed using the chi-square test. Decision making in multivariate analysis used a logistic regression test. Computer-aided statistical test applied Winsteps and SPSS 22 software.

Results

The study was conducted among 181 selected respondents. Two groups were identified in this study. There were 58 people (32%) in the group who had ever performed VIA test and 123 people in the group who had never performed VIA test.

Table 1. Results of the Transformation of Knowledge, Attitude and Motivation

Variable	Cut-off point	
Knowledge*	Median	75
Attitude in the group who had ever performed VIA test **	Mean (logit)	54.77
Attitude in the group who had never performed VIA test **	Mean (logit)	50.58
Motivation in the group who had ever performed VIA test **	Mean (logit)	65.29
Motivation in the group who had never performed VIA test **	Mean (logit)	65.22

* Analyzed using Liliefor's test
** Analyzed using Rasch model

Table 1 shows the results of transforming knowledge, attitude and motivation variables into categorical variables. In the next step, knowledge above 75 is classified as good knowledge and below 75 as less knowledge. Attitudes in the VIA study group are transformed into supportive and non-supportive attitudes with a cut-off point of 54.77. Attitudes in the group who never had the VIA test were transformed into supportive and non-supportive attitudes with a cut-off point of 50.58. The motivation in the group that had the VIA test was converted into less and good motivation with a cut-off point of 65.29. Motivation in the group who never had VIA test was broken down into less and good motivation with a cut-off point of 65.22.

Table 2. Characteristics of Respondents Regarding Behavior towards VIA test

Variable	Never had VIA test	Ever had VIA test	P value	OR (95% CI)
Age				
Mean	46.89	44.26		
Median	44.00	44.50	0.357*	-1.722 – 6.408
Min-Max	19-85	20-74		
Employment status				
Unemployed	106 (58.6%)	47 (26%)	0.501**	1.459
Employed	17 (9.4%)	11 (6%)		(0.635 – 3.355)
Parity				
≥3	49 (27.1%)	23 (12.7%)	0.981**	1.008

Variable	Never had VIA test	Ever had VIA test	P value	OR (95% CI)
<3	74 (40.9%)	35 (19.3%)		(0.532 – 1.907)
Age at first marriage				
<20 years old	43 (23.8%)	12 (6.6%)	0.050**	2.060
≥20 years old	80 (44.2%)	46 (25.4%)		(0.987 – 4.299)
Marriage frequency				
>1 time	17 (9.4%)	2 (1.1%)	0.034**	4.491
1 time	106 (58.6%)	56 (30.9%)		(1.001 – 20.136)
Education				
Primary level	74 (40.9%)	33 (18.2%)	0.799**	1.144
Higher level	49 (27.1%)	25 (13.8%)		(0.608 – 2.154)

* Analyzed using t-test
** Analyzed using chi square

Table 2 shows that the mean age of the respondents was 44 and 46 years. The results of the analysis indicated that there was no significant relationship between age and towards behavior VIA test (p-value=0.357 >0.05). Most of respondents in the two groups were unemployed, the majority of respondents were housewives and did not earn any money from their families. Bivariate analysis showed that there was no significant relationship between employment status and behavior towards VIA test (p-value=0.501 >0.05). Regarding the part, most of respondents in both groups had a parity of <3. Statistically, there was no significant relationship between parity and behavior towards VIA test.

Most of respondents in both groups were married at the age of >20 years old. However, looking at a total of 181 respondents, almost half (30.4%) were married before the age of 20 years old. The results of statistical tests showed that there was a significant relationship between age at first marriage and behavior towards VIA test (p-value=0.050 <0.05). Close relationship analysis showed that respondents who were married >20 years of age were 2 times more likely to do VIA test (OR=2,060). In general, respondents married only once. However, a small proportion (10.5%) of respondents had married more than one time. The results of the analysis showed that the marriage frequency was significantly related to the behavior of the VIA test (p-value=0.034 <0.05). The OR value of 4.491 indicated that respondents who had married once were 4.5 times more likely to perform VIA test.

Out of a total of 181 respondents, most (59.1%) of respondents had the primary level of education. In this case, the primary education in question referred to a 9-year compulsory education set by the government, up to upper secondary level. Also, the dominance looked the same in both groups, the percentage variance was higher for respondents with primary education in both groups that had ever performed VIA test and had never performed VIA test at all. Further analysis showed that there was no significant relationship between level of educational and behavior towards VIA test.

Table 3. Relationship between Motivation, Attitude and Knowledge with Behavior towards VIA test

Variable	Had never performed IVA test	Had ever performed VIA test	P value	OR (95% CI)
Motivation				
Poor	73 (40.3%)	42 (23.2%)	0.124*	0.556
Good	50 (27.6%)	16 (8.8%)		(0.282 – 1.097)
Attitude				
Non-supportive	72 (39.8%)	33 (18.2%)	0.835*	1.070
Supportive	51 (28.2%)	25 (13.8%)		(0.569 – 2.011)
Knowledge				
Poor	51 (28.2%)	12 (6.6%)	0.010*	2.715
Good	72 (39.8%)	46 (25.4%)		(1.309 – 5.632)

The results of the analysis described in table 3 showed that most of respondents (63.5%) were poorly motivated to perform VIA test. The results of the bivariate analysis showed that there was no significant relationship between motivation and behavior towards VIA test (p-value=0.124 >0.05). Table 3 also revealed that most of respondent (58%) had a non-supportive attitude to perform VIA test. The results of the analysis showed that there was no significant relationship between attitude and VIA test, as evidenced by the p value of 0.835 >0.05. 39.8% out of a total of 181 respondents in the group who had never performed VIA test had a good knowledge regarding VIA test. Likewise, 24.5% of respondents in the group that had ever performed VIA test had a good knowledge regarding VIA test. The results of the analysis using the chi-square test showed that knowledge was significantly related to the behavior regarding VIA test (p-value=0.010 <0.05). The power of exposure was completed with an OR=2.715, meaning that respondents with a good knowledge had a 2.7 times higher chance of having VIA test than respondents with poor knowledge.

Table 4. Logistic Regression Analysis of Age at First Marriage, Marriage Frequency, Motivation and Knowledge with Behavior towards VIA test

Variable	Coef (β)	SE (β)	Wald	P value	Exp.B (95% CI)
First marriage at the age of <20 years	0.521	0.393	1.761	0.184	(0.78-3.637)
Marriage frequency of >1 time	1.348	0.787	2.932	0.087	(0.823-17.994)
Poor motivation	-0.687	0.361	3.614	0.057	(0.248-1.022)
Poor knowledge	0.928	0.387	5.766	0.016	(1.186-5.398)
Constant	0.682	0.316	4.668	0.031	

Hoshmer and Lemeshow tests=0.838
Logistics Regression Equation=0.977

From table 4 it was known that the logistic regression model could explain the data well, as evidenced by the Hoshmer and Lemeshow test values of >0.05. The multivariate analysis showed that the most important factor influencing the VIA test in area of hamlet 003, Tanah Tinggi Village, Johar Baru District, Central Jakarta was knowledge. This is supported by the knowledge analysis results with the lowest p-value (p-value=0.016) and the highest proximity (Wald=5.766). The results of this multivariate analysis applied the enter method. The results of the calculation using the logistic regression probability formula obtained a value of 0.977, which meant that the probability that a person did not perform VIA test from the criteria for age at first marriage <20 years, marriage frequency of >1 time, had poor motivation and knowledge was 97.7%.

Discussion

VIA test is one of the preventive examinations recommended by the WHO for the early detection of cervical cancer. The advantages of the VIA test are that it meets the criteria for a good screening test and this test is comparable to pap smear and HPV or colposcopy regarding the sensitivity and specificity (Nuranna, 2012). The VIA test can be performed at any time during the menstrual cycle, pregnancy, and postpartum care. This test may be performed on women who are suspected or known to have a sexually transmitted disease or HIV/AIDS. Predisposing factors that trigger cervical cancer include age in first sexual intercourse <20 years old, multiple sexual partners, history of chlamydia or gonorrhea, particularly HIV/AIDS, having mother or sister with cervical cancer, history of abnormal pap smear

results, and smoking. In addition, women with immune-compromised problems (eg HIV/AIDS) or chronic corticosteroid users (eg, medications for asthma or lupus) are more likely to develop cervical cancer if they are infected with HPV (Moh RI, 2015).

VIA test is one of the efforts that can be easily performed by someone to detect cervical cancer early. However, usually a woman comes to the health care system late in the final stage of cancer. This is because cervical cancer does not cause any symptoms that patients experience in the early stages. Furthermore, patients are not screened regularly for cervical cancer, and this may reduce the chances of recovery from advanced disease (WHO, 2020).

Cervical cancer is the second leading cause of death in women after breast cancer (Globocan, 2020a; WHO, 2018). WHO recommends that cancer can be optimally treated with a greater chance of cure if someone carries out regular screening. Cervical cancer screening can be performed by pap smear, colposcopy and VIA test. The VIA test is one of the simple tests that is simple, inexpensive and leads to conclusions immediately. Sectional dysplasia can be identified with a smear containing 3-5% cervical acetic acid (Sari & Abdiana, 2019).

The results of the analysis showed that not all observed characteristics were related to the VIA test. Age at first marriage and frequency of marriage were factors which were related to behavior towards VIA test. The results of the study found that age, employment status, parity, and education were not significantly related to an individual's decision to take a VIA test. This is consistent with a study conducted by Putu Ika Widayanti in Yogyakarta on 2017, which found that education and employment status did not have a significant relationship with VIA test (Widayanti, Tyastuti, & Hernayanti, 2018). The study finding is also in line with a study conducted by Sri Dew Handayani on 2017 that age and parity did not have significant relationship with VIA test (Handayani et al., 2017). However, a study conducted in 2019 in Cibinong, Indonesia, found that age was significantly related to VIA test (Pebrina, Kusmiyanti, & Surianto, 2019).

Age and parity cannot be used as a benchmark to assess whether or not an individual desires to take an IVA test. This is influenced by several aspects that determine a person's decision. According to Harvey in Sabri Alisub it is explained that maturity is not always affected by age (Sabri, 2007). The maturity to think wisely and determine behavior when dealing with a problem were influenced by other factors such as knowledge and emotional maturity. In fact, maturity of thought is directly proportional to age, but under certain conditions it is inversely proportional. Factors of experience and understanding influence how a person thinks and acts (Sabri, 2007).

So far it has been assumed that the relationship between age at first marriage and frequency of marriage using the VIA test is influenced by one's own knowledge. Women who have a good understanding of the risk factors for cervical cancer have a higher awareness of having VIA test. The move is believed to be one of the efforts to help women detect cervical cancer early. A person's decision to have VIA test is influenced by several other factors and is linked to health behavior. Health behavior can be interpreted as an individual's response to stimuli related to health status (Siregar, Panggabean, & Simbolon, 2021). This condition manifests itself in the form of knowledge, perceptions, attitudes,

support from health care workers, use of facilities, and even of take the medicine (Crosby, 2011; Dewi, 2014).

It is well known that knowledge is the most significant factor which influence a person to decide whether they want to take a VIA test or not. The results of this study are consistent with the study conducted by Sri Dewi Handayani and Siregar (Handayani et al., 2017; Siregar et al., 2021). The relationship between knowledge and VIA test was also found in the study conducted by Sidabutar (Sidabutar, 2018). However, the attitudes and motivations in this study are inconsistent with the findings of a study on the same topic (Sidabutar, 2018). Another study conducted by multiple researchers found that knowledge was significantly related to VIA test (Nurhayati, 2019; Purwanti, Handayani, & Kusumasari, 2020).

Lewin (1951) describes behavior as being related to individual and environmental characteristics. Here, motivation, personality traits and social interactions can be identified as characteristics. Environment has a major impact on behavior change, and the impact is even more significant than the individual characteristics. Therefore, relationship between these two factors in determining a person's behavior becomes very complex (Crosby, 2011; Dewi, 2014; Sabri, 2007).

Regarding behavior change decisions, a person's attitude influences behavior based on rationality and life implications. Behavior is developed not only by general attitudes but by specific attitudes towards stimuli. Attitudes and subjective norms influence decisions in determining a person's behavior. These two things make up interest and behavioral intention. The subjective norm can be interpreted as belief in the actions of others in order for us to follow the pattern. The interplay of attitudes, subjective norms, and interests form the determinants that a person believes in whether the behavior is important or not (Kusnadi, 2015).

Green proposed that behavior is influenced by three factors, including predisposing, supportive and motivating factors. These factors were identified in healthcare workers' knowledge, attitudes, motivation, health facilities, and support (Crosby, 2011).

Knowledge can be interpreted as information gained through learning efforts about some information. Knowledge can be the basis for decisions and actions to deal with a problem. There are several factors that influence knowledge, including education, employment status, age, interest or motivation, experience, and information. It is undeniable that education is one of the most influential factors in someone’s knowledge. The higher a person's level education, the easier it is for him or here to obtain information, which in turn increases knowledge. Similar to work, this condition creates an environment that allows a person to interact with one another, resulting in experiences that influence knowledge. In line with these two factors, age becomes an internal influence that can change a person's perspective and thought patterns to become more mature (Kusnadi, 2015; Purwanti et al., 2020; Sidabutar, 2018).

Attitude is a reaction or response that is still closed to an object's stimulus. Attitude is followed up as a willingness to act based on motivational purpose. In fact, attitudes are formed after someone knows information and has experienced an event. Attitudes can be shaped as a medium of

communication, meaning that they function as a chain of links between individuals and their groups (Nurhayati, 2019; Siregar et al., 2021; Widayanti et al., 2018).

Martin Fishbien and Ajzen found that there was a relationship between attitudes and behavior which was also related to beliefs derived from norms and intentions. This theory was introduced as the theory of reasoned behavior or reasoned action. Furthermore, this theory was modified by Ajzen into a theory of planned behavior which includes three aspects including belief, motivation and awareness (Mahyarni, 2013).

In this study, it is assumed that the tendency of women not to have VIA test was influenced by attitudes, but this did not change the behavior, since the awareness of carrying out an early screening due to some fears affecting the next, life was not changed. The study found that some respondents feared pain, either fear of pain during the exam, fear of repeated use of the instrument (sterility of the instrument), or fear of knowing the results. All this information forms the confidence in the person not to do IVA test. Several other factors influencing individual attitudes are known information (knowledge) found through past experiences or through mass media/social media, the influence of information provided by others, and emotional factors.

Motivation is intended to bring about changes in behavior. Woodworth mentions that there are three motivational traits that can influence behavior, including: intensity, direction, and persistence (Widayanti et al., 2018). However, if any of these three traits are found to be weak, the individual's behavior cannot be changed. The weakness of the drive that causes the individual to avoid a behavior leads to a tendency to repeat the behavior believed to be true. In this study, it was concluded that motivation had no significant association with VIA test, which could be caused by several other factors affecting VIA test behavior and motivation. These factors include habits, attitudes, norms, traumatic experiences, sociocultural, environmental, perceptions and reactions of other individuals or groups.

Conclusions

Based on the results of the examinations carried out, several conclusions can be drawn. First, only a small proportion of women of childbearing age and elderly women had ever performed VIA test. Furthermore, there was a relationship between age, employment status, level of education and knowledge with behavior towards VIA test. The dominant factor which influenced behavior towards VIA test found in this study was knowledge. Therefore, increasing knowledge is one of the strategies that can be implemented to encourage people to undertake VIA test. One of the activities that involve the community in order to increase knowledge is the activation of peer groups in every community activity.

In addition, to improve the quality of the theory found, there should be further research by using any of the educational methods to increase the level of public knowledge.

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