



Early Warning System of Cervic Cancer (EWS Ca. CERVIC) In Women of Reliable Age Based on Mobile

Aprina^{1*}), Titi Astuti², Gustop Amatiria³

¹ Academic Nursing, Poltekkes Tanjungkarang, Indonesia

² Academic Nursing, Poltekkes Tanjungkarang, Indonesia

ARTICLE INFO

Article history:

Received 20 July 2022

Accepted 31 October 2022

Published 10 December 2022

Keyword:

Factors
Cervical Cancer
Application

ABSTRACT

Cervical cancer is cancer with the highest prevalence in Indonesia. In the form of an application for early detection of cervical cancer risk so that the Cervical Cancer Early Warning System (EWS Ca Cervical) can perform early detection of cervical cancer and can provide solutions regarding appropriate early prevention and can assist the public in recognizing risk factors for cervical cancer in women of childbearing age and make it easier for people to use this application. This research aims to obtain a model of an early detection system for Ca. The cervix in women of childbearing age is mobile-based. This type of research is an observational analytic study with an analytical research design with a cross-sectional approach. The measuring instrument/instrument for data collection is a questionnaire for primary data obtained during the research. The research will be conducted from April to December 2022. The research will be conducted in Lampung Province. The population of this study was all women of childbearing age. The sample size in this study was 388 samples with random sampling data collection techniques. Data analysis with a univariate analysis method was carried out descriptively and for bivariate analysis using Chi-Square statistical test, with a 95% confidence degree, for multivariate analysis using a logistic regression test. The results showed that there was a relationship between education, age, age at first having sex, the pattern of sexual intercourse, parity, personal hygiene and use of panty liners, smoking, oral contraceptives, nutritional deficiencies, socioeconomic status, sexual partners, history of venereal disease and the risk of cervical cancer, the results of data processing on the ISO 25010 test by testing two aspects, namely functional suitability and usability, stated that the EWS Ca Cervical application software had an overall percentage of applications getting a score of 88% which means the application is good to use, it is hoped that this application will be an early intervention used in women childbearing age can be carried out more effectively and efficiently so that women can prevent cervical cancer early

This open access article is under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Kata kunci:

Factors
Cervical Cancer
Application

*) corresponding author

Dr. Aprina, S.Kp., M.Kes

Jurusan Keperawatan
Poltekkes Tanjungkarang
Jl. Soekarno Hatta No.1, Hajimena,
Kec. Natar, Kabupaten Lampung
Selatan, Lampung 35145

ABSTRAK

Cervical cancer is cancer with the highest prevalence in Indonesia. In the form of an application for early detection of cervical cancer risk so that the Cervical Cancer Early Warning System (EWS Ca Cervical) can perform early detection of cervical cancer and can provide solutions regarding appropriate early prevention and can assist the public in recognizing risk factors for cervical cancer in women of childbearing age and make it easier for people to use this application. This research aims to obtain a model of an early detection system for Ca. The cervix in women of childbearing age is mobile-based. This type of research is an observational analytic study with an analytical research design with a cross-sectional approach. The measuring instrument/instrument for data collection is a questionnaire for primary data obtained during the research. The research will be conducted from April to December 2022. The research will be conducted in Lampung Province. The

Email: Aprinamurhan@yahoo.co.id

DOI: 10.30604/jika.v7i4.1378
Copyright @author(s)

population of this study was all women of childbearing age. The sample size in this study was 388 samples with random sampling data collection techniques. Data analysis with a univariate analysis method was carried out descriptively and for bivariate analysis using Chi-Square statistical test, with a 95% confidence degree, for multivariate analysis using a logistic regression test. The results showed that there was a relationship between education, age, age at first having sex, the pattern of sexual intercourse, parity, personal hygiene and use of panty liners, smoking, oral contraceptives, nutritional deficiencies, socioeconomic status, sexual partners, history of venereal disease and the risk of cervical cancer, the results of data processing on the ISO 25010 test by testing two aspects, namely functional suitability and usability, stated that the EWS Ca Cervical application software had an overall percentage of applications getting a score of 88% which means the application is good to use, it is hoped that this application will be an early intervention used in women childbearing age can be carried out more effectively and efficiently so that women can prevent cervical cancer early



This open access article is under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

INTRODUCTION

Cervical cancer is the fourth most common cancer in women with an estimated 530,000 new cases, representing 7.9% of all female cancers. In 2015 about 90% of deaths or as many as 270,000 due to cervical cancer occurred in low- and middle-income countries (World Health Organization, 2017). The American Cancer Society's estimate for cervical cancer in the United States for 2018 is approximately 13,240 new cases of invasive cervical cancer. Approximately 4,170 women will die from cervical cancer (American Cancer Society, January 2018). In 2018, an estimated 930 new cases of cervical cancer will be diagnosed in Australia (Australian Institute of Health and Welfare, January 2018). In Hong Kong, cervical cancer is the seventh most common cancer among women with 500 new cases in 2015, accounting for 3.3% of all new cancer cases in women (Soerjomataram, 2017).

Cervical cancer is a cancer with the highest prevalence in Indonesia in 2015, namely in Lampung Province by 0.2% or as many as 765 people (Ministry of Health, 2015). In 2016 out of 1,739 EFA women suspected of cervical cancer, Lampung province was the third highest with a total of 227 cases after DKI Jakarta (269 cases) and Bali as many as 254 cases (Ministry of Health, 2017).

One of the causes of cervical cancer is the Human Papilloma Virus (HPV) which is transmitted through sexual intercourse (Samadi, 2010). Women are usually infected with HPV in their teens to thirties, but cancer will appear 10 to 20 years later. Risk factors for HPV infection are sexual intercourse at an early age, having sex with multiple partners and having a partner who likes to change partners. Co-factors that allow HPV infection to be at risk for cervical cancer include immune status (HIV positive patients), high parity, smoking, co-infection with other sexually transmitted diseases or long-term use (more than 5 years) oral contraceptives (more than 5 years). WHO, 2006).

The incidence of cervical cancer is influenced by various factors, including socio-demographic factors including age, socioeconomic status, and sexual activity factors which include age at first sexual intercourse, multiple sexual partners, uncircumcised sexual partners, parity, lack of sexual intercourse, maintaining genital hygiene, smoking, history of venereal disease, family history of cervical cancer patients, chronic trauma to the cervix, use of sanitary

napkins and panty liners, diethylstilbestrol (DES) and use of oral contraceptives (Winkjosastro, 2016)

Cervical cancer cannot be prevented, but it can be detected earlier than before. Early detection of cervical cancer can be done by performing cervical self-examination, VIA examination, routine pap smears and initial examination of suspected wounds. The earlier the cancer is detected, the greater the chance of curing it. To overcome this, the expertise of a specialist in this field is needed to make a diagnosis and examination, so that the treatment carried out is truly precise and accurate. However, the problem is, until now the distribution of specialist doctors has not been evenly distributed in Indonesia, so that in certain areas there is still a shortage of medical personnel, in this case especially specialist doctors, as well as these examinations, of course, require money and time-consuming so that a system is needed that can perform early detection of cervical cancer, and can provide solutions regarding appropriate treatment and prevention, so that it can help the community without having to go to a specialist.

Reports from 25 hospitals with the number of cancer patients visiting and being treated at hospitals in Lampung Province in 2018 reached 283 patients and the achievement of early detection of cervical cancer in 2018 was 7,920 people. In 2019, out of 8,705 women of childbearing age (WUS) who underwent an IVA examination, 306 WUS with a positive IVA where the highest case was in South Lampung Regency of 2,900 women who underwent an IVA examination, 57 people were declared positive or equal to (1.96%) and The lowest was in West Lampung and Pesisir Barat Districts with an incidence of 0. Meanwhile, Central Lampung District of 480 women who had an IVA examination, as many as 19 (3.95%) women with a positive IVA (Lampung Provincial Health Office, 2019). In 2019, out of 1,210,947 women aged 30-49 years, as many as 28,612 (2.36%) women who had an IVA examination, the highest district was in South Lampung Regency with 11,459 (8.02) people and the lowest in Lampung Tengah with 171 (0.09%) (Lampung Provincial Health Office, 2016)

The development of computer technology is so rapid that it can be used as a data processing tool and information producer as well as a tool for decision making on a particular problem. The science that studies how to make computer technology so that it can act and have the same intelligence as humans is artificial intelligence (Artificial Intelligence). An

expert system is one part of artificial intelligence that is able to imitate the reasoning of an expert so that computers can solve certain problems. Knowledge stored in expert systems is generally taken from a human who is an expert in a particular problem. The important role of an expert can be assisted by a computer program which in principle works to provide a definite solution as is usually done by experts (Tena, 2017)

A computer programming model that can be operated by health workers at the primary level is currently very much needed considering that it is very helpful in detecting cervical cancer risk factors. Various methods or programs have been developed by the Government of Indonesia to detect cervical cancer early, for example in a very simple way, namely IVA, but this method still does not meet the target because WUS are less interested in conducting examinations so that the achievements expected by health services in this case are Puskesmas has never been achieved, besides that there is an examination with a Pap smear but this program has not shown good results because the incidence of cervical cancer is increasing every year.

According to MC Leod in Lubis (2016) "The system is a set of components or variables whose contents are from several interrelated, connected, and mutually supportive parts as a whole united in unity to achieve certain goals effectively". a person with specialized knowledge and experience, accompanied by methods for solving problems in a particular field. Expert system A computer application used to help make decisions or solve problems in a particular field. Applications are computer programs that aim to perform specific tasks from the user. Android is a touch screen mobile device that uses an operating system. Basic4Android is a RAD (Rapid Application Development) tool that is used to create Android-based applications.

The mobile-based Early Warning System for Cervical Cancer (EWS Ca Cervical) is a technology in the form of an application to detect the risk of cervical cancer early so that the Early Warning System for Cervical Cancer (EWS Ca Cervical) can perform early detection of cervical cancer and can provide solutions regarding early prevention that appropriate and can help the public in recognizing risk factors for cervical cancer in women of childbearing age and make it easier for people to use this application.

This study aims to create a mobile-based Early Warning Cervical Cancer System (EWS Ca. Cervical) model in women of childbearing age..

METHODE

This type of research is an analytic study with a cross-sectional approach to analytical research design. The research will be conducted from April to December 2022. The research is planned to be conducted in Lampung Province. The study population was all female mothers of childbearing age. The sample size is 388 samples with random sampling data collection techniques, measuring instruments / data collection instruments are questionnaires for primary data obtained during the research. The dependent variable is the risk of cervical cancer while the independent variables of this study are education, age, age at first having sex, sexual intercourse patterns, parity, personal hygiene and use of panty liners, smoking, oral contraceptives, nutritional deficiency, socioeconomic, sexual partners, history of venereal disease, oral contraceptives. This research will be divided into 3 stages, namely stage 1

collecting and processing quantitative data, stage 2 developing a model for early detection of Ca. Cervix in mobile-based women of childbearing age, stage 3. feasibility test of the "EWS Ca. Cervix", expert workshops, and socialization of the "EWS Ca. Cervix" to find out the weakness of the model. Statistical analysis will be poured into simulator programming to produce models of "EWS Ca. Cervix" which can be used to estimate the risk of cervical cancer in women of childbearing age which can be accessed online based on mobile. Data analysis with univariate analysis method was carried out descriptively and for bivariate analysis using Chi Square statistical test, with a 95% confidence degree, for multivariate analysis using logistic regression test.

RESULT

EWS Ca Cervical Application User Calculation Software ISO 25010

The mobile-based EWS Ca cervical application was tested for feasibility using ISO 25010. The trial was conducted on 142 female respondents of childbearing age, by answering 8 questions consisting of 2 questions regarding Functional Suitability, namely the extent to which the software is able to provide functions that meet the needs that can be used, under certain conditions. And 6 Questions about Usability, namely the extent to which a product or system can be used by certain users to achieve goals effectively, efficiently, and certain satisfaction in the context of use, and each question has an answer choice and the score consists of Strongly agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (2).

$$\begin{aligned} \text{Persentase ISO 25010} &= \frac{\text{actual score}}{\text{ideal score}} \times 100\% \\ &= \frac{4972}{5680} \times 100\% \\ &= 88\% \end{aligned}$$

Then the calculation results obtained from the questionnaire, then compared with the range of score interpretation criteria to state the results obtained with the range of interpretation criteria. (Sugiyono, 2018)

Interpretation Criteria Range

No	Criteria Range	Criteria
1	0% - 20%	Very Not Good
2	21% - 40%	Not good
3	41% - 60%	Not good
4	61% - 80%	Well
5	81% - 100%	Very good

The results of data processing on the ISO 25010 test by testing two aspects, namely functional suitability and usability, stated that the EWS Ca Cervical application software had an overall percentage of applications that scored 88%, which means the application is very good to use based on the range of interpretation scores for use.

Cervical Cancer Risk Factors

Table 1
Frequency Distribution of Cervical Cancer Risk Factors

VARIABEL	KATEGORI	FREQUENCY	PERCENT
Cervical Cancer Risk Factors	high risk	272	70,1
	alert	116	29,9
Age	risky	143	36,9
	no risk	245	64,1
Education	Base	124	32,0
	Tall	264	68,0
Age of first having sex	risky	238	61,3
	no risk	150	38,7
Sexual Relationship Pattern	Abnormal	109	28,1
	Normal	279	71,9
parity	risky	148	38,1
	no risk	240	61,9
Use of panty liners	Once	250	64,4
	Never	138	35,6
Smoke	Active smoker	77	19,8
	Passive smoker	311	80,2
Nutritional deficiency	< BMI or > BMI	129	33,2
	According to BMI	259	66,8
Economic status	<UMR	248	63,9
	>UMR	140	36,1
Sexual partner	> From 1	266	68,6
	1	122	31,4
Use of contraceptives	hormones	151	38,9
	Non-hormonal	237	61,1
History of venereal disease	There is a history	36	9,3
	There isn't any	352	90,7
Total		388	100

Tabel 2.
Corelation Cervical Cancer Risk Factors

Variabel	Category	Cervical Cancer Risk Factors				Total		P_ Value	OR (95%CI)
		High Risk		Alert		n	%		
		N	%	n	%				
Age	risky	140	97,9	3	2,1	143	36,9	0,019	1,629 (1,100-2,413)
	no risk	132	53,9	113	46,1	245	63,1		
Education	Base	109	87,9	15	12,1	124	32,0	0,025	1,672 (1,086-2,576)
	Tall	163	61,7	101	38,3	264	68,0		
Age of first having sex	risky	207	87,0	31	13,0	238	61,3	0,000	8,732 (5313-14.50)
	no risk	65	43,3	85	56,7	150	38,7		
Sexual Relationship Pattern	Abnormal	94	86,2	15	13,8	109	28,1	0,042	1,611 (1,040-2,495)
	Normal	178	63,8	101	36,2	279	71,9		
parity	risky	136	91,9	12	8,1	148	38,1	0,040	1,711 (1,053-2,778)
	no risk	136	56,7	104	43,3	240	61,9		
Use of panty liners	Once	177	70,8	73	29,2	250	64,4	0,385	1,097 (0,699-1,724)
	Never	95	68,8	43	31,2	138	35,6		
Smoke	Active smoker	66	85,7	11	14,3	77	19,8	0,001	3,058 (1,549-6,038)
	Passive smoker	206	66,2	105	33,8	311	80,2		
Nutritional deficiency	< BMI or > BMI	104	80,6	25	19,4	129	33,2	0,001	2,253 (1,359-3,736)
	According to BMI	168	64,9	91	35,1	259	66,8		
Economic status	<UMR	200	80,6	48	19,4	248	63,9	0,000	3,935 (2,491-6,217)
	>UMR	72	51,4	68	48,6	140	36,1		
Sexual partner	> From 1	157	59,0	109	41,0	266	68,6	0,001	2,264 (1,384-3,705)
	1	115	94,3	7	5,7	122	31,4		
Use of contraceptives	hormones	139	92,1	12	7,9	151	38,9	0,000	9,058 (4,761-17,231)
	Non-hormonal	133	56,1	104	43,9	237	61,1		
History of venereal disease	There is a history	27	75,0	9	25,0	36	9,3	0,500	1,310 (0,596-2,881)
	There isn't any	245	69,6	107	30,4	352	90,7		

Based on the results of the study, it is known that of the 388 respondents, most of the respondents with high risk were 272 (70.1%), the age of the respondents was mostly 245 (63.1%)., the first age to have sex some of the respondents were at risk as many as 238 (61.3%), the pattern of sexual relations of some of the respondents was normal as much as 279 (71.9%), the parity of the respondents was mostly not at risk as much as 240 (61.9%), Respondents most of the passive smokers were 311 (80.2%), the nutritional deficiency of most of the respondents according to BMI was 259 (66.8%), the economic status of most of the respondents was below the minimum wage as much as 248 (63.9%), most of the respondents' sexual partners 1 as many as 266 (68.6%) using contraception, most of the respondents using non-hormonal contraception as many as 237 (61.1%) and the majority of respondents having no history of venereal disease as many as 352 (90.7%)

Based on table 2. In the Age variable statistical test results obtained p-value = 0.019 which means $< \alpha$, it can be concluded that there is a relationship between age and cervical cancer risk with an OR value of 1.629 meaning respondents with age at risk have a 1.6 times greater chance of experiencing cervical cancer when compared with respondents with age not at risk.

Based on table 2. In the Education variable, the statistical test results obtained p-value = 0.025 which means $< \alpha$, it can be concluded that there is a relationship between education and the risk of cervical cancer with an OR value of 1.672, which means that respondents with basic education have 1 times greater chance of experiencing cervical cancer. when compared to respondents with higher education.

Based on table 2. In the variable Age of first having sex with statistical test results obtained p-value = 0.000 which means $< \alpha$, it can be concluded that there is a relationship between the age of first having sex with the risk of cervical cancer with an OR value of 8.732, which means that respondents with the age at risk of having sex 8 times greater chance of having cervical cancer when compared to respondents with age not at risk.

Based on table 2. In the Variable Pattern of sexual intercourse statistical test results obtained p-value = 0.042 which means $< \alpha$, it can be concluded that there is a relationship between the pattern of sexual intercourse with the risk of cervical cancer with an OR value of 1.611, which means that respondents with abnormal sexual intercourse patterns have a chance 1.6 times more likely to have cervical cancer.

Based on table 2. In the Parity variable statistical test results obtained p-value = 0.040 which means $< \alpha$, it can be concluded that there is a relationship between Parity and the risk of cervical cancer with an OR value of 1.097 meaning that respondents with parity at risk have a 1.9 times greater chance of experiencing cervical cancer.

Based on table 2. In the variable using panty liners, the statistical test results obtained p-value = 0.385 which means $< \alpha$, it can be concluded that there is no relationship between the use of panty liners and the risk of cervical cancer with an OR value of 1.097.

Based on table 2. In the smoking variable, the statistical test results obtained p-value = 0.001 which means $< \alpha$, it can be concluded that there is a relationship between smoking and the risk of cervical cancer with an OR value of 3,058 meaning that respondents with smoking have a 3,058 times greater chance of developing cancer.

Based on table 2. In the Nutrition Deficiency variable, the statistical test results obtained p-value = 0.001 which means $< \alpha$, it can be concluded that there is a relationship between

Nutritional Deficiency and the risk of cervical cancer with an OR value of 2.253 which means that respondents with Nutritional Deficiency have a 2.253 times greater chance of experiencing cervical cancer.

Based on table 2. In the variable economic status statistical test results obtained p-value = 0.000 which means $< \alpha$, it can be concluded that there is a relationship between economic status and the risk of cervical cancer with an OR value of 3.935 which means that respondents with less economic status have a 3,935 times greater chance have cervical cancer.

Based on table 2. On the sexual partner variable, the statistical test results obtained p-value = 0.001 which means $< \alpha$, it can be concluded that there is no relationship between sexual partners and the risk of cervical cancer with an OR value of 2.264.

Based on table 2. In the variable use of contraceptives, the results of statistical tests obtained p-value = 0.000 which means $< \alpha$, it can be concluded that there is a relationship between the use of contraceptives and the risk of cervical cancer with an OR value of 9.058, which means that respondents with the use of hormonal contraceptives have 9 chances. times more likely to have cervical cancer

Based on table 2. In the history of venereal disease, the statistical test results obtained p-value = 0.500 which means $< \alpha$, it can be concluded that there is no relationship between history of venereal disease and the risk of cervical cancer with an OR value of 1.310.

Analisis Multivariate

According to Hastono (2016), multivariate analysis aims to see several independent variables (more than 1 variable) which are the most dominant to the dependent variable. To obtain information on which variables are most dominantly associated with pneumonia, it is necessary to perform multiple logistic regression analysis of predictive models. The stages of the analysis modeling are as follows:

Table 3
Bivariate Analysis Results for Multivariate Model Candidate Selection

Variabel	<i>p-Value</i>
Age	0,000
Education	0,000
Age First Have Sex	0,000
Sexual Relationship Pattern	0,000
parity	0,000
Use of Panty liners	0,687
Smoke	0,001
Nutritional Deficiency	0,001
Economic Status	0,000
Sexual Couple	0,000
Use of Contraceptives	0,000
History of venereal disease	0,000

Bivariate Selection

Bivariate selection is carried out one by one for each variable with a p-value of 0.25, then the variable is included in the multivariate model. For variables with p-value > 0.25 but

substantially important, then these variables can be included in the model. When it is entered into multivariate analysis, the variables that remain in the multivariate model are those with p-value > 0.05. Variables with p-value > 0.05 were excluded from the multivariate model one by one starting with the largest p-value. Based on the results of the bivariate selection, the following results were obtained (table 3). Based on the table 3, it is known that there are 11 variables that are candidates for modeling because the p-value 0.25.

Modeling stage

At the modeling stage, all multivariate candidate variables were included in the model, then the logistic

regression results were evaluated using Wald's statistical test for each variable with an alpha standard of 0.05. Variables with alpha values > 0.05 were removed one by one from the model, starting with the model with the highest alpha value. Another consideration is looking at the change in the odds ratio (OR) value by comparing the OR value before and after the covariate variable is removed, if there is an OR value of more than 10% then the variable can be maintained in the model.

Stage 1 model

Based on the evaluation of the selection results in the phase 1 model, the following results were obtained:

Table 4
Multivariate Model Double Logistics Regression Stage 1

Variabel	Sig.	OR	95% C.I.for EXP(B)	
			Lower	Upper
Age	0,998	1.3221	0,000	0,000
Education	0,612	0,749	0,246	2.286
Age First Have Sex	0,000	6.678	3.584	12.442
Sexual Relationship Pattern	0,285	0,540	0,174	1.673
parity	0,999	0,000	0,000	0,000
Use of Panty liners	0,326	1.398	0,717	2.727
Smoke	0,525	0,666	0,190	2.335
Nutritional Deficiency	0,130	0,526	0,229	1.208
Economic Status	0,000	4.034	2.178	7.474
Sexual Couple	0,197	0,455	0,138	1.505
Use of Contraceptives	1,000	0,005	0,000	0,000
History of venereal disease	0,363	1.728	0,532	5.615

Based on table 4 above, the multivariate model of stage 1 turns out to be the variable that has the highest p-value, namely the Contraceptive Device Use variable (p=1,000). So the exclusive

ASI variable is the first variable that must be removed from the model

Table 5
Multivariate Model After Variable Use of Contraceptive Devices is Excluded

Variabel	Sig.	OR	95% C.I.for EXP(B)	
			Lower	Upper
Age	0,998	8.9522	0,000	0,000
Education	0,612	0,749	0,246	2.286
Age First Have Sex	0,000	6.678	3.584	12.442
Sexual Relationship Pattern	0,285	0,540	0,174	1.673
parity	0,998	0,000	0,000	0,000
Use of Panty liners	0,326	1.398	0,717	2.727
Smoke	0,525	0,666	0,190	2.335
Nutritional Deficiency	0,130	0,526	0,229	1.208
Economic Status	0,000	4.034	2.178	7.474
Sexual Couple	0,197	0,455	0,138	1.505
History of venereal disease	0,363	1.728	0,532	5.615

Table 6
Changes in OR Value After Risk Factors are removed

Variabel	OR1	OR2	Change OR (%)
Age	1.3221	8.952	4.269
Education	0,749	0,749	0,000
Age First Have Sex	6.678	6.678	0,000
Sexual Relationship Pattern parity	0,540	0,540	0,000
Use of Panty liners	0,000	0,000	0,000
Smoke	1.398	1.398	0,000
Nutritional Deficiency	0,666	0,666	0,000
Economic Status	0,526	0,526	0,000
Sexual Couple	4.034	4.034	0,000
History of venereal disease	0,455	0,455	0,000
	1.728	1.728	0,000

Because there was no change in the OR value > 10% before and after the contraceptive device was removed from the model, the risk factor variables were still excluded from the model. The next stage is the creation of a multivariate model without the variable Age and multiple logistic regression analysis is performed.

Model tahap 2

Based on the evaluation of the selection results in the phase 2 model, the following results were obtained:

Table 7
Multivariate Model Double Logistics Regression Stage 2

Variabel	Sig.	OR	95% C.I.for EXP(B)	
			Lower	Upper
Education	0,855	0,917	0,363	2,317
Age First Have Sex	0,000	6.815	3.851	12.058
Sexual Relationship Pattern parity	0,810	1.118	0,448	2.789
Use of Panty liners	0,002	4.491	1.759	11,466
Smoke	0,507	1.238	0,659	2.324
Nutritional Deficiency	0,476	1.455	0,518	4,085
Economic Status	0,360	0,707	0,336	1.487
Sexual Couple	0,000	3.179	1.820	5.552
History of venereal disease	0,035	0,341	0,125	0,929
	0,376	1.635	0,551	4.856

Based on the table above, the stage 2 multivariate model turns out to be the variable that has the highest p-value, namely

the Education variable (p=0.855). So the Education variable is the second variable that must be removed from the model.

Table 8
Multivariate Model After Education Variable is excluded

Variabel	Sig.	OR	95% C.I.for EXP(B)	
			Lower	Upper
Age First Have Sex	0,000	6.796	3.846	12.010
Sexual Relationship Pattern parity	0,832	1.103	0,447	2.719
Use of Panty liners	0,001	4.355	1.814	10.454
Smoke	0,508	1.237	0,659	2,323
Nutritional Deficiency	0,490	1.428	0,520	3,921
Economic Status	0,362	0,708	0,336	1,488
Sexual Couple	0,000	3.182	1.822	5.558
History of venereal disease	0,034	0,348	0,132	0,921
	0,372	1.641	0,553	4,869

Table 9
Changes in OR Value After Education is issued

Variabel	or1	or2	Change OR (%)
Age First Have Sex	6.815	6.796	0,019
Sexual Relationship Pattern	1.118	1.103	0,015
parity	4.491	4.355	0,136
Use of Panty liners	1.238	1.237	0,001
Smoke	1.455	1.428	0,027
Nutritional Deficiency	0,707	0,708	0,001
Economic Status	3.179	3.182	-0,003
Sexual Couple	0,341	0,348	0,007
History of venereal disease	1.635	1.641	-0,006

Because there is no change in the OR value > 10%, the next step is to create a multivariate model without the parity variable and perform multiple logistic regression analysis.

Model tahap 3

Based on the evaluation of the selection results in the stage 3 model, the following results were obtained:

Table 10
Stage 3 Multivariate Logistics Regression Model

Variabel	Sig.	OR	95% C.I.for EXP(B)	
			Lower	Upper
Age First Have Sex	0,000	6.796	3.846	12.010
Sexual Relationship Pattern	0,832	1.103	0,447	2.719
Use of Panty liners	0,508	1.237	0,659	2.323
Smoke	0,490	1.428	0,520	3.921
Nutritional Deficiency	0,362	0,728	0,336	1.488
Economic Status	0,000	3.182	1.822	5.558
Sexual Couple	0,034	0,348	0,132	0,921
History of venereal disease	0,372	1.641	0,553	4.869

Based on table 10 above, it turns out that the variables that are significantly related to the risk of cervical cancer have a p-value <0.05, namely the variable Age at first having sex, economic status and sexual partners with values (P-value 0.000, 0.000 and 0.034) Based on the OR value The variables obtained were age at first having sex (OR: 6.796), Variable economic status (OR: 3.182) while variable for sexual partners (OR: 0.348) So the most dominant variable associated with cervical cancer was age at first having sex..

DISCUSSION

Age correlationWith Cervical Cancer Risk

In the Age variable, the statistical test results obtained p-value = 0.019 which means $< \alpha$, it can be concluded that there is a relationship between age and cervical cancer risk with an OR value of 1.629, meaning that respondents with age at risk have a 1.6 times greater chance of experiencing cervical cancer when compared to with respondents with age not at risk.

This study is in line with Putri's research (2017) in the age group of respondents when diagnosed with illness more in the 46-55 year age group. The existence of a group of respondents who were diagnosed with cervical cancer in the age group of 26-35 years shows that cervical cancer also attacks women at a younger age. The incidence of cervical cancer in developing countries begins to increase at the age of 20-29 years and reaches a peak around the age of 55-64 years, and the decline will occur after the age of 65 years. The results of the homogeneity test showed that the variance of the respondent's

age group when diagnosed with illness was homogeneous. This shows that there is no difference between the two groups of respondents when diagnosed.

Age is the length of a person's life which shows the time a person has been born. The more old enough, the level of maturity and strength of a person will be more mature in thinking and working. Cervical cancer can occur at the age of 18 years. In general, there are four categories of physical growth, namely changes in size, changes in proportions, loss of old characteristics and the emergence of new characteristics, this occurs due to the maturation of organ functions (Notoatmodjo, 2018).

According to the literature, when a woman is 35 years old, the location of the squamocolumnar junction epithelium which was previously located on the outer cervix becomes inside the uterine cervical canal, where the junction between this epithelium tends to proliferate easily and if uncontrolled, cell dysplasia can occur which at one time can lead to the opposite direction. violence (Putri, 2017). This study is in line with the research conducted by Puspitasari (2016) which obtained the results of the chi-square statistical test with a p value of 0.021. Because the p-Value value is 0.021 <0.05, which means that Ho is rejected, which means that there is a relationship between the age of the respondent and the incidence of cervical cancer. This explains that the age group >35 years has 12 times the risk of cervical cancer compared to respondents in the age group 35 years.

Educational correlationWith Cervical Cancer Risk

In the Education variable statistical test results obtained p-value = 0.025 which means $< \alpha$, it can be concluded that there is a

relationship between education and the risk of cervical cancer with an OR value of 1.672, meaning that respondents with basic education have 1 times greater chance of experiencing cervical cancer when compared to respondents with higher education.

In this study, education was identified as one of the risk factors for cervical cancer. This finding is comparable to another case-control study conducted by Shield TS et al. in women exposed to the oncogenic strain of human papillomavirus. The results showed that low education, low income and unclear history of genital infections increased the risk of cervical carcinoma. These findings are also comparable with other studies conducted by Tbeu PM et al. about attitudes and knowledge about cervical cancer. The results showed that uneducated, housewives, and women who gave birth to their first child before the age of 20 years were associated ($P < 0.005$) with cervical cancer (Nainakashi et al., 2019)

This happens because the higher a person's level of education, the easier it is to obtain information about cervical cancer so that the more knowledge he has. Someone who has a high level of education tends to have a more developed and more logical mindset (Notoadmojo, 2014).

In this study, it was found that the level of education was related to cervical cancer, possibly because the low level of education with the incidence of cervical cancer was influenced by the low level of patient knowledge about cervical cancer so that they paid less attention to genital hygiene and were late in early detection of cervical cancer. This study is in accordance with the research conducted by Fanny Asyfa (2019) with the results of patient characteristics in the univariate analysis based on education level that 32 samples with a high education level with a percentage of 47.1%, and a low education level of 36 samples with a percentage of 52, 9%. The results of the bivariate analysis showed that the level of education with low education in cervical cancer patients with a total of 23 samples (63.9%) and higher education in patients without cervical cancer with a total of 21 samples (65.6%). = 0.029 which means that there is a relationship between level 6 education and the incidence of cervical cancer because ($p < 0.05$ Chi Square test (χ^2)). This happens because the higher a person's level of education, the easier it is to obtain information about cervical cancer so that the more knowledge he has.

Researchers argue in other words, cervical cancer sufferers with low education are risk factors that affect the occurrence of cervical cancer. Women with low education pay less attention to health, especially health that has to do with the cleanliness of their genitals, so they will have a risk of getting cervical cancer. In women with higher education, the interest in doing VIA examinations is also getting higher. The results of another study on parents of teenage girls showed that the higher the education level of the parents, the higher the willingness to vaccinate their daughters with HPV. Parents with a high level of education generally have a better level of knowledge and information than someone with a low level of education. The understanding of parents with higher education is better than the understanding of parents with low education regarding efforts to prevent cervical cancer through HPV vaccination (Karneli et al., 2013).

First Age correlation Having Sex With Cervical Cancer Risk

In the variable Age of first having sex with statistical test results obtained p -value = 0.000 which means $< \alpha$, it can be concluded that there is a relationship between the age of first having sex with the risk of cervical cancer with an OR value of 8.732, meaning that respondents with age at risk have 8 times more chances more experienced cervical cancer when compared to respondents with age not at risk.

The results of this study are also in line with research conducted by Rina Chairani Lubis (2019), the majority of respondents who had sex for the first time < 20 years were 36 people (62.1%). Based on direct interviews with respondents, generally respondents had sexual intercourse at the age of 19 years. For the control group, the majority of respondents had

sexual intercourse 20 years as many as 39 people (67.2%). Based on the simple logistic regression test in which the age variable for the first time had sexual intercourse, obtained a value ($p = 0.002$; OR = 3.359 95% CI 1.566-7.203). That is, there is an effect of age at first having sex on the incidence of cervical cancer where age at first having sex < 20 years has a 3.4 times greater risk of cervical cancer compared to the age of first having sex 20 years. Based on the results of the study, respondents had sexual intercourse at the age of 16 years.

The results of this study are in accordance with the theory where according to the theory the age at first having sex at risk of cervical cancer is age 18 years, while the results of this study are more respondents aged 18 years.

Correlation Pattern of Sexual Relationships With Cervical Cancer Risk

In the pattern of sexual intercourse variables, the results of statistical tests obtained p -value = 0.042 which means $< \alpha$, it can be concluded that there is a relationship between the pattern of sexual intercourse and the risk of cervical cancer with an OR value of 1.611, which means that respondents with abnormal sexual relations have a 1.6 times chance more likely to have cervical cancer.

Another host factor is the age of starting sexual activity, the younger the chance of suffering from cervical cancer is 3.9 times greater. Likewise in his research that the age of first menstruating will be at risk of 2.92 times greater. Agent factors include the type of virus, infection of several types of oncogenic HPV at the same time, the number of viruses. Other exogenous factors are coinfection with other sexually transmitted diseases, long-term use of hormonal contraceptives. To provide good knowledge about the importance of reproductive health, good communication with adolescents and women is needed with various media and communication, both directly and indirectly.

Husband-wife sex should be done regularly 1-4 times a week. The consideration is that the frequency is in accordance with the rhythm of the body or the physiological conditions of men and women. Sperm production by the testicles has met the storage quota within three days. (Idhayanti, 2020).

Correlation Parity With Cervical Cancer Risk

In the Parity variable statistical test results obtained p -value = 0.040 which means $< \alpha$, it can be concluded that there is a relationship between Parity and the risk of cervical cancer with an OR value of 1.097 which means that respondents with parity at risk have a 1.9 times greater chance of experiencing cervical cancer.

This is in accordance with Aminanti's (2013) theory which states that parity is dangerous to have more than 2 children or the delivery distance is too close, because it can cause changes in abnormal cells in the cervix. If the number of children born through the normal way can cause abnormal cell changes from the epithelium in the cervix and can develop into malignancy.

The results of this study indicate that the incidence of cervical cancer is influenced by respondents who are in the category of multipara parity (> 2). The more often you give birth, the greater the risk of cervical cancer. The high number of parity, can increase the incidence of cervical cancer, caused when starting sexual contact for the first time due to birth trauma. Women with parity 5 or more have a risk of cervical cancer 2.5 times greater than women with parity 3 or less. Based on the theory, the higher the parity, the higher the incidence of cervical cancer, but the high parity is not a cause but as a factor. risk for HPV infection. Trauma to the cervix and frequent injuries to the reproductive organs during childbirth can facilitate the entry of HPV as the causative agent of cervical cancer. Changes in the composition of the hormones progesterone and estrogen during pregnancy also have an influence on HPV and cancer development (Herlana et al, 2017).

This finding is also comparable with the study conducted by Misra et al. about risk factors and strategies for cervical cancer control. The results showed that age and high parity were the main factors in the occurrence of cervical carcinoma. HPV, sexually transmitted diseases, and herpes simplex virus are mostly associated with cases of squamous intraepithelial lesions. STIs can occur due to poor personal and genital hygiene. The widespread use of old clothes repeatedly during menstruation can also increase the risk of infection in women.

Correlation Use of Panty liners With Cervical Cancer Risk

In the variable using panty liners, the results of statistical tests obtained p -value = 0.385 which means $< \alpha$, it can be concluded that there is no relationship between the use of panty liners and the risk of cervical cancer with an OR value of 1.097

The incidence of cervical cancer is influenced by various factors, including socio-demographic factors including age, socioeconomic status, and sexual activity factors which include age at first sexual intercourse, multiple sexual partners, uncircumcised sexual partners, parity, lack of sexual intercourse, maintaining genital hygiene, smoking, obesity, history of venereal disease, family history of cervical cancer, chronic trauma to the cervix, use of sanitary napkins and panty liners, diethylstilbestrol (DES) and use of oral contraceptives. There are factors that can be modified and factors that cannot be modified (Ministry of Health, 2018)

The relationship between the use of panty liners with the incidence of vaginal discharge in fourth semester midwifery students at the University of 'Aisyiyah Yogyakarta. This is obtained from the results of statistical tests with p value 0.019 < 0.05 . The test results were obtained with the data described in table 4.6 that most of the respondents who used panty liners well did not experience vaginal discharge, namely 42 people (36.4%), while the least respondents were using panty liners poorly and did not experience vaginal discharge. the incidence of vaginal discharge is 1 person (2.7%). The results of the chi square test concluded that there was a relationship between using a panty liner and the incidence of vaginal discharge at the University of 'Aisyiyah Yogyakarta (Septia ulfa, 2018)

The opinion of the researcher in this study was that there was no relationship between the use of panty liners with the risk of cervical cancer, the data obtained that the respondent's behavior in using panty liners which were classified as quite good could be caused because some respondents knew several ways to use panty liners well, but did not fully understand them. whole. Respondents may only know that how to use panty liners properly, namely not using panty liners that contain perfume or chemicals that contain fragrances, panty liners that contain perfumes or fragrances in which there are certain chemicals, for those with sensitive skin or their use for a period of time. A long time when it is moist will cause allergies or infections such as irritation or itching, redness and even acne in the female area

Correlation Smoking With Cervical Cancer Risk

In the smoking variable, the statistical test results obtained p -value = 0.001 which means $< \alpha$, it can be concluded that there is a relationship between smoking and the risk of cervical cancer with an OR value of 3,058 meaning that respondents with smoking have a 3,058 times greater chance of developing cancer.

The risk of passive smoking (people around smokers who are inhaled by cigarette smoke) is no less than that of smokers who suffer from disease. The impact of cigarette smoke on health is that it causes hair loss, heart disease, stroke, lung cancer, cervical cancer, cervical cancer (Tumigolung, Wungouw, and Onibala, 2013)

research conducted by Sulistiowati and Sirait (2014) which states that women who smoke have a 2 times greater risk of developing cervical cancer compared to women who do not smoke. local immune status so that it is a cocarcinogen from viral infection.

Sawitri and Adiputra (2013) who obtained the results that exposure to cigarette smoke increased the risk of cervical precancerous lesions by 4 times compared to without exposure to cigarette smoke. In this study, respondents who experienced exposure to cigarette smoke were obtained at home or at work where exposure to cigarette smoke occurred in 79 respondents with positive VIA examination results in 6 respondents.

The results of this study obtained data that women who came for VIA examination were exposed to cigarette smoke. In 1 cigarette contains 4000 chemicals that are harmful to health, 200 of which are toxic materials consisting of 85% gas and particles namely nicotine, carbon monoxide gas, nitrogen oxides, hydrogen cyanide, ammonia, acrolein, these materials can cause cancer. for the body

Correlation Nutritional Deficiency With Cervical Cancer Risk

In the Nutrition Deficiency variable, the statistical test results obtained p -value = 0.001 which means $< \alpha$, it can be concluded that there is a relationship between Nutrition Deficiency and the risk of cervical cancer with an OR value of 2.253 which means that respondents with Nutritional Deficiency have a 2.253 times greater chance of experiencing cervical cancer.

Research on 29 cervical cancer patients undergoing chemotherapy showed that there was no significant relationship between food intake and nutritional status based on upper arm circumference (Trijayanti & Probosari, 2016).

According to the theory put forward by Flier et al, (2015) obesity has a major side effect on health. Obesity is associated with increased mortality, this is due to an increased 50 to 100% risk of death from all causes compared with normal weight people, and especially by cardiovascular causes and causes of cancer. The results of this study are in accordance with the theory that respondents who are obese are at risk for The occurrence of cervical cancer, this is because the increase in body weight is related to the body's homeostatic processes in stabilizing hormones which can be one of the factors for obesity.

The researcher's opinion is that considering nutritional status is very important in cancer treatment, nutritionists need to pay more attention to weight control for cancer patients undergoing chemotherapy. Attention is not only directed to patients who experience poor nutritional status, but also to patients who tend to experience weight gain in overweight and obese patients

Correlation Economic Status With Cervical Cancer Risk

In the economic status variable, the results of statistical tests obtained p -value = 0.000 which means $< \alpha$, it can be concluded that there is a relationship between economic status and the risk of cervical cancer with an OR value of 3.935 which means that respondents with less economic status have a 3,935 times greater chance of experiencing cervical cancer.

The incidence of cervical cancer is influenced by various factors, including socio-demographic factors (age, socioeconomic status) and sexual activity factors (age for first having sex, changing sex partners) and parity, lack of genital hygiene, smoking, history of disease. gender, chronic trauma to the cervix, use of sanitary napkins, and use of oral contraceptives for more than 4 years (Khalaf, 2015)

The direct cause of cervical cancer is not known. Several studies have shown that there is a close relationship with a number of extrinsic factors, one of which is rarely found in virgins, the incidence is higher in those who are married than those who are not married, especially in girls who first have sex at an early age, the incidence increases with increasing parity, especially when distance labor is too close, from low socioeconomic groups (unclean sexual hygiene), sexual activity that often changes partners, is less common in people whose husbands are circumcised or performs circumcision, often found

in women who are infected with the Human Papilloma Virus (HPV) virus type 16 or 18, and smoking habits (Saulaja, 2016)

Other studies have recognized low socioeconomic status as a risk factor for cervical cancer. In this study, low-income women and middle-income women were positive for HPV DNA, while none of the women were HPV DNA positive for the high-income group. Related factors that modify this specific finding are events related to women's socioeconomic status, for example age at first marriage, marital history, reproductive history, education, nutrition and others.

Correlation Sexual Partners with Cervical Cancer Risk

In the sexual partner variable, the statistical test results obtained p-value = 0.001 which means $< \alpha$, it can be concluded that there is no relationship between sexual partners and the risk of cervical cancer with an OR value of 2.264.

research from Nindrea (2017) that there is a relationship between sexual behavior seen from the number of sexual partners (p = 0.0011 has a 13.3 times chance of having a pre-cervical cancer lesion than women who have a partner = 1 (CI95%: 2.81) -63.11)

Likewise with Handayani's research (2015) which explains that respondents who have more than 1 partner, have a positive IVA test result compared to respondents who have 1 sexual partner.

The increased incidence of tumors is more common in monogamous women whose husbands often have sexual relations with many other women, giving rise to the concept of "high-risk men" as vectors of infectious agents. Women or male partners who have a history of changing sexual partners may be infected with venereal diseases, one of which is HPV. This virus will change the cells on the surface of the mucosa to divide into more so that it is not controlled and becomes cancer. However, in this study there was no relationship between sexual partners and the risk of cervical cancer, this is because most respondents have 1 partner and the risk of cervical cancer is not easy to occur.

Correlation Use of Contraceptive Devices with Cervical Cancer Risk

In the variable Use of contraceptives, the results of statistical tests obtained p-value = 0.000 which means $< \alpha$, it can be concluded that there is a relationship between the use of contraceptives and the risk of cervical cancer with an OR value of 9.058, which means that respondents with the use of hormonal contraceptives have a 9 times greater chance of experiencing cervical cancer

The results in this study are in accordance with the results of research by Parwati et al (2015) in two health centers in Denpasar-Bali that there is a relationship between the variable duration of hormonal contraceptive use and the incidence of cervical pre-cancerous lesions (p = 0.045; OR = 10.7; CI 95%: 1.04-108.17). According to the WHO, oral contraceptives used in the long term for more than 5 years can increase the risk of cervical cancer 1.53 times.

Supported by Leslie H, et al. (2014) which states that the incidence of cervical cancer is generally higher in women who use hormonal contraception., Other studies have also stated that a history of using hormonal contraception affects the incidence of cervical cancer. Results from another study showed that 10 years of excessive use of oral contraceptives increased the relative risk of cervical cancer from 7.3 to 8.3 per 1,000 population in poor countries and from 3.8 to 4 per 1,000 population in developed countries (Kusuma, 2010).

The oral contraceptive pill (OC) The oral contraceptive pill is known to be a risk factor for cervical cancer. In an international collaborative epidemiological study of cervical cancer, the relative risk in current users increased with increasing duration of oral contraceptive use. It has been reported that the use of oral contraceptives for 5 years or more can double the risk of cancer (Harrari et.al, 2014). And in a multi-center case-control study,

among women who tested positive for HPV DNA, the risk of cervical cancer increased 3-fold if they had used oral contraceptive pills for 5 years or more. Moreover, a recent systematic review & meta-analysis also suggested that the use of oral contraceptive pills has a definite associated risk for developing cervical cancer especially for adenocarcinoma. This study concluded that the use of oral contraceptive pills is an independent risk factor in causing cervical cancer (Asthana S, Foam V, 2020).

The use of hormonal contraceptives with the composition of estrogen and progesterin acting through their receptors on target cells, can increase the incidence of cervical ectropion and other potential carcinogens. Estrogens and progestins can also affect cervical cells directly, promote the integration of HPV DNA into the host genome, stimulate HPV DNA transcription and promote cell proliferation. Sex hormone steroids can increase the expression of HPV-16 E6 and E7 genes with inactivation and/or degradation of p53 and Rb protein which then causes failure of the apoptotic mechanism and increased carcinogenesis in cervical cells. Moreover, cervical tissue is one of the preferred targets for female steroid hormones.

Correlation History of venereal disease with cervical cancer risk

In the variable history of venereal disease, the results of statistical tests obtained p-value = 0.500 which means $> \alpha$, it can be concluded that there is no relationship between history of venereal disease and the risk of cervical cancer with an OR value of 1.310.

Not in accordance with Melva's 2018 study, which in his research used an IVA examination, stated that women with a history of venereal disease had a greater risk of cervical cancer with RP = 2.58 (95% CI: 1,693,76) (Melva, 2018). Biomedically, it can be explained that STIs may act as co-factors for human papillomavirus infection. STIs may cause lesions on the cervix which further facilitate the entry of the HPV virus into the cervical basement membrane. In addition, STIs in women may also affect the immune system and accelerate the development of HPV infection. A suppressed immune system predisposes to oncogenic viral infections.

In this study, there was no relationship between a history of sexual disease and the risk of cervical cancer, this is because some respondents did not have a history of venereal disease, so the possibility of cervical cancer is small, but it is a concern. Thus, every sexually active woman has a risk for cervical cancer. HPV is an initiator of cervical cancer. Oncoproteins E6 and E7 derived from HPV are the cause of malignant degeneration. Oncoprotein E6 will bind to p53 so that the TSG (Tumor Suppressor Gene) of p53 will lose its function. While oncoprotein E7 will bind TSG Rb, this binding causes the release of E2F which is a transcription factor so that the cell cycle runs without control. Cervical carcinoma usually arises in an area called the squamo-columnar junction (SCJ), which is the boundary between the epithelium that lines the ectocervix (porsio) and the endocervix of the cervical canal, where histologically there is a change from the ectocervical epithelium, namely stratified squamous epithelium with endocervical epithelium, namely cuboidal epithelium. short columnar ciliated layer. The location of the SCJ is influenced by factors of age, sexual activity and parity. In young women, the SCJ is outside the external uterine os, while in women over 35 years of age, the SCJ is inside the cervical canal. Several studies have shown that the risk of cervical cancer is higher for women who have had sexually transmitted diseases, such as genital warts, chlamydia, gonorrhoea, and syphilis. Women who are suffering from sexually transmitted diseases also have a high risk of cervical cancer. This is because HPV infection can occur together with sexually transmitted diseases. One type of sexually transmitted infection that causes cervical cancer is chlamydia. Chlamydia is an infectious disease of the reproductive system that can be caused by bacteria. These bacteria can usually be transmitted through

sexual contact. Some studies suggest that the bacteria that cause chlamydia can help the HPV virus grow in the reproductive area, increasing the risk of cervical cancer. Chlamydia experienced by women sometimes does not cause any noticeable symptoms. Women may not know they have chlamydia until they see a doctor. In addition to chlamydia, other sexually transmitted infections cause cervical cancer, including gonorrhea, syphilis, and HIV/AIDS.

Dominant Factor

The dominant factor in the variable that is significantly related to the risk of cervical cancer has a p-value <0.05, namely the variable age at first having sex, economic status and sexual partners with values (P-value 0.000, 0.000 and 0.034) Based on the OR value, the variable obtained age at first having sex (OR: 6.796), Variable economic status (OR: 3.182) while variable sexual partner (OR: 0.348) So the most dominant variable associated with cervical cancer is age at first having sex.

In line with the research of Nainakashi et.al (2019), which showed that women with the age of first intercourse 20 years, an increase in the number of partners, an increase in the use of contraceptives and education as risk factors for developing cervical cancer. In this study, most of the participants came from rural areas, which may affect the educational status of the participants. In rural areas, women have lower levels of education and higher illiteracy. Thus, women's knowledge about cervical cancer is relatively less because they cannot read and write. In addition, if women have possible signs of cervical cancer, they may not visit the hospital because of many problems such as poverty, poor socioeconomic status, lack of transportation facilities and financial problems, etc.

And supported by the research of Hadi Ashar and Arif Musoddaq (2020). The results of the multivariate test showed that the age at first having sex was less than 20 years had a risk of 2.3; Mothers with high parity (>4 children) and having more than one sexual partner have a risk of 16.5.

According to the theory, having sex at a young age, which is under the age of 18, is very susceptible to viruses. And having sex under that age can cause trauma to the genital organs and open up opportunities for abnormal cells to grow (Riksani, 2016). Cervical carcinoma is thought to be a sexually transmitted disease. Some evidence suggests an association between a history of sexual intercourse and the risk of this disease. In accordance with the etiology of infection, women with multiple sexual partners and women who start sexual intercourse at a young age will increase the risk of cervical cancer (Price, 2015).

Researchers concluded that ideally sex is carried out after a woman is fully mature which also depends on the mucous cells found in the lining of the skin inside the body cavity. Generally, new mucosal cells mature after women are 20 years and over. Cell abnormalities that lead to cervical cancer do not occur in a matter of days or even months. But it requires a process that takes 10 to 20 years. So that having sex for the first time at the age of <20 years is a bridge to the occurrence of pre-cervical cancer lesions and even cervical cancer, because it can be a trigger for HPV to infect deeper due to the unpreparedness or immaturity of the cervical mucosa at that age compared to having sex at the age of ≥20 years.

Cervical Cancer EWS risk factors

The results of the statistical analysis are stated in the results of data processing on the ISO 25010 test by testing two aspects, namely functional suitability and usability. used to estimate the risk of cervical cancer which can be opened ONLINE based on Mobile at the address: <http://ewscaserviks.online.com> By using this model it will be known early on the risks that will be experienced by women of childbearing age and the interventions obtained and where women of childbearing age must do early detection of cervical cancer.

CONCLUSION

1. Research Results There is a relationship between education, age, age at first sexual intercourse, pattern of sexual intercourse, parity, personal hygiene and use of panty liners, smoking, oral contraceptives, nutritional deficiency, socio-economics, sexual partners, history of venereal disease and cancer risk cervical,
2. The most dominant variable associated with cervical cancer is the age of first having sex
3. The results of data processing on the ISO 25010 test by testing two aspects, namely functional suitability and usability, stated that the EWS Ca Cervical application software had an overall percentage of applications that scored 88%, which means the application is good to use.

SUGGESTION

It is hoped that this application can be an early intervention used in women of childbearing age that can be carried out more effectively and efficiently so that women can prevent cervical cancer early

REFERENCES

- ACS. (2018). The American Cancer Facts and Figures of the 2018. American Cancer Society, (No. 500818 Rev.6/18), 1–76. Retrieved from cancer.org. 1.800.227.2345 1.866.228.4327 TTY
- Adekunle OO (2012). *Cervical intraepithelial neoplasia (cin) squamous dysplasia*. Dalam: Srivastava S (eds). *Intraepithelial neoplasia*. InTech. [http://www.intechopen.com/books/intraepithelialneoplasia/cervicalintraepit helial-neoplasia-cin-squamousdysplasia](http://www.intechopen.com/books/intraepithelialneoplasia/cervicalintraepit%20helial-neoplasia-cin-squamousdysplasia).
- Adiputra, Dewi, Sawitri, A. (2013). No Title. Paparan Asap Rokok Dan Hygiene Diri. Merupakan Faktor Resiko Lesi Prakanker Di Kota Denpasar.
- American Cancer Society (2015). *Cervical cancer prevention and early detection*. Atlanta, Ga: American Cancer Society 2015.
- Aminanti, D. (2013). Cara Bijak Menghadapi Dan Mencegah Kanker Leher Rahim (Serviks). Yogyakarta: Brillian Books.
- Apriani (2012). *Faktor-Faktor Yang Mempengaruhi Keikutsertaan Dalam Pemeriksaan Inspeksi Visual Asam Asetat (IVA) Di Rumah Sakit Bunda Jakarta*, Tesis
- Asthana S, Busa V, Labani S Oral contraceptives use and risk of cervical cancer-A systematic review & meta-analysis. *Eur J Obstet Gynecol Reprod Biol*. 2020; 247:163–75. doi: 10.1016/j.ejogrb.2020.02.014.
- Australian Institute of Health and Welfare [AIHW]. (2018). Family, Domestic and Sexual Violence in Australia 2018. <https://www.aihw.gov.au/reports/domesticviolence/family-domestic-sexual-violence-in-australia-2018/data>
- Azwar, Saipunin (2012) *sikap Manusia. Teori dan pengukurannya*. Jakarta: Rineka Cipta
- Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A Cancer Journal for Clinicians. <https://doi.org/10.3322/caac.21492>
- Budiman, (2013). *Kapita Selektta Kuesioner Pengetahuan*. Salemba Medika: Jakarta.

- Damayanti, I.P., 2013. Faktor-faktor yang Berhubungan dengan Kejadian Kanker Serviks di RSUD Arifin Achmad Pekanbaru 2008–2010. *Jurnal Kesehatan Komunitas*. 2: 88–93.
- Dinas Kesehatan Provinsi Lampung. 2016. Rencana Strategis Dinas Kesehatan Provinsi Lampung Tahun 2015–2019. Lampung: Provinsi Lampung.
- E. Trijayanti, and E. Probosari, "Hubungan Asupan Makan dan Status Gizi pada Pasien Kanker Serviks Post Kemoterapi," *Jurnal Kedokteran Diponegoro (Diponegoro Medical Journal)*, vol. 5, no. 4, pp. 751–760, Nov. 2016. <https://doi.org/10.14710/dmj.v5i4.14342>
- Fanny Asyifa (2019). hubungan antara paritas dan tingkat pendidikan terhadap kejadian kanker serviks di RSUD Dr. Moewardi surakarta. Program Studi Strata I pada Jurusan Kedokteran Fakultas Kedokteran. UMS
- Flier JS, Maratos-FE (2015). *Biology obesity*. Dalam: Harrison's principles of internal medicine. Edisi ke 19. USA: McGraw-Hill Companies, pp: 2386- 2391.
- Fitriana, A. (2011). *Faktor-Faktor yang Berhubsunga dengan Partisipasi Wanita dalam Pemeriksaan Deteksi Dini Kanker Leher Rahim di Puskesmas Kesesi Kabupaten Pekalongan Tahun 2010*, Skripsi, Universitas Negeri Semarang.
- Gaol, Tiomarni Lumban. (2013). *pengaruh faktor sosiodemografi, sosioekonomi dan kebutuhan terhadap perilaku masyarakat dalam pencarian pengobatan di Kecamatan Medan Kota*. [balitbang.pemkomedan.go.id/pdf_program_studi_S2 Ilmu Kesehatan Masyarakat Fakultas Kesehatan Masyarakat Universitas Sumatera Utara](http://balitbang.pemkomedan.go.id/pdf_program_studi_S2_Ilmu_Kesehatan_Masyarakat_Fakultas_Kesehatan_Masyarakat_Universitas_Sumatera_Utara).
- Green, W Lawrenca (2005). *Health education Planning A diagnostik approach*.
- Gyenwali D, Jitendra Pariyar, Sharad Raj Onta, 2013, *Factors Associated with Late Diagnosis of Cervical Cancer in Nepal*, *Asian Pasific Journal of Cancer Prevention*, Vol 14, No 7, hlm. 4373-4377.
- Hadi Ashar dan Arif Musoddaq (2020). First sexual intercourse and high parity are the most influential factors of precancerous cervical lesion. <https://doi.org/10.20473/mog.V28I32020.113-118>
- Handayani, dkk. 2015. *Nutrition Care Process (NCP)*. Penerbit Graha Ilmu., Yogyakarta
- Harari A, Chen Z, Burk RD Human papillomavirus genomics: past, present and future. *Curr Probl Dermatol*. 2014;45:1–18. doi: 10.1159/000355952.
- Hasibuan, Malayu S.P. (2014). *Manajemen Sumber Daya Manusia*. Cetaka 11. Jakarta: PT.Bumi Aksara.
- Hastono, Suatnto Priyo. (2016). *Modul analisis data* . FKM UI Jakarta
- Herlana, F., Nur, I., Purbaningsih, W., 2017. Karakteristik Pasien Kanker Serviks Berdasar Atas Usia, Paritas, dan Gambaran Histopatologi di RSUD Al-Ihsan Bandung. *Bandung Meeting on Global Medicine and Health*. 1: 138-142.
- Idhayanti, R. I., Ayuningtyas, A., dan Siti, M. (2020). *Komunikasi dan Konseling dalam Praktik Kebidanan*. Yogyakarta: Graha Ilmu
- Karneli, N.K., Suwiyoga, K., Sudibya, A., 2013. Kesiediaan Membayar Vaksinasi Kanker Serviks Di Sekolah Menengah Umum Kabupaten Badung. *Public Health and Preventive Medicine Archive*, 1: 70-77
- Kemenkes, RI. (2016). *Profil Kesehatan Indonesia 2015*, Jakarta
- Kemenkes, RI. (2015). *Buku acuan pencegahan kanker serviks dan kanker leher rahim*. Direktorat jendral PP & PL. Direktorat Pengendalian Penyakit Tidak Menular. Jakarta.
- Kemenkes, RI. (2018). *Buku acuan pencegahan kanker serviks dan kanker leher rahim*. Direktorat jendral PP & PL. Direktorat Pengendalian Penyakit Tidak Menular. Jakarta.
- Kementrian Kesehatan RI (2013). *Riset kesehatan dasar (riskesdas) 2013*. Jakarta: Badan Litbangkes Depkes RI 2013
- Khalaf M.K., Rasheed F.A., & Hussain S.A., 2015, *Association between Early Marriage and Other Sociomedical Characteristics with the Cervical Pap Smear Results in Iraq Women*, *Scientific Research Publishing*, vol 5, hal 73-82.
- Khadijah, Nyanyu. (2014). *Psikologi Pendidikan*. Nuha Medika: Jakarta
- Kusuma LF, Yarso KY. Hormonal contraceptive use as risk factor for breast cancer in young Javanese women. *J Med scienc*. 2016;48(4):2016
- Leslie HH, Karasek DA, Harris LF, et al. Cervical cancer precursors and hormonal contraceptive use in HIV-positive women. *PLoS One*. 2014;9(6):1–12
- Lubis, A. (2016). *Basis Data Dasar*. Deepublish.
- Manuaba, IBG. 2013. *Ilmu Kebidanan, Penyakit Kandungan dan Keluarga Berencana Untuk Pendidikan Bidan*. Jakarta: EGC.
- Melva. (2018). Faktor-faktor yang Mempengaruhi Kejadian Kanker Leher Rahim pada Penderita yang Datang Berobat di RSUD H. Adam Malik Medan
- Misra JS, Srivastava S, Singh U, Srivastava AN. Risk-factors and strategies for control of carcinoma cervix in India: hospital based cytological screening experience of 35 years. *Indian J Cancer* 155–9.
- Nainakshi Kashyap, Nadiya Krishnan, Sukhpal Kaur, Sandhya Ghai (2019). Risk Factors of Cervical Cancer: A Case-Control Study. *Asia-Pacific Journal of Oncology Nursing* Volume 6, Issue 3, July–September 2019, Pages 308-314
- Nindrea, RD. (2017). Prevalensi dan faktor yang mempengaruhi kanker serviks pada wanita. *Journal Endurance*. Vol.2, no. 1. pp. 53-61. Doi: 10.22216/jen
- Ningrum. (2012). *Faktor-Faktor Yang Mempengaruhi Motivasi Ibumengikuti Deteksi Dini Kanker Serviks Melalui Metode Inspeksi Visual Asam Asetat (Iva) Di Kabupaten Banyumas*.
- Notoatmodjo, (2012). *Promosi Kesehatan dan perilaku kesehatan*. Rineka Cipta: Jakarta.
- Notoatmodjo, Soekidjo. (2013). *Kesehatan masyarakat Ilmu dan Seni*. Jakarta: Rineka Cipta
- Notoatmodjo. 2011. *Kesehatan Masyarakat: Ilmu dan Seni*. Jakarta: Rineka. Cipta
- Notoatmodjo, S (2018). *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta.
- Nugroho (2010). *Kesehatan Wanita gender dan permasalahannya*. Yogyakarta: Nuha Medika
- Nursalam. (2014). *Manajemen Keperawatan*. Jakarta: Salemba Medika
- Parwati, N. M., Artawan, I. W. G., Putra, E., Karmaya, M., Kesehatan, D., & Bali, P. (2015). *Kontrasepsi Hormonal dan Riwayat Infeksi Menular Seksual sebagai Faktor Risiko Lesi Prakanker Leher Rahim Hormonal Contraceptive Use and History of Sex ually Transmitted Infection as Risk Factors of the Pre-Cancerous Cervical Lesions*. *Public Health and Preventive Medicine Archive*, 173(2), 173–178.

- <http://download.portalgaruda.org/article.php?article=411329&val=4933&title=HormonalContraceptive Use and History of Sexually Transmitted Infection as Risk Factors of the PreCancerous Cervical Lesion>
- Prawirohardjo, S. (2007). *Ilmu Kandungan*. Jakarta: Yayasan Bina Pustaka Padila (2012) buku ajar keperawatan keluarga. Jogjakarta: Nuha Medika
- Puspitasari N, A. (2016). Hubungan Usia Paritas dan Usia Aktivitas Seksual Pertama Kali Dengan Kejadian Kanker Serviks Di Ruang Rawat Inap RSUP DR. Hasan Sadikin Bandung Provinsi Jawa Barat 16 Maret-16 April 2016. *Jurnal Kesehatan Kartika* Volume. 11 No.3, Desember 2016.
- Puspitasari. (2015). *Faktor – faktor yang mempengaruhi partisipasi ibu balita ke posyanduKencursari I Di Dukung Tegaltandan Desa Banguntapan Kabupaten Bantul*. opac.unisayogya.ac.id/567/1/NASKAH%20PUBLIKASISKRIPSI.pdf Program Studi Bidan Pendidik Jenjang D IV Sekolah Tinggi Ilmu Kesehatan 'Aisyiyah Yogyakarta.
- Putri Meihartati, T. 2017. Hubungan Faktor Predisposisi Ibu Terhadap Kanker Serviks. *Jurnal Darul*
- Price A, Sylvia., M, Lorraine. (2015). *Patofisiologi Edisi 6 Vo 2 Konsep Klinis Proses-. Proses Penyakit*. Jakarta: EGC
- R. I. Idhayanti. (2020). *Komunikasi Dan Konseling Dalam Praktik Kebidanan*. Graha ilmu.
- Rahma, R.A dan Prabandari, F., 2012. Beberapa Faktor Yang Mempengaruhi Minat Wus (Wanita Usia Subur) Dalam Melakukan Pemeriksaan IVA (Inspeksi Visual Dengan Pulasan Asam Asetat) Di Desa Pangebatan Kecamatan Karanglewas Kabupaten Banyumas Tahun 2011. *Bidan Prada: Jurnal Ilmiah Kebidanan*, 3:1
- Rasjidi I (2007). *Epidemiologi kanker serviks. Indonesian Journal of Cancer Savitri, A dkk. 2015. Kupas Tuntas Kanker serviks, Leher Rahim, dan Rahim*. Yogyakarta: Penerbit Pustaka Baru Press.
- Ratna, W. (2013). *Sosiologi dan Antropologi Kesehatan*. Yogyakarta: Pustaka Rihama
- Ratnasari (2011). *Hubungan Penyuluhan Tentang Kanker Serviks Dengan Keikutsertaan Dan Pelaksanaan Pap Smear Di Puskesmas Ambal I Kabupaten Kebumen, Tesis*
- Rhina Chairani Lubis (2017) pengaruh usia pertama kali melakukan hubungan seksual terhadap kejadian kanker serviks pada wanita di RSUD. Dr. Pirngadi Kota Medan Tahun 2017. *Jurnal Muara Sains, Teknologi, Kedokteran, dan Ilmu Kesehatan* ISSN 2579-6402 (Versi Cetak), Vol. 1, No. 2, Oktober 2017: hlm 145-152
- Riksani, R. (2016). *Kenali Kanker Serviks Sejak Dini*. Yogyakarta: Rapha. Publishing
- Riyanto Agus. (2011). *Aplikasi Metodologi Penelitian Kesehatan*. Jakarta: Nuha Medika
- Saifuddin AB. (2014). *Panduan Praktis Pelayanan Kesehatan Maternal dan Neonatal*. Jakarta: EGC.
- Samadi Priyanto. H. 2010. *Yes, I Know Everything About Kanker Servik*. Yogyakarta: Tiga Kelana.
- Sailaja T.K., Kumar B.I.N., Rajasree T.K., Plavi M.P., & Sreedhar B., 2016, Socio-Economic Factors and its Correlation with HPV Positivity. *MRIMS Journal of Health Sciences*, vol 4, hal 103-105.
- Sari, P.A., Syahrul, F., 2014. Faktor yang Berhubungan dengan Tindakan Vaksinasi HPV pada Wanita Usia Dewasa. *Jurnal Berkala Epidemiologi*. 2: 321-330
- Saryono. 2011. *Metodologi Penelitian Kualitatif dalam Kesehatan*. Yogyakarta: Nuha Medika.
- Sepa. (2015). *Pengaruh Penyuluhan Kanker Serviks Terhadap Minat Pemeriksaan Pap Smear Pada Ibu Usia 20-60 Tahun Di Dusun Ngangkrik Triharjo Sleman Tahun 2015*.
- Setyaningsih. (2010). *Hubungan antara tingkat pengetahuan tentang kanker serviks dengan motivasi melakukan pemeriksaan pap smear pada ibu rumah tangga di desa gulunan Sidokerto Kecamatan Plupuh kabupaten Sragen*.
- Sugiyono. (2016). *Metode Penelitian Kuantitatif Kualitatif dan R & D*. Bandung: Alfabeta
- Sulistiowati, E., Sirait, A., M. 2014. Knowledge on Risk Factors, Behaviour and. Early Detection of Cervical Cancer by Visual Inspection Acetic Acid (IVA).
- Susilowati (2014) *Pengetahuan Tentang Faktor Risiko, Perilaku Dan Deteksi Dini Kanker Serviks Dengan Inspeksi Visual Asam Asetat (Iva) Pada Wanita Di Kecamatan Bogor Tengah, Kota Bogor*.
- The john hapkins university: Mayfieltd publication company*
- Tira. 2008. *Risiko jumlah perkawinan, riwayat abortus dan pemakaian alat kontrasepsi hormonal terhadap kejadian kanker serviks di rumah sakit pelamonia Makassar tahun 2006-2007*. *Mkm. 3 (1): 20-28*.
- Tumigolung, C., Wungouw H., & Onibala, F. (2013). Pengaruh pendidikan kesehatan terhadap tingkat pengetahuan siswa tentang bahaya merokok di SMA Negeri
- Umri. S. 2013. Hubungan Usia Pertama Kali Melakukan Hubungan Seks Dengan Kejadian Kanker Serviks Di Rumah Sakit Pusat Haji Adam Malik Medan
- Undang-Undang Republik Indonesia Nomor 23 Tahun 1992 Tentang Kesehatan. (diunduh tanggal 2 Januari 2018 di http://hukum.unsrat.ac.id/uu/uu_23_92.htm)*
- Varney, Helen. (2006). *Buku Ajar Asuhan Kebidanan edisi 4 volume 1*. Jakarta : EGC
- Verawati, Septhia Ulfa (2018) *Hubungan Penggunaan Panty Liner Dengan Kejadian Keputihan Pada Mahasiswa Kebidanan Semester Empat Di Universitas 'Aisyiyah Yogyakarta. Skripsi thesis, Universitas 'Aisyiyah Yogyakarta*.
- Wahyuningsih T, Mulyani EY (2014). *Faktor resiko terjadinya lesi prakanker serviks melalui deteksi dini dengan metode IVA (Inspeksi Visual dengan Asam Asetat)*. *Forum Ilmiah*. 11 (2): 192-209.
- Wardahani, Hanif Alienda, Siti Moetmainnah & Noor Yazid. Hubungan Kejadian Carcinoma Cervicis Uteri dengan Umur, Status Perkawinan, dan Paritas di RSUD Dr Kariadi Semarang Periode Januari-Maret 2011. *Jurnal Kedokteran Muhammadiyah*. Volume 1 Nomor 2 tahun 2013
- WHO. *Comprehensive Cervical Cancer Control, A Guide to Essential Practice*. Geneva, Switzerland: WHO Press; 2006.
- Widoyono. (2011). *Penyakit Tropis (Epidemiologi, Penularan, Pencegahan & Pemberantasannya)*, penerbit erlangga: 2011
- Wiknjosastro H. *Ilmu Kebidanan*. Edisi ke-5. Yayasan Bina PustakaSarwono Prawirohardjo; 20016
- World Health Organization (2018). Screening for cervical cancer. http://www.who.int/cancer/detection/cervical_cancer_screening/en/ diakses tanggal 2 Januari 2018*.