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ORIGINAL RESEARCH

Indonesian Self-Risk Assessment for Cervical Cancer (SiNara): Instrument Development and Validation

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Abstract

Background: Women's ignorance of cervical cancer risk factors has caused low participation in the screening of the disease. Women can independently assess cervical cancer risk factors in themselves through a risk assessment instrument. However, no instruments were found that assessed cervical cancer risk based on the characteristics of Indonesian women.
Purpose: This study aimed to develop and validate an Indonesian self-risk instrument for cervical cancer.
Methods: The instrument was developed based on scale development following the guidelines by DeVellis (2017). A cross-sectional study was implemented to validate the instrument. A total of 20 women were involved in the pre-testing, and as many as 200 women were included in the instrument testing. Based on the scale development guidelines, data collection was initiated with a literature review to determine the instrument construct and item pool. A total of 29 articles were used in the formulation of the item pool and resulted in 38 items for validity and reliability testing. Content validity ratio (CVR) and content validity index (CVI) were used to test the content validity of the instrument, which was reviewed by three experts. Exploratory factor analysis (EFA) with principal component analysis (PCA) method and Kuder-Richardson 20 (KR-20) were used to evaluate construct validity and internal consistency reliability, respectively.
Results: A total of 26 items met the content validity and 21 items met the construct validity evaluation, with five items being removed because they had a loading factor value of <0.4. After the validity were evaluated, the instrument was reduced from 38 items to 21 items. The internal consistency reliability with Kuder-Richardson 20 (KR-20) was 0.807.
Conclusion: The Indonesian self-risk assessment for cervical cancer (SiNara) instrument is of good validity and reliability. However, it needs to be tested in other settings using larger samples to measure its psychometric properties as well as its applicability and acceptability.

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1. Introduction

Cervical cancer has still become one of the most common cancers in women in the world (World Health Organization, 2020). In Indonesia, the incidence rate of cervical cancer was 24.5 per 100,000 women in 2018, where about 32,469 new cases are diagnosed each year (International Agency for Research on Cancer, 2018). Human papillomavirus (HPV) type 16 and 18 are clearly involved in the etiology of cervical cancer (Li et al., 2011). HPV transmission can occur due to several risk factors, including sexual activity at a young age, sexual intercourse with both female and male partners, smoking, poor nutrition, low socioeconomic conditions, long-term use of oral contraceptives, multiparity, genetic factors, and sexually transmitted disease (Bassal et al., 2016; Borruto & Ridder, 2012; Chelimo et al., 2013; Khatun et al., 2018; Natphopsuk et al., 2012). Cervical cancer has an impact on women in the form of physical, psychological, sexual, social and spiritual function (Bae & Park, 2016; Bjelic-radisic et al., 2012; Pfaendler et al., 2015; Thapa et al., 2018). Various changes can be experienced by cervical cancer patients, so it is important to detect cervical cancer early through visual inspection with acetic acid (IVA), pap smear, and HPV DNA test (World Health Organization, 2014).

One of the Indonesian government's efforts to reduce cervical cancer is low-cost screening using the IVA method at the public health center (Kim et al., 2013). In fact, women's participation in cervical cancer screening is still low. In 2018, the coverage of cervical cancer screening using the IVA method was only 2,747,662 women (7.34%) (Ministry of Health Republic Indonesia, 2019). Several research results have shown various factors that influence the low participation of women to participate in cervical cancer screening. Those factors including shame, fear of pain, discomfort with the procedure, fear of the results, lacking knowledge about cervical cancer, cost, time, and lacking awareness about the importance of screening (Ghebre et al., 2015; Linadi, 2013; Nurhasanah & Afiyanti, 2017; Studts et al., 2013; Sudenga et al., 2013). Moreover, access to health facilities and lack of social support (family, husband, health workers) are factors that influence participation in cervical cancer screening (Abiodun et al., 2013; Armadhani et al., 2019). Among these various factors, lack of knowledge and public awareness about the importance of cervical screening become the most barrier factors for women to do a screening. This is evidenced by the result of a single visit approach with a see and threat program through a pilot project in six districts in Indonesia which shows that the biggest obstacle is the low level of knowledge and awareness of women about the importance of cervical cancer screening (Budiman et al., 2019).

Several previous studies have applied various interventions to increase women's participation in cervical cancer screening activities, including invitation letters, telephone calls, leaflets, booklets and multimedia (Acera et al., 2017; Lubis et al., 2015; Silalahi et al., 2018; Valdez et al., 2019). Women's knowledge increased after receiving health education but did not affect their attitudes regarding screening behavior. Attitudes related to screening barriers are self-efficacy, low perceptions of vulnerability, and confidence (Valdez et al., 2019). Poor perceptions are often the reason for the delay in accessing health services for cervical cancer patients in Indonesia (Warta et al., 2015).

Women participate in cervical cancer screening when they have a high awareness (Mingo et al., 2015). Women who realize that they are at risk for cervical cancer express their desire to take preventive measures (Rio & Suci, 2017). Thus, women need to recognize their own risk of developing cervical cancer through a cancer risk detection or a risk assessment instrument. Risk assessment is a term used to describe a process or method for identifying hazards and risk factors, analyzing and evaluating risks, and controlling risks (Canadian Centre for Occupation Health and Safety, 2017). The idea of developing a risk assessment is to predict the risk of developing cancer, so it is necessary to obtain credentials (Prendiville, 2011). Various studies have used risk assessment instruments to assess the risk of various cancers, including cervical cancer, with the results of increasing screening awareness (Ezechi et al., 2013; Rimmi et al., 2016; Schroy et al., 2013; Soans et al., 2012; Van Erkelens et al., 2017).

Cervical cancer risk assessment instruments have been developed and used both manually and online in several countries such as India, Nigeria, Canada, and New York (Cancer Care Ontario, 2019; Ezechi et al., 2013; Rimmi et al., 2016; Soans et al., 2012; University of Rochester Medical Center, 2020). Various research results show that women have more than one risk of cervical cancer and express a desire to do cervical cancer screening after knowing the risk of cervical cancer. Previous research has shown the importance of a cervical cancer risk assessment instrument to increase awareness of cervical cancer screening (Ezechi et al., 2013; Rimmi et al., 2016; Soans et al., 2012).

Several cervical cancer risk assessment instruments have been developed in other countries, yet in Indonesia. Moreover, all existing instruments were in English. There was also an instrument that has been developed according to the characteristics of women and the risk factors found in the region, such as India, which uses castes in the demographic characteristics section (Soans et al., 2012). This research was conducted to develop a self-risk assessment instrument using the Indonesian language and according to the characteristics, culture, and risk factors found in Indonesia. Thus, it is hoped that the instrument can be easily understood so that it can be used independently by Indonesian women. Therefore, this study aimed to develop the Indonesian self-risk assessment instrument for cervical cancer.

2. Methods

2.1 Research design

The instrument follows DeVellis's (2017) guidelines in developing a scale using seven stages of scale development. These stages are the identification of the construct to be measured, the

formulation of the item pool, the determination of the instrument format, the assessment of the items by the expert panel, item testing, item evaluation, and scale optimization (DeVellis, 2017). Content Validity Ratio (CVR) and Content Validity Index (CVI) were used to evaluate content validity, while exploratory factor analysis (EFA) with the principal component analysis (PCA) method was used to evaluate construct validity. A reliability test was carried out using Kuder-Richardson 20 (KR-20).

2.2 Setting and samples

Instrument testing was conducted in Bandung City, West Java, Indonesia. A total of 20 women were included in the pre-test, and the instrument was then tested on 200 women via a Google form. The sample size was determined based on the assumption that a sample size of 200 is sufficient for most cases with a factor analysis of no more than 40 items (DeVellis, 2017), and must exceed the number of items, from 2 to 20 respondents per item with a minimum number of 100 respondents (Anthoine et al., 2014). The inclusion criteria were being married, had never been diagnosed with cervical cancer and were willing to participate in the study.

2.3 Measurement and data collection

The content validity ratio (CVR) and content validity index (CVI) assessment form was used by experts to evaluate the items. The first step was developing the instrument by determining the construct through a literature review. The search for articles was carried out on the PubMed, CINAHL, Google Scholar, and Garuda databases, with inclusion criteria including the publication year of 2010-2019, using Indonesian or English, and articles were published in the Science and Technology Index (SINTA) and Scopus indexed journals. The keywords used in Indonesian were "risk factors AND cervical cancer" and in English were "risk factors AND cervical cancer AND Indonesia." A total of 29 articles met the inclusion criteria and were used in the formulation of the item pool.

The item pool was formed based on a literature review and comparison with cervical cancer risk assessment instruments from other countries. A total of 30 items were developed as the instrument. The items were women's demographic data, containing items on the number of marriages (Chandrawati, 2016; Yuliani et al., 2019), age (Fitrisia et al., 2019; Jasa, 2016), and husband's and wife's income (Chandrawati, 2016; Umami et al., 2017). Next, the disease history included a previous history of sexually transmitted diseases (Darmayanti et al., 2015; Partiwi et al., 2015), excessive white vaginal discharge, foul-smelling vaginal discharge, bleeding after menopause (Jasa, 2016; Nindrea, 2017; Trifitriana et al., 2017), history of immune system disease, and history of using immunosuppressant drugs (Borruto & Ridder, 2012). Furthermore, obstetric histories including age at marriage (Diapari et al., 2014; Sundari et al., 2017), age at first sexual intercourse (Arfailasufandi et al., 2016; Lestariningsih & Martini, 2013; Umami et al., 2017), age at first pregnancy, number of delivery (Chandrawati, 2016; Hidayat et al., 2014; Sundari et al., 2017), age at menarche and menstrual cycle (Mwaka et al., 2015; Nindrea, 2017; Walker & Hamilton, 2017) were also pooled.

Family history of disease, including family history of cancer and family history of cervical cancer (Arfailasufandi et al., 2016; Rahmah et al., 2017; Yuviska & Amirus, 2015); and lifestyle, including smoking habits, history of cigarette smoke exposure (Natphopsuk et al., 2012; Nindrea, 2017; Dewi et al., 2013; Putri et al., 2019), no daily fruit and vegetable consumptions (Rasjidi, 2009; Syatriani, 2011) were taken. Personal hygiene included no changing sanitary napkins every 4-6 hours a day during menstruation, no drying out the vagina after micturition, no washing the genital area after sexual intercourse, and using panty liners and public toilets frequently (Dianti & Isfandiari, 2015; Fitrisia et al., 2019; Dewi, 2017). Sexual behaviors which were pooled included the number of sexual partners (Umami et al., 2017; Yuliani et al., 2019), bleeding after sexual intercourse, and intercourse during menstruation (Damayanti, 2013; Nindrea, 2017). The use of contraceptives, like types of contraception and duration of using the contraceptive (Dewi et al., 2015; Fitrisia et al., 2019; Jasa, 2016; Partiwi et al., 2015); and cervical cancer prevention measures, such as the history of HPV vaccine and IVA or pap smear screening were derived (Dewi et al., 2015; Kusumawati et al., 2016; Putri et al., 2019). Factors related to husbands, consisting of uncircumcised husbands (Syatriani, 2011), number of husbands' marriages (Rimmi et al., 2016; Soans et al., 2012), husband's history of venereal disease/ HIV, and smoking (Arfailasufandi et al., 2016; Putri et al., 2019; Soans et al., 2012), were also included in the pooled items.

The instrument format consisted of risk factor items and answer choices. The answer choices included two choices, with a score of 1 (risky) and 0 (no risk). The risk answer column was red, and the non-risk answer column was green. Respondents gave a checkmark (√) according to their own risk factors. The instrument category was divided into two categories; risky and not risky. The determination of instrument categories was in accordance with the theory and literature review about cervical cancer risk factors. If there was only one factor contained in the instrument item in women, it was categorized as at risk of cervical cancer. This was adjusted to the purpose of developing instruments and in accordance with several instruments that have been previously developed using dichotomous answer choices.

Three experts consisting of psychometricians, nurses, and doctors were involved in the assessment of instrument items. All experts had had a minimum education level of master degree with a working period of >5 years, so they had qualified experiences. The assessment of items by experts used the content validity ratio (CVR) and content validity index (CVI) assessment forms. The content validity assessment was carried out in two stages with the calculation of CVR and CVI, as well as a comparison of the results of CVR and CVI (Bolarinwa, 2016). CVR was assessed using a Likert scale, divided into "1=essential", "2=important but not essential" and "3=not essential". The CVI assessment used a four-point Likert scale, including "1=not relevant", "2=content cannot be reviewed without revision", "3=relevant with minor revisions", and "4=very relevant". The I-CVI value should be 1.00 if the expert panels are five or fewer (Hendryadi, 2017). In the first stage, 9 items were not essential with the CVR of -0.33. As a result, 29 items had a positive value of 0.33-1, meaning that half the panelists considered that the items were essential/important. The CVI calculation showed that 27 items were not valid with an I-CVI value of <1 and an S-CVI value of 0.71 (71%). After comparing the results of the CVR and CVI calculations, 14 items were removed and 32 items were included in the second stage of testing. In the second stage, 6 items were removed because the CVI value did not meet the requirements of the three experts, leaving 26 items meeting the content validity, with a CVR value of 0.33-1 and I-CVI from each expert of 1.00 and S-CVI of 1.00.

The instrument with 26 valid items based on the expert judgment was tested on 20 respondents to determine the respondents' understanding of the items in July 2020. After that, it was continued with item testing on 200 respondents in August 2020. Google forms were used to test items by respondents. Next, a construct validity test was conducted on 26 items using principal component analysis (PCA). Five items were removed because the Measure of Sampling Adequacy (MSA) value was <0.5. Twenty-one items had a Kaiser Meyer Olkin Measure of Sampling Adequacy (KMO MSA) value of 0.805 (≥0.6) and an MSA value of each item of >0.5, indicating the adequacy of the sample used for factor analysis and had a strong significance with a value of Bartlett's test of sphericity of p=0.000 (p<0.05).

2.4 Data analysis

The content validity test used the content validity ratio (CVR) and the content validity index (CVI). Construct validity with principal component analysis (PCA) was conducted to explain the proportion of limited variance (shared variance) through varimax rotation analysis (DeVellis, 2017). The most recommended approach is the Kaiser and Cattell method based on the eigenvalue of 1.0 and should not be less than 1.0 because it reflects unstable factors (DeVellis, 2017). Correlation matrix analysis was used to analyze the pattern of co-variation and correlation between items through Barlett's test of sphericity with a significance value of p<0.05 and Kaiser-Meyer-Olkin (KMO) with a value of 0.6. In addition, to perform further factor analysis, an anti-image correlation item value of >0.5 was required. In the advanced factor analysis, the loading factor value of 0.40 was used as significance in defining the factor. Internal consistency reliability test was calculated using Kuder-Richardson 20 (KR-20) >0.70 (ri>0.70).

2.5 Ethical considerations

This study had received ethical approval from the Research Ethics Committee of Universitas Padjadjaran with a reference number of 466/UN6.KEP/EC/2020. Permission from the National Unity and Politics of the Bandung City Health Office was obtained before conducting the research. Informed consent was included in the questionnaire via Google form. The respondents who agreed to participate continued filling out the questionnaire.

3. Results

3.1 Content validity

Table 1 shows that after passing the item assessment process and content validity testing, the self-risk assessment instrument consisted of 26 items with a CVR value of 0.33-1, the I-CVI of each expert of 1.00, and S-CVI of 1.00.

Table 1. Content validity based on the assessment of stages I and II (item=26)

No	Items	CVR	CVI
1	Number of marriages	0.33	1
2	Age	0.33	1
3	Husband's income	0.33	1
4	Wife's income	0.33	1
5	Have experienced excessive white vaginal discharge	0.33	1
6	Have experienced foul-smelling and itchy vaginal discharge	1	1
7	Have experienced bleeding outside the menstrual period	1	1
8	Have experienced bleeding after menopause	1	1
9	Age at first sexual intercourse	1	1
10	Number of delivery	1	1
11	Have a family history of cancer	1	1
12	Have a family history of cervical cancer	1	1
13	Have a smoking habit	1	1
14	Have a history of exposure to cigarette smoke in the environment where you live or work	0.33	1
15	Have a habit of changing pads during menstruation	1	1
16	Have a habit of washing out the genital area after sexual intercourse	1	1
17	Have a habit of washing out the vagina with soap or cleaning fluids	1	1
18	Have a number of sexual partners	1	1
19	Have experienced bleeding after sexual intercourse	1	1
20	Have had sexual intercourse during menstruation	1	1
21	Have experienced complaints during the use of contraceptive	1	1
22	Have had a vaccine / HPV immunization	1	1
23	Have had an IVA or pap smear	1	1
24	Number of husbands' marriages	1	1
25	Husband has a history of venereal diseases such as gonorrhea, syphilis or HIV disease	1	1
26	Husband has a smoking habit	1	1
		S-CVI	1

3.2 Characteristics of respondents

Based on Table 2, the characteristics of respondents on item testing with the minimum age of the respondent was 19 years, and the maximum age was 66 years. Most of the respondents had a higher education level (70%) and worked as private employees (44%).

Table 2. The characteristics of respondents (n=200)

Characteristics	f	%
Age (year)		
19-28	41	20.5
29-38	78	39.0
39-48	47	23.5
49-58	21	10.0
≥59	13	6.5
Education		
Elementary School	0	0
Junior High School	9	4.5
Senior High School	51	25.5
Academic/University	140	70.0
No School	0	0

Table 2. Continued

Characteristics	f	%
Occupation		
Housewife	62	31.0
Civil Servants	27	13.5
General employees	88	44.0
Entrepreneur	5	2.5
Labor	2	1.0
Others	16	8.0

3.3 Construct validity

Table 3 shows that the factor analysis carried out on 21 items in the self-risk assessment instrument through rotated component matrix analysis resulted in six factors. First factors (items 13, 16, 18, 19, 20, 25), second factors (item 5, 6, 15), third factors (items 3, 4, 9, 23), fourth factors (items 14, 17, 26), fifth factors (items 7, 11, 12) and a factor of six (items 10, 21) had a loading factor value of each item of ≥0.4.

Table 3. Analysis of the factors of the self-risk assessment instrument (n=21)

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Factor 1						
13. Have a smoking habit	0.713					
16. Have a habit of washing out the genital area after sexual intercourse	0.404					
18. Have a number of sexual partners	0.735					
19. Have experienced bleeding after sexual intercourse	0.442					
20. Have had sexual intercourse during menstruation	0.666					
25. Husband has a history of venereal diseases such as gonorrhea, syphilis or HIV disease	0.611					
Factor 2						
5. Have experienced excessive white vaginal discharge		0.836				
6. Have experienced foul-smelling and itchy vaginal discharge		0.869				
15. Habit of changing pads during menstruation		0.551				
Factor 3						
3. Husband's income			0.794			
4. Wife's income			0.709			
9. Age at first sexual intercourse			0.538			
23. Have had an IVA or pap smear			0.434			
Factor 4						
14. Have a history of exposure to cigarette smoke in the environment where you live or work				0.784		
17. Have a habit of washing out the vagina with soap or cleaning fluids				0.576		
26. Husband has a smoking habit				0.770		
Factor 5						
7. Have experienced bleeding outside the menstrual period					0.456	
11. Have a family history of cancer					0.698	
12. Have a family history of cervical cancer					0.779	

Table 3. Continued

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Factor 6						
10. Number of delivery						0.527
21. Have experienced complaints during used contraceptive						0.671

3.4 Reliability test

Table 4 shows that the KR-20 value was 0.807 (ri>0.70), so that the self-risk assessment instrument (SiNara) was reliable.

Table 4. Kuder-Richardson 20 analysis of 21 items of self-risk assessment instrument (n=200)

Number of Items	Number of Respondents	Alpha
21	200	0.807

3.5 Optimization of scale length

Table 5 describes the items of the self-risk assessment instrument adjusted to the results of the factor analysis. Based on the results of the content and construct validity test, there was a change in the number of items from 38 items in the item pool to 21 items.

Table 5. The final results of the cervical cancer self-risk assessment instrument (item=21)

No	Items
1	Have a smoking habit
2	Have a habit of washing out the genitalia area after sexual intercourse
3	Have a number of sexual partners
4	Have experienced bleeding after sexual intercourse
5	Have had sexual intercourse during menstruation
6	Husband has a history of venereal diseases such as gonorrhea, syphilis or HIV disease
7	Have experienced excessive white vaginal discharge
8	Have experienced foul-smelling and itchy vaginal discharge
9	Have a habit of changing pads during menstruation
10	Husband's income
11	Wife's income
12	Age at first sexual intercourse
13	Have had an IVA or pap smear
14	Have a history of exposure to cigarette smoke in the environment where you live or work
15	Have a habit of washing the vagina with soap or cleaning fluids
16	Husband has a smoking habit
17	Have experienced bleeding outside the menstrual period
18	Have a family member who has been diagnosed with cancer
19	Have a female family member who has had cervical cancer
20	Number of delivery
21	Have experienced complaints during used contraceptive

4. Discussion

The purpose of this study was to develop the Indonesian self-risk assessment instrument for cervical cancer. This study showed that the Indonesian self-risk assessment for cervical cancer (SiNara) instrument had been developed, and the instrument had good validity and reliability score. Content validity test showed that there were 26 items with a CVR value of 0.33-1 and I-CVI as well as S-CVI of 1 (100%), meaning that all experts agreed that these items were valid content. The construct validity test was carried out on 21 items, because there were five items, including items 1, 2, 8, 22, and 24 omitted due to MSA values of <0.5. The varimax rotation resulted in six factors, namely factor one consisting of six items, factor two consisting of three items, factor three consisting of four items, factor four consisting of three items, factor five consisting of three items, and factor six consisting of two items. The internal consistency reliability testing was conducted

only once and then analyzed (Gray et al., 2013). The six factors had each item loading factor value of ≥0.4. The Kuder-Richardson 20 (KR-20) value showed that the instrument had good reliability on internal consistency, with the KR-20 value of >0.70 (Fraenkel et al., 2011).

The instrument, "SiNara", consists of six factors with 21 valid and reliable items. Compared to the previous self-risk assessment instrument, there were three new items produced in this study, including having a habit of washing out the vagina with soap or cleaning liquid (Dianti & Isfandiari, 2015; Fitrisia et al., 2019; Syatriani, 2011), having a history of cigarette smoke exposure in the environment where they live or work (Arfailasufandi et al., 2016; Dewi, 2017; Putri et al., 2019), and experiencing complaints during the use of contraceptive agents (Damayanti, 2013; Darmayanti et al., 2015; Nindrea, 2017; Partiwi et al., 2015). Various risk factors in the instrument can evidently increase the risks of cervical cancer, either directly or indirectly. Smoking is one of the factors that can increase the risk of cervical cancer in women in Indonesia (Nindrea, 2017). Also, exposure to cigarette smoke can increase the risk of cervical pre-cancerous lesions (Arfailasufandi et al., 2016; Dewi, 2017; Putri et al., 2019). A study showed that women with partners who smoked for 20 years with a total of 20 packs per year had an increased risk of cervical cancer (Natphopsuk et al., 2012). It can be concluded that not only active smokers who have a risk but women who were in a smoking environment can also increase the risk of being infected with HPV.

Habits of sexual activity and personal hygiene could increase the risk of cervical cancer. Some studies showed that having more than one sexual partner increases the risk of cervical cancer (Jasa, 2016; Umami et al., 2017; Yuliani et al., 2019). First sexual activity at an average age of 16 or <20 years can also increase the risk of cervical cancer (Arfailasufandi et al., 2016; Darmayanti et al., 2015; Fitrisia et al., 2019; Nindrea, 2017). In addition, personal hygiene factors such as the use of antiseptics in the genital area, rarely changing pads during menstruation, and no washing out the genitalia area after sexual intercourse can increase the risk of cervical cancer (Dianti & Isfandiari, 2015; Syatriani, 2011). Thakur et al. (2015) pointed out that poor genital hygiene is one of the risks of cervical cancer. Furthermore, several factors related to sexual activity or other disease conditions can also increase the risk of cervical cancer, including bleeding after sexual intercourse, bleeding outside the menstrual period, excessive white vaginal discharge, and foul-smelling and itchy vaginal discharge (Nindrea, 2017; Trifitriana et al., 2017).

Women with low socioeconomic status tend to have cervical cancer risk (Chandrawati, 2016; Umami et al., 2017). Socio-economic status related to nutrition is one of the factors that influence the incidence of cervical cancer (Syatriani, 2011). Most Indonesian women were known to have never done early detection of cervical cancer. This is indirectly influenced by economic status, which can be several barriers, such as inadequate access to health services and a lack of knowledge that cancer can be detected (Lee & Lee, 2017; Nurhasanah & Afiyanti, 2014; Putri et al., 2019). Another factor that could increase the risk of cervical cancer in Indonesia was genetic factors. The previous studies showed that women with a family history of cancer have an increased risk of cervical cancer (Arfailasufandi et al., 2016; Rahmah et al., 2017; Yuviska & Amirus, 2015). In addition, multiparity women were more at risk of developing cervical cancer (Arfailasufandi et al., 2016; Chandrawati, 2016; Damayanti, 2013; Hidayat et al., 2014; Lestariningsih & Martini, 2013; Sundari et al., 2017). The use of contraceptives is also a risk factor for cervical cancer. The results of the study state that the long-term use of hormonal contraceptives increases the risk of cervical cancer (Damayanti, 2013; Darmayanti et al., 2015; Fitrisia et al., 2019; Nindrea, 2017; Partiwi et al., 2015). Furthermore, the use of oral contraceptives for more than 5 years can escalate the risk of cervical cancer (Dewi et al., 2015; Jasa, 2016; Yuliani et al., 2019).

5. Implication and limitation

This study has some implications for clinical practice and nursing research. First, the Indonesian self-risk assessment instrument for cervical cancer "SiNara" has good validity and reliability to be used independently by women to detect cervical cancer. The existence of this instrument is expected to increase women's awareness to carry out early detection of cervical cancer through the IVA test or pap smear. Second, the instrument consists of three new items, which were not published previously by another researcher, and were specific to the Indonesian setting. Third, the "SiNara" instrument in the Indonesian language has relatively short items and is easy to fill out so that it can be extensively used by Indonesian women and women's health practitioners/ researchers.

This study has several limitations. The first was item pools formulation used secondary data through literature reviews, not primary data. The second limitation was no research on cervical cancer risk factors related to culture or customs. Therefore, it is still needed to develop this instrument by examining it from a cultural perspective that may increase the risk of cervical cancer. The third limitation was the sample used, which only consisted of a population that had smartphones. However, online data collection using smartphones was very helpful for research during a pandemic.

6. Conclusion

The Indonesian self-risk assessment instrument for cervical cancer "SiNara" had been valid and reliable with relatively short items and used the Indonesian language. The "SiNara" instrument is recommended for every Indonesian woman to assess the risk of cervical cancer independently. Moreover, this instrument can be used by further researchers to identify the risk of cervical cancer in women in Indonesia on a large scale. It is recommended for further researchers to use primary data besides literature review to develop more items.

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Author contribution

DM contributed to the initial conception, design, formulation of instrument items, data collection, data analysis, data interpretation, manuscript drafting, and critical revision of the manuscript. YH and TS contributed to the formulation of instrument items, selection of experts, critical writing, and revision of the manuscript. All authors approved the final version of the manuscript.

Conflict of interest

No conflict of interest in this study was declared by the authors.

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