RESEARCH ARTICLE

Twelve Years Implementation of Cervical and Breast Cancer Screening Program in Indonesia

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Abstract

Objective: The study aimed to measure achievement of the national program of cervical and breast cancer screening in Indonesia after 12 years implementation and factors associated with the number of the screening. **Methods:** This was a cross-sectional study with descriptive and analytic analysis. Secondary data was collected from Directorate of Non Communicable Disease Control, Ministry of Health. **Results:** From 2007 to 2018, the program was implemented in all 34 provinces, at 51% primary health centers (PHC) with 3 providers each. Total women aged 30-50 years screened was 3,664,625 (9.8% of the target). The number rose gradually from 2007 to 2014, with significant increase from 2015 to 2018. Bali province had the highest coverage (31%) and Papua had the lowest (1%). We found a wide disparity of coverage among provinces. There was 3.4% of VIA-positive, 16.1% was treated with cryotherapy, 1.3 per 1,000 of suspected cervical cancer, 5,4% lump in the breast, and 0.7 per 1,000 suspected breast cancer. Factors associated with number of the screening were number of PHC providing screening, number of GP, total provider, number of NCD post, number of Village with NCD Post, and income of the province. **Conclusion:** The cervical and breast cancer screening program was running in all provinces in more than half of primary health centers in Indonesia. National coverage (9.8%) was far below the target and varied widely among provinces. Number of PHC with screening services, number of GP, number of total provider, number of NCD post, number of Village with NCD Post, and income of the province have association with cervical and breast cancer screening.

Keywords: Cervical cancer- breast cancer- cancer screening- VIA- Indonesia

Introduction

Cervical and breast cancer were the most common cancers among women in Indonesia. Breast cancer became the leading cancr among women with an incidence rate of 40.3 per 100,000 and death rate 21.5 per 100,000. Meanwhile, incidence of cervical cancer was 17.3 per 100,000 and death rate 10.3 per 100,000 (IARC, 2012). In Jakarta Province the incidence of breast cancer was 18.6 per 100,000 women and cervical cancer was 9.25 per 100,000 women (Wahidin et al., 2012).

The national program of cervical and breast cancer screening was started as a pilot project in 2007 by 6 districts of 6 provinces in Indonesia: Jakarta, West Java, Central Java, Jogjakarta, North Sumatera, and South Sulawesi. In April 2008, the program was launched as national program by Indonesian First Lady. The screening program for cervical cancer used the screening method of Visual Inspection with Acetic Acid (VIA) and cryotherapy for VIA-positive lesions. Breast cancer screening was performed with Clinical Breast Examination (CBE). The screening was provided by trained health care providers (general practitioner dan midwife) in primary health centers with referral system to district/municipality hospitals (Kemenkes, 2013, 2015b).

Cervical cancer screening using VIA is recommended in low- and middle-income countries like Indonesia. Recognizing that HPV testing is currently not feasible or affordable for many low-resource settings, and that Pap screening is difficult to implement, the Alliance for Cervical Cancer Prevention (ACCP) recommends that countries, areas, or institutions seeking to initiate or strengthen cervical cancer screening programs consider introducing or expanding VIA plus cryotherapy programs (ACCP, 2009). VIA can offer significant advantages over Pap screening in low-resource settings, particularly in terms of increased screening coverage, improved follow up care and overall program quality. VIA has successfully been paired with cryotherapy, a relatively simple and inexpensive method of treating cervical lesions that can be performed by primary care physicians and mid-level providers (Cervical Cancer Action, 2009).

Screening is a part of secondary prevention of cancer, besides pre cancer lesions. It will be effective if it is

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conducted at age of 30-49 years. It has 80% sensitivity and 92% specificity. Organized screening program have reduced cervical cancer incidence and mortality by 50% to 75% in various countries (WHO, 2002; WHO SEARO, 2015). VIA screening in Indonesia was conducted by following national guideline , for women aged of 30-50 every five years (Kemenkes, 2013).

In China, breast cancer screening is performed by Chinese physicians working in the community with collaboration on numerous aspects of the screening program. This screening is started at younger ages in contrast to existing guidelines. The physicians of participants recommended more clinical breast exams compared to mammograms or ultrasounds (Wu et al., 2020). Method of cervical cancer screening using VIA and breast cancer screening using CBE are also chosen in India. In an Integrated Cancer Screening Camp from a Rural Setting of North India, a community based screening, there was 3.9% of 50 women had positive on VIA and two of which had suspected breast lumps (Bashar, Aggarwal, & Valecha, 2020). Meanwhile, in Nepal a study showed that the screening for breast cancer was performed through breast self-examination (77.3% of respondents), clinical breast examination (28.0%), mammogram (10%) (Mulmi et al., 2019).

The Ministry of Health of Indonesia, in collaboration with provincial and district governments, developed and implemented the program. This was strengthened by national regulation stated that cervical and breast cancer screening is one of prevention of these disease (Kemenkes, 2015b). This also becomes one of target in minimum health services standard of local government which is an obligation of the government (Kemenkes, 2016b). Since 2014, both screening programs were supported by Indonesia's National Health Insurance, BPJS through non capitation scheme (Kemenkes, 2016a). Providers in Primary health centers can process the fee from the insurance for screening activities.

Report of the cervical and breast cancer screening program included coverage of the screening, VIA positive cases, cryotherapy for positive cases, suspected cervical cancer, lump in the breast, and suspected breast cancer. Data of screening is recorded using a specific form and reported from providers in primary health centers to district health office, provincial health office, and Ministry of Health through surveillance information system. This online system is part of Non Communicable Disease surveillance system.

As cervical and breast cancer screening in Indonesia need strengthening, there is a need for evidence regarding how the program has performed and what factors to be strengthened. There is a limited analysis of the program, even after 12 years of implementation. Thus, this study was conducted to measure the achievement of the National screening program and factor associated with number of the screening.

Materials and Methods

This was a cross-sectional study with descriptive and analytic analysis. Secondary data were collected through online Information System of Non Communicable Disease and Profile of Non Communicable Disease 2018 for variables related to cervical and breast screening program and Non Communicable Disease Post. Data of provincial gross domestic product was collected from online data of National Statistical Bureau.

Cervical screening in Indonesia was performed using method of Visual Inspection of Acetic Acid (VIA) and Clinical Breast Examination (CBE) for breast cancer screening. These screenings were combined in Primary Health Center for women aged 30-50 years. The screening was performed by trained midwives and general physician with supervision from Obstetric and Gynecologist from referral hospital in districts.

Population of the study was all women aged 30-50 years who have been screened from 2007 till 2018. A total of 3,664,625 women became sample of this study which was a total population.

Descriptive analysis was performed to determine the distribution of cervical and breast cancer screening, PHCs running the screening, number of provider (general practitioners (GP) and midwives), and results of the screening, including: coverage, VIA positive, cryotherapy treatment, suspected cervical cancer, breast tumor, and suspected breast cancer. Correlation analysis was performed to know association between selected factors to cervical and breast cancer screening. These factors were number of PHC with VIA screening, number of GP, number of midwives, number of total providers, number of village with NCD Post, number of NCD Post, and Income based on Provincial Gross Domestic Product. Before perform correlation analysis, the data of number of the screening was tested for its normality. A test of normality using Kolmogorov-Smirnov showed that the p value was 0.020 which meant that data distribution was normal. Thus, we used Person Product Moment as test of correlation.

Results

From 2007 to2018, the program was running in all 34 (100%) at 5,115 out of 9,993 primary health centers (PHC) or 51%. Providers of screening were 13,586 (general practitioners and midwives) or 3 persons per PHC (Table 1).

Total women screened from 2007-2018 was 3,664,625 or 9.8% out of 37.4 million women aged 30-50 years. The number rose gradually from 2007 to 2014, and there was a significant increase from 2015 to 2018. The largest annual screening numbers were in 2017 for 1.1 million people (Figure 1).

By 2018, only 9.8% (3,664,625) of women aged 30-50 years had been screening from the target of 37,415,483 women. Bali province w screened the largest proportion of the target (31%) and Papua the lowest (1%). There was wide disparity in the coverage among provinces in Indonesia (Figure 2).

Results of the cervical cancer screening also shows 124,686 (3.4%) women with VIA-positive lesions, but only 16.1% had been treated with cryotherapy. The highest VIA-positive prevalence was in Southeast Sulawesi

Table 1. Number of PHC and Provider of Cervical and Breast Screening Program in Indonesia, by Province, 2007-2018

No.	Province	Total PHC	PHC with VIA Service	% PHC with VIA Service	Provider (midwives and GPs)	Mean of provider per PHC
1	Aceh	348	77	22	210	2.7
2	NorthSumatera	581	279	48	841	3.0
3	WestSumatera	275	110	40	376	3.4
4	Riau	216	63	29	62	1.0
5	KepulauanRiau	83	62	75	80	1.3
6	Jambi	195	195	100	391	2.0
7	SouthSumatera	332	252	76	505	2.0
8	Bengkulu	180	175	97	204	1.2
9	Lampung	302	269	89	531	2.0
10	BangkaBelitung	64	64	100	127	2.0
11	Jakarta	321	260	81	532	2.0
12	WestJava	1.069	203	19	580	2.9
13	CentralJava	881	476	54	1238	2.6
14	Jogjakarta	121	117	97	289	2.5
15	EastJava	967	474	49	701	1.5
16	Banten	242	155	64	232	1.5
17	Bali	120	120	100	309	2.6
18	WestNusatenggara	166	113	68	316	2.8
19	EastNusatenggara	381	179	47	110	0.6
20	WestKalimantan	244	166	68	346	2.1
21	CentralKalimantan	200	146	73	358	2.5
22	SouthKalimantan	233	233	100	3052	13.1
23	EastKalimantan	183	40	22	85	2.1
24	NorthKalimantan	56	56	100	206	3.7
25	NorthSulawesi	193	135	70	185	1.4
26	CentralSulawesi	202	125	62	330	2.6
27	SouthSulawesi	458	266	58	568	2.1
28	SoutheastSulawesi	284	54	19	293	5.4
29	WestSulawesi	94	12	13	66	5.4
30	Gorontalo	93	12	13	52	4.3
31	Maluku	208	73	35	64	0.9
32	NorthMaluku	134	58	43	87	1.5
33	Papua	408	82	20	101	1.2
34	WestPapua	159	16	10	162	10.2
	Indonesia	9.993	5.115	51	13.589	2.7

(8.9%) and Central Java Province (8.7%). The lowest were East Kalimantan and Bangka Belitung province for 0.6% each. There was 4,786 (1.3 per 1,000) suspected cervical cancer, with the highest in Banten province (6.4 per 1,000) and the lowest in Aceh and North Sulawesi (0.1 per 1,000) (Figures 3-5).

Table 2. Correlation between Selected fFactors to Cervical and Breast Screening in Indonesia at Provincial Level

| No.	Variable	P value	r	Conclusion
1	PHC with screening services	0.000	0.828	Significant, positive correlation
2	Provider_GP	0.000	0.669	Significant, positive correlation
3	Provider_Midwives	0.088	0.297	Not significant
4	Provider_total	0.024	0.387	Significant, positive correlation
5	NCD Post	0.000	0.861	Significant, positive correlation
6	Village with NCD Post	0.000	0.780	Significant, positive correlation
7	Income	0.000	0.832	Significant, positive correlation
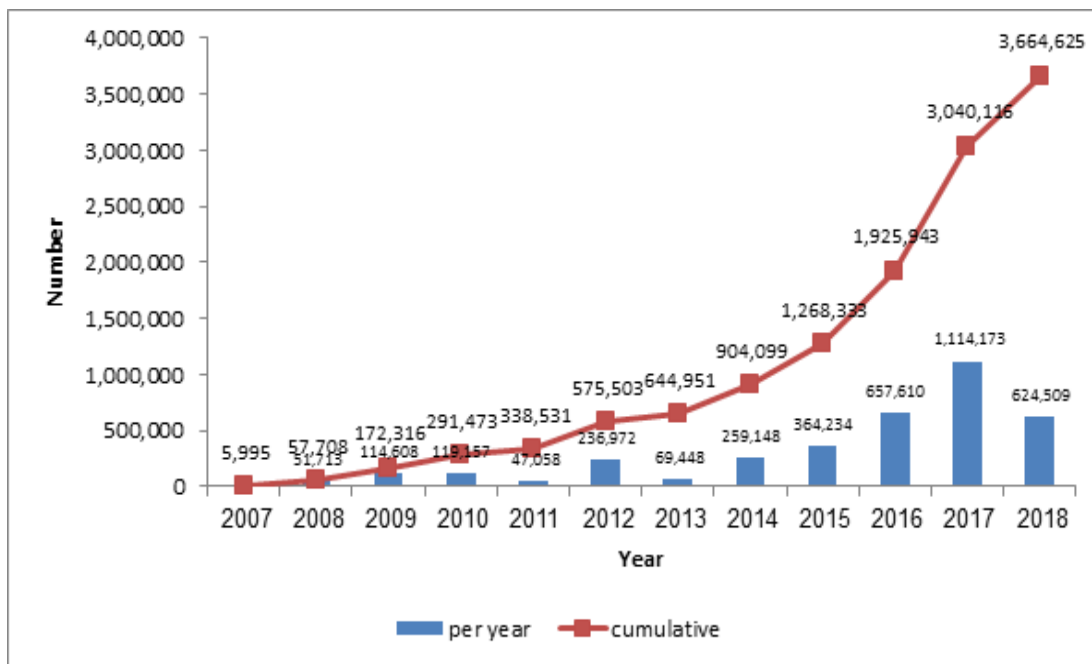
Figure 1. Number of Cervical and Breast Cancer Screening in Indonesia, 2007-2018

Results of breast cancer screening found 19,759 women with lump in the breast/breast tumor with highest prevalence in Banten (17.2%) and the lowest in North Sulawesi (0.1%). Additionally, there were 2,489 with suspected breast cancer (0.7 per 1,000), with the highest prevalence was North Kalimantan (20.3 per 1,000) and West Sumatera was the province with the lowest prevalence (0%) (Figure 6-7).

Bivariate analysis using correlation test (Pearson Product Moment) showed factors that significantly associated/correlated with cervical and breast cancer screening were PHC with screening services (p 0,000; r 0.828), GP (p 0.000; r 0.669), total provider (p 0.024; r 0.387), NCD post (p 0.000; r 0.861), Village with NCD

Post (p 0.000; r 0.780), and income of the province (p 0.000; r 0.832). Meanwhile, number of midwives was not associated with the screening (Table 2).

Discussion

Our study shows findings on coverage of cervical and breast cancer screening in Indonesia from 2007-2018, including provincial distribution, rates of screening, providers of screening program, coverage, and result of the screening. Additionally, there were several factors associated with number of the screening.

The screening was run at all provinces in Indonesia and was provided at 51% Primary health centers with
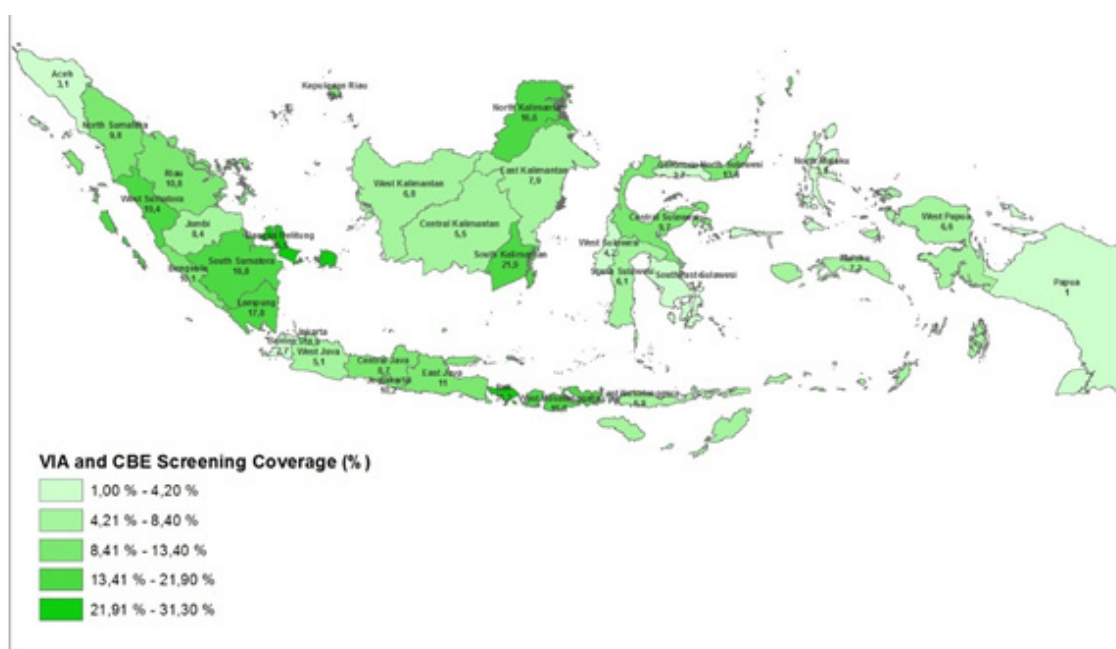

Figure 2. Coverage of Cervical and Breast Cancer Screening in Indonesia 2007-2018, by Province

Figure 3. VIA Positive Prevalence from Cervical and Breast Cancer Screening in Indonesia 2007-2018, by Province

2.7 providers per PHC. The screening programs are run in Primary Health Centers. Primary health centers are the entry point of health services in Indonesia. The role of PHC should be expanded to include promotion of cervical and breast cancer screening. A study in Indonesia in 2015 showed that number of providers significantly associated with coverage of cervical and breast cancer screening (Wahidin, 2016). Another study in Banyuasin, South Sumatera in 2019 showed a significant association between health providers and support from husbands with VIA screening (Rahmadini & Minarti, 2019).

Human resources are important part of health care system in Indonesia (Perpres No 72 Tahun 2012, 2012). Limited human resources for breast and cervical cancer screening became factor that influenced the ability of the programs to meet their targets. A study in Karawang, West Java in 2017 showed that lack of trained providers to provide screening. This is due to the high screening target and other responsibilities of the providers (Apriningrum et al., 2017). Another study in Semarang (2017) showed that one barrier to early detection of cancer was human resources (Wahyuningsih and Mulyani, 2014). In Semarang, a VIA screening program was not implemented well due to limited providers, lack of budget, and minimum education/socialization (Riyadini, 2015). A study in Sleman, Jogjakarta showed that cadres provided emotional and persuasive influence towards the empowerment woman in the conduct of the early detection
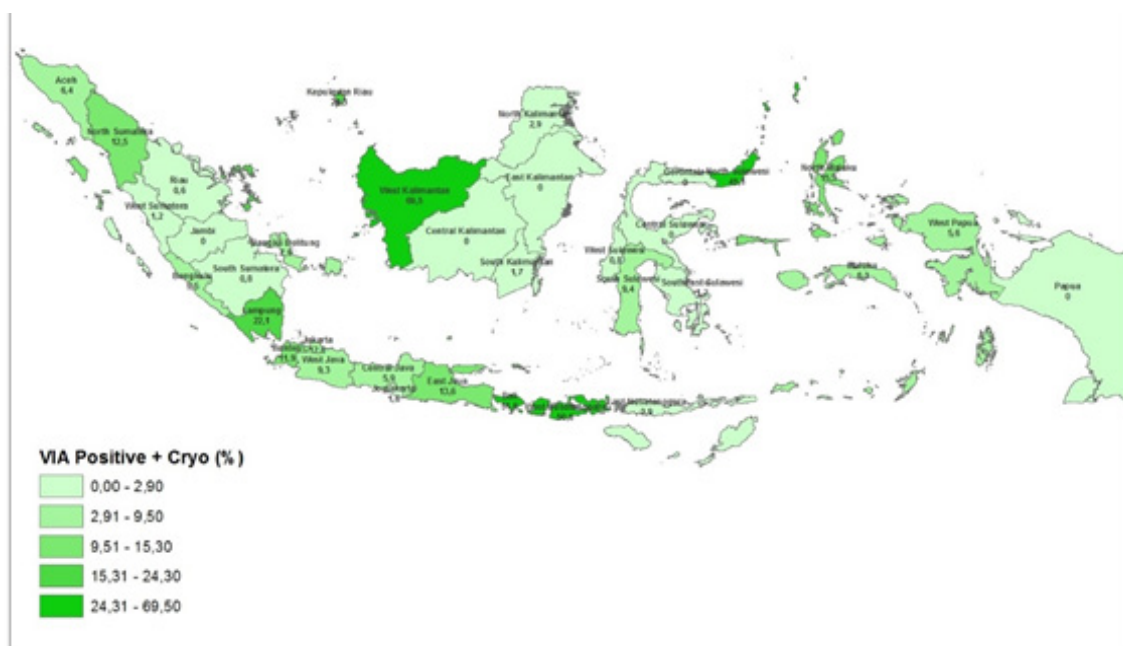

Figure 4. VIA Positive with Cryotherapy Treatment from Cervical and Breast Cancer Screening in Indonesia 2007-2018, by Province
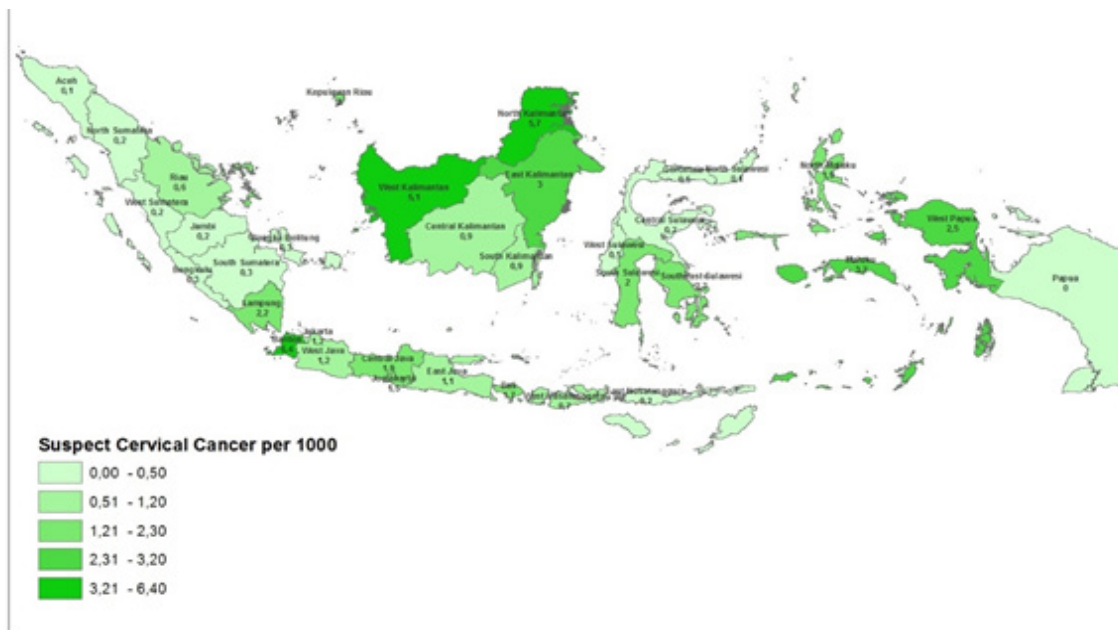
Figure 5. Suspected Cervical Cancer Revalence from Cervical and Breast Cancer Screening in Indonesia 2007-2018, by Province

of cervical cancer. Cadre was local health volunteer who had education on the screening activities (Setyani, 2018).

Coverage of cervical and breast cancer screening in Indonesia was 9.8%. This coverage was still lower than target of Minstry of Health 40% in 2018 (Kemenkes, 2015a). This was also still lover from target recommended by World Health Organization (WHO, 2002). The coverage of cervical cancer screening in other Asian countries, such as India, Bangladesh, Bhutan, Maldives, Nepal, are generally low and insignificant (<80%), except in Thailand and Sri Lanka are high (WHO SEARO, 2015). In Indonesia, the screening is conducted for women aged 30-50 years. In Bangladesh, VIA test is conducted at age of 30 years or above at an interval of three years. Meanwhile, in India it is performed to 30-59 years of age,

and in Thailand and Nepal, it was for women aged 30-60 years (WHO SEARO, 2015). In India, a multipronged approach is necessary which can target areas of high prevalence identified by registries with a combination of behavior change communication exercises and routine early screening with VIA (Sreedevi et al., 2015).

There was variation in terms of screening coverage across provinces in Indonesia. Bali province was the highest (31%) and Papua was the lowest (1%). There was also variation between province from different main islands, such as Sumatra and Kalimantan. These finding suggest that screening coverage could be increased in each main island by coordination among provinces. There was large number of women that has not been screened and PHC should be more active to catch them. A study in a
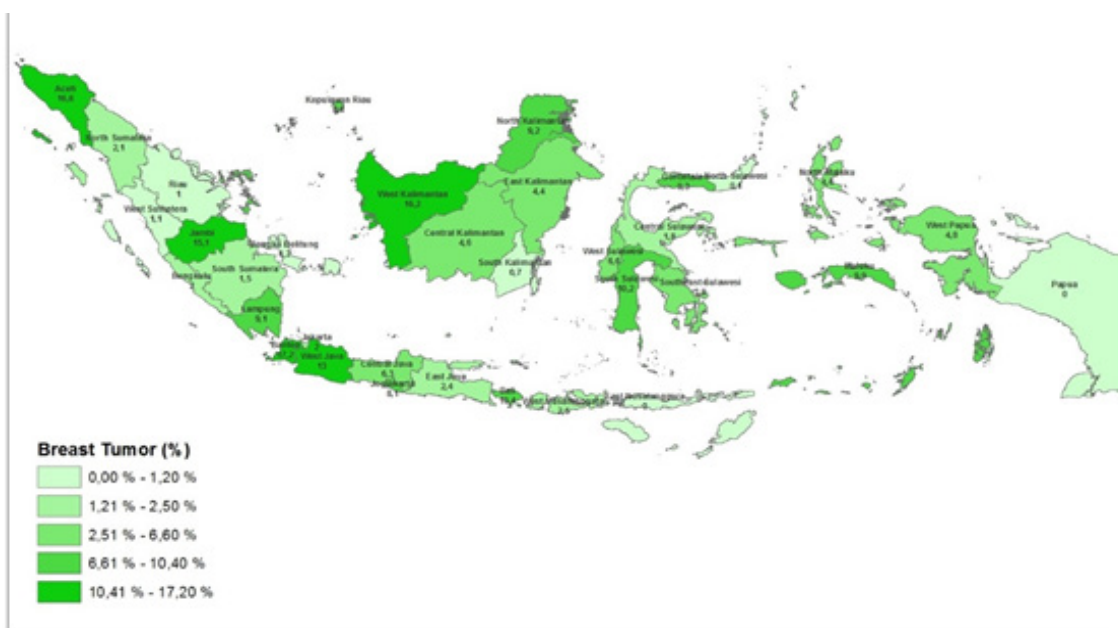

Figure 6. Breast Tumor Prevalence of Cervical and Breast Cancer Screening in Indonesia 2007-2018, by Province
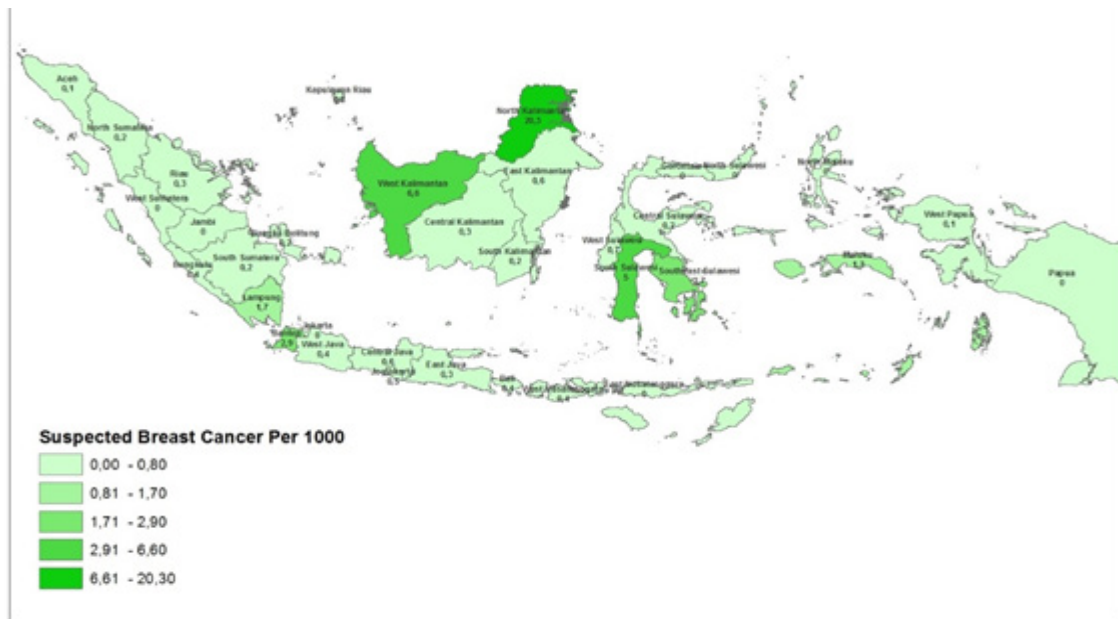
Figure 7. Suspected Breast Cancer Prevalence of Cervical and Breast Cancer Screening in Indonesia 2007-2018, by Province

PHC in Jogjakarta showed that 92.3% of 350 respondent (women aged 19-49) was not attending VIA screening in last 3 years due to lack of knowledge (Wartini and Indrayani, 2016).

Results of the this study shows that 3.4% of screened women was positive for VIA test and 16.1% had been treated by cryotherapy. Similar result was seen in study in India from 2004-2007 that positive cases for VIA was 4.3% (WHO SEARO, 2015). Study in Jakarta showed that prevalence if VIA positive was 4.2% with cryotherapy treatment 6.4% (Nuranna et al., 2012). Another study in Indonesia in 2012 showed the prevalence was 4.4% (Vet et al., 2012). But a study in one PHC in Jakarta in 2013 showed that among 100 women there was 48% among those were VIA positive (Wahyuningsih and Mulyani, 2014). Suspected cervical cancer in Indonesia (130 per 100,000) was quite higher compared to prevalence of cervical cancer in Indonesia (23.4 per 100,000). Similarly, for suspected breast cancer (70 per 100.000) was quite high compare to breast cancer prevalence (42.1 per 100,000) (IARC, 2019). In Thailand, incidence of cervical cancer was 17.8 per 100,000 women. Meanwhile, in India the prevalence was 22 per 100,000 women (IARC, 2012).

There was variation of result of the screening across provinces in Indonesia. The highest VIA positive prevalence was in Southeast Sulawesi and Central Java Province. Meanwhile the lowest was East Kalimantan and Bangka Belitung. Highest prevalence of suspected cervical cancer was in Banten province and the lowest was Aceh and North Sulawesi. Meanwhile, lump in the breast/breast tumor with highest prevalence was Banten and the lowest was North Sulawesi. Additionally, suspected breast cancer the highest prevalence was North Sumatera and West Sumatera was the province with the lowest prevalence. These findings indicate that cryotherapy should be supported in the province with high VIA positive lesion rates. Referral hospital for detecting of

cervical cancer should be prepared in the provinces with high VIA-positive and high suspected cervical and breast cancer numbers.

In order to enhance cervical and breast cancer screening, family support and health education should be expanded. A study in Kudus showed that family support was significantly associated with decision to attend cervical cancer screening (Wigati and Nisak, 2017). A study in Bandung described a significant positive effect of the health education based on the movie on the mother's attitude on VIA test (Mulyati et al., 2015). Study in a PHC in Semarang showed that there was relations between participation socialization with participation of early cervical cancer detection using VIA (Fatimah and Indrawati, 2018). Study in Padang indicated a significant relationship between the level of knowledge with, access to information and husband support and the IVA test (Aprianti and Azrimaidalisa, 2018). A study in Bali There was a difference in motivation between reproductive aged women in the coverage area of high VIA with women reproductive in low coverage areas. There was an interaction between participation in VIA test and coverage of VIA test to the knowledge and internal motivation (Suarniti et al., 2014). A study in Iran showed knowledge about cervical cancer, Pap smear and age was the most important predictors of the Pap test performance (Ashtarian et al., 2017).

In this study, number of PHC with screening services, number of GP, number of total provider, number of NCD post, number of Village with NCD Post, and income of the province have association with number cervical and breast cancer screening. It indicates that local government should increase and strengthen PHC providing the screening and provide adequate provider at the screening. In other hand, NCD post should be involved more to provide socialization for the screening. Last, local government should allocate more funding to strengthen the screening

program.

Government of Indonesia should strengthen cervical and screening program in order to achieve its target. Efforts of the strengthening program could be mass socialization, expanding utilization of insurance for screening, partnership with local government to achieve minimum health service standard on cervical screening, and enhancing cadres and screening provider capacities.

Author Contribution Statement

MW drafted this paper with contribution from all authors. MW drafted initial manuscript and reviewed all parts including contribution from all authors. RF contributed in discussion section, FS and SRH contributed in data collection. All authors agreed with the final version of the paper.

Acknowledgements

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