

Awareness of Breast Cancer and Its Screening among Indonesian Women

SOLIKHAH SOLIKHAH¹, MONTHIDA SANGRUANGAKE², SUPANEE PROMTHET³

ABSTRACT

Introduction: Breast cancer has a high morbidity and mortality rate worldwide. However, most developing countries with resource constrained setting, like Indonesia, encounter several difficulties to implement mass screening for breast cancer.

Aim: To investigate knowledge, barriers, and behaviours of women regarding breast cancer screening among rural and urban Indonesian women.

Materials and Methods: This cross-sectional study was conducted among 864 Indonesian women aged ≥ 18 years. A self-administered questionnaire using a validated instrument was administered from March to May 2016. The ordered logistic regression model analysis was performed to further evaluate five domains of awareness regarding breast cancer screening and its determinants. A p-value under 0.05 was considered significant.

Results: Overall, 864 women participated in this study (response rate of 98.28%). The mean age of women was 30.01 ± 11.01 years. Ordinal logistics regression analysis showed that urban women demonstrated better knowledge of risk factors for breast cancer, while they had poorer behaviours for the breast cancer screening method. A higher level of education (relative to no formal education) was associated with better behaviours for the breast cancer screening method, whereas being married and women living in East Nusa Tenggara were significantly related to barriers for breast cancer screening.

Conclusion: Urban Indonesian women had poor breast cancer screening practice, whereas they were highly educated. Participant's characteristics like marital status and locality were found as barriers to breast cancer screening. It is likely to provide valuable insight among women in general for breast cancer screening behaviours, which in turn, will improve targeted breast health promotion.

Keywords: Awareness, Breast cancer, Barriers, Indonesian, Screening

INTRODUCTION

Breast cancer is a kind of cancer or malignant tumour which has uncontrolled cell growth and has high morbidity and mortality rate worldwide. There are 14.1 million new cases and 8.2 million death from breast cancer around the globe. Moreover, breast cancer is the second most common diagnosed cancer in females across the world. However, this disease is reported as the majority of the cause of death among female [1]. In recent years, mortality from breast cancer poses much higher risk in low and middle-income countries, like south eastern Asian countries, as compared to Western countries [1,2]. In Asian women, mortality rates of breast cancer accounted for over half of death occurring among them, representing 22% of all new cancer cases. Notably, based on the Infodatin data from the Health Ministry Indonesia (2015), breast cancer was reported as having the highest morbidity and mortality, although, its incidence rate is ranked second in the Asian countries [3].

More importantly, increasing mortality rate of breast cancer in Asian countries especially in low and middle-income countries, like Indonesia, is likely reflected by the fact that this disease is most commonly diagnosed at advanced stage during first presentation [4]. In western countries, the mortality rate is slightly lower, reflecting the benefits of early detection, screening, and improving treatments where many patients with breast cancer are reasonably earlier diagnosed in their adequate healthcare settings [5].

Studies undertaken in Asian countries [6,7], especially in the developing countries and even among women minority in the developed country [8], revealed that lack of resources was rampant in their health system, including poorly covered breast screening such as Clinical Breast Examination (CBE) and mammography. A poor quality of health system implied poor early detection of breast

cancer, thereafter breast cancer is diagnosed in advanced stage and has the potential to trigger shortening breast cancer survival [9]. Several difficulties in assessing healthcare such as long distances and being located in the remote area were also stipulated as barriers for women to perform breast cancer screening and treatment. Residing in rural areas was significantly associated with both long distances and higher cost of conveyance to access health care service [10].

Based on current poor resources in healthcare systems, most developing countries believe that improving strategy through raising breast cancer awareness may be feasible and cost-effective, before implementing widespread population-based screening [4,11-13]. Perhaps more importantly, increasing public awareness of risk of breast cancer among women will make them aware of changes in their own breast resulting in early detection and treatment of breast cancer. Numerous previous studies have identified breast cancer awareness in Western countries [14,15], Asia in general [16,17]. However, no study regarding awareness of breast cancer screening have focused on the differences between rural and urban women, especially in Indonesia. Therefore, this study examined breast cancer knowledge, attitude to breast cancer prevention, barriers to breast cancer screening, and health behaviour related to breast cancer screening among rural-urban Indonesian women.

MATERIALS AND METHODS

Study Design and Sample Population

A cross-sectional study was conducted among Indonesian women. The study area, Indonesia, provides an interesting context for examining rural-urban disparities for two reasons. Indonesia encompasses a diversity of geographic settings and is a huge

archipelagic country. There are five major islands and about 30 smaller groups which are densely populated city to smaller metropolitan areas to remote rural extending 5,120 kilometres from east to west and 1,760 kilometres from north to south. Also, Indonesia is well known as a multi-culture community representing the spectrum of cultures, religions, and socioeconomics.

In total, 864 women living in either rural or urban areas from the east and west regions of Indonesia were recruited from women of community that represented three areas of breast cancer incidence in Indonesia. The participants were sampled using a stratified sampling design where strata were based on province-locality (rural-urban) combination. Women living in Yogyakarta, South of Sumatera, and East Nusa Tenggara were chosen to adequately represent the spectrum of cultures, religions, and socioeconomics in Indonesia. The questionnaire was administrated from March to May 2016 to women aged ≥ 18 years who had no history of breast cancer and neither pregnant or breastfeeding, were able to read and understand Indonesian, and were willing to participate in the study. The authorized person from the Indonesian Ministry of Home Affairs (No.440.02/1085/Polpum) allowed to conduct the study, and all participants provided written informed consent. Data collection was completed by means of a participant self-report. The study protocol was approved by the ethics committee of Khon Kaen University (HE582369).

Instrument Translation and Face Validity

Firstly, the existing instrument for breast cancer awareness was reviewed and later adapted for the instrument in this study. The original version of the BCAS-I is a self-administered scale composed of 35 items designed to investigate breast cancer awareness [18]. In this study, the instrument items were translated from English into Indonesian using forward and backward translation technique outlined by Epstein [19]. Four Indonesian-English bilingual translators were identified, and of these, two were used to forward translate the original version of the existing instrument from Indonesian to English. The original and back-translated versions of the questionnaire were then compared by two native English speakers. Finally, the questionnaire was field-tested in a pilot group consisting of 20 Indonesian women to evaluate the translational quality and the practical aspects of test administration. Finally, a good level of internal consistency reliability for the instrument of this study and its subscale were evaluated by confirmatory factor analysis with Cronbach's alpha of 0.79 for the overall scale.

Data Collection

Each participant completed the questionnaire about their experience of breast cancer with knowledge of risk factors, knowledge of signs and symptoms, barriers to breast cancer screening, and breast cancer screening behaviours. Two items of knowledge were measured using a categorical response scale (yes, no and don't know). Item of barriers to breast cancer screening was rated on a 5-point Likert scale ranging from strongly disagree to strongly agree. Lastly, an item of breast cancer screening behaviours was responded with five response scale. The questionnaire also included eight questions relating to sociodemographic parameters including age, province, education level, marital status, monthly household income, occupation and health insurance.

STATISTICAL ANALYSIS

Descriptive statistics were used to summarize the participant characteristics of the study population. Measurement data were expressed as the mean \pm Standard Deviation (SD), and frequencies and percentages were employed for those that were categorical. Lastly, ordinal logistic regression was performed to further evaluate all items of the questionnaire and its determinant. For this analysis, a three-point ordinal scale was used to measure each subscale (knowledge of risk factors for breast cancer, knowledge of signs

and symptoms, barriers to breast cancer screening, and breast cancer screening behaviours). The highest group was represented by those at least one standard deviation above of the mean; the middle group, those within one standard deviation of the mean; lastly, the lowest group, those at least one standard deviation below the mean. All data analysis was conducted using STATA statistical software version 13, and a p-value under 0.05 was considered significant.

RESULTS

Sample Characteristics

Of the 864 Indonesian women who were aged 18 and over without breast cancer participated in the study, with a response rate of 98.28%. Five hundred and thirty-six (62.04%) of them were from the rural area and 328 (37.96%) were urban women. The participant characteristics are reported in [Table/Fig-1].

[Table/Fig-2-5] provide the adjusted model using an ordinal logistic regression model analyses for all five domains of awareness regarding breast cancer screening. Overall, perusal of women level effects for multivariate model revealed a strong consistency in the direction of association for five domains of awareness regarding

Characteristics	Number (%); (N=864)
Age (year) Mean (SD)	Mean= 30.01 (SD= 11.01)
Locale	
Rural	536 (62.04)
Urban	328 (37.96)
Province	
Yogyakarta	196 (22.69)
East Nusa Tenggara	258 (29.86)
South of Sumatera	410 (47.45)
Education level	
Primary school	66 (7.64)
Junior high school	60 (6.94)
Senior high school	329 (38.08)
Bachelor degree	382 (44.21)
Postgraduate degree	27 (3.13)
Marital status	
Single	428 (49.54)
Married	403 (46.64)
Widowed/separated/discovered	33 (3.82)
Monthly household income	
<2,000,000 IDR*(<152 USD**)	653 (75.58)
2,000,000 to 6,000,000 IDR (152 to 457 USD)	200 (23.15)
$\geq 6,000,000$ IDR (≥ 457 USD)	11 (1.27)
Occupation	
No employment (include housewives)	291 (33.68)
Farmer	47 (5.44)
Trader	73 (8.45)
Laborer	97 (11.23)
Government/official/enterprise/business	183 (21.18)
Student	173 (20.02)
Health insurance	
Yes	522 (60.49)
No	341 (39.51)

[Table/Fig-1]: Participants characteristic of awareness regarding breast cancer screening among Indonesian women

*: Indonesian Rupiah; **: United States Dollar

breast cancer screening, such as knowledge of risk factors, knowledge of signs and symptoms, attitude to breast cancer prevention, barrier of breast screening, and health behaviour related to breast cancer screening. [Table/Fig-2] shows, although the adjusted effect of knowledge of risk factors for breast cancer was identified as significant for urban women than rural women (AOR urban women: 1.44, 95% CI: 1.07, 1.96, $p < 0.05$) while after all

Effects	Risk factors			
	Crude OR	95% CI	AOR	95% CI
Age (Year)	1.00	0.99, 1.01	1.00	0.98, 1.01
Region (ref. rural)	1.50	1.16, 1.95	1.44*	1.07, 1.96
Marital status (ref: single)				
Married	0.94	0.73, 1.22	0.95	0.66, 1.36
Discovered/Separated/Widowed	1.01	0.53, 1.93	1.12	0.52, 2.41
Educational level (ref: primary school)				
Junior High School	1.08	0.57, 2.05	1.14	0.59, 2.21
Senior High School	1.52	0.94, 2.47	1.44	0.83, 2.49
Bachelor Degree	1.71	1.06, 2.75	1.49	0.85, 2.63
Postgraduate School	3.92	1.68, 9.16	2.95*	1.16, 7.49
Monthly household income (ref: <2,000,000 IDR*(<152 USD**))				
2,000,000 to 6,000,000 IDR (152 to 457 USD)	1.35	1.00, 1.82	1.14	0.80, 1.64
≥ 6,000,000 IDR (≥ 457 USD)	2.11	0.63, 7.02	1.73	0.50, 5.96
Religion (ref: Muslim)				
Christians	1.01	0.76, 1.33	0.92	0.40, 2.07
Others	1.47	0.46, 4.71	1.13	0.32, 3.99
Occupation (ref: farmer)				
No employment (include housewives)	0.73	0.37, 1.44	0.66	0.32, 1.33
Trader	1.09	0.57, 2.09	0.88	0.43, 1.76
Labor	1.44	0.79, 2.62	1.04	0.53, 2.05
Government /Official/ Enterprise/Business	0.92	0.52, 1.64	0.75	0.40, 1.42
Student	1.09	0.60, 2.00	0.81	0.40, 1.65
Health insurance (ref: no having health insurance)	1.05	0.81, 1.36	0.90	0.69, 1.19
Smoking history (ref: no smoking history)	1.91	0.84, 4.36	2.18	0.92, 5.14
Alcohol history (ref: no alcohol history)	1.72	1.09, 0.79	1.55	0.71, 3.37
Province (ref: Yogyakarta)				
East Nusa Tenggara	0.82	0.58, 1.16	1.03	0.44, 2.44
South of Sumatera	0.73	0.53, 1.00	0.78	0.54, 1.13

[Table/Fig-2]: The adjusted odds of the ordered logistic regression model for risk factors among Indonesian women
***= $p < 0.001$; **= $p < 0.01$; *= $p < 0.05$

covariate pooled to the level of knowledge of signs and symptoms did not retain significance within rural and urban women. Women who completed higher level of education had 2.95 times the odds of higher knowledge of risk factors of breast cancer (AOR: 2.95, 95%CI: 1.16, 7.49, $p < 0.05$).

Surprisingly, in [Table/Fig-3], women who resided in the rural and urban area and three provinces, Yogyakarta, South of Sumatera, and East Nusa Tenggara did not show significance when all covariate pooled to the level of the risk factor of breast cancer. However, women with higher education had 2.85 times higher the odds of better knowledge of signs and symptoms of breast cancer compared with low educated women (AOR: 2.85, 95% CI: 1.08, 7.55, $p < 0.05$). Urban women did not show significance to perceived barriers to breast screening, but perhaps not surprisingly,

their odds were decreased by 16% and 61% from women who lived in East Nusa Tenggara and being married respectively [Table/Fig-4] (AOR_East Nusa Tenggara: 0.17, 95%CI: 0.07, 0.41, $p < 0.001$ and AOR_marry women: 0.62, 95% CI: 0.42, 0.91, $p < 0.01$).

Effects	Signs and symptoms			
	Crude OR	95% CI	AOR	95% CI
Age (Year)	0.99	0.99, 1.02	0.99	0.97, 1.01
Region (ref. rural)	1.03	1.80, 1.33	0.97	0.72, 1.32
Marital status (ref: single)				
Married	0.87	0.67, 1.12	1.11	0.77, 1.59
Discovered/Separated/Widowed	0.83	0.44, 1.58	1.25	0.57, 2.76
Educational level (ref: primary school)				
Junior High School	1.62	0.87, 3.12	1.52	0.80, 2.86
Senior High School	2.05	1.28, 3.29	1.53	0.89, 2.62
Bachelor Degree	2.25	1.41, 3.59	1.54	0.88, 2.70
Postgraduate School	4.57	1.88, 11.13	2.85*	1.08, 7.55
Monthly household income (ref: <2,000,000 IDR*(<152 USD**))				
2,000,000 to 6,000,000 IDR (152 to 457 USD)	1.34	1.00, 1.81	1.17	0.782, 1.66
≥ 6,000,000 IDR (≥ 457 USD)	1.69	0.56, 5.14	1.76	0.55, 5.68
Religion (ref: Muslim)				
Christians	1.49	1.12, 1.98	1.84	0.77, 4.42
Others	1.09	0.33, 3.61	1.25	0.34, 4.65
Occupation (ref: farmer)				
No employment (include housewives)	1.37	0.55, 2.03	1.02	0.51, 2.02
Trader	1.44	0.76, 2.71	1.35	0.69, 2.66
Labor	2.08	0.16, 3.75	1.64	0.85, 3.21
Government /Official/ Enterprise/Business	1.58	0.90, 2.75	1.34	0.72, 2.50
Student	2.12	0.17, 3.86	1.67	0.83, 3.34
Health insurance (ref: no having health insurance)	1.23	0.96, 1.59	1.13	0.86, 1.48
Smoking history (ref: no smoking history)	1.32	0.54, 3.27	1.37	0.53, 3.56
Alcohol history (ref: no alcohol history)	2.26	0.98, 5.24	2.22	0.91, 5.44
Province (ref: Yogyakarta)				
East Nusa Tenggara	1.21	0.85, 1.71	0.54	0.21, 1.34
South of Sumatera	0.80	0.59, 1.09	0.71	0.50, 1.02

[Table/Fig-3]: The adjusted odds of the ordered logistic regression model for signs and symptoms among Indonesian women
***= $p < 0.001$; **= $p < 0.01$; *= $p < 0.05$

A perusal of [Table/Fig-5] reveals that urban women had decreased odds of higher level of behaviour related to breast cancer screening than compared to their odds in rural women (AOR urban women: 0.61, 95%CI: 0.44, 0.83, $p < 0.01$). However, the odds of better behaviour of breast cancer screening was decreased in 42% of unemployed women when compared to the farmer (AOR: 0.43, 95%CI: 0.21, 0.90, $p < 0.05$). In addition, compared to women with primary school (reference group), the women who completed senior high school had 2.84 times higher the odds of higher health behaviour related to awareness breast cancer screening. This difference was more pronounced with the higher level of education. Regardless this pattern was also found evident for women with smoking experience and who didn't have health insurance (AOR_women smoking: 3.08, 95%CI: 1.18, 8.01, $p < 0.05$; AOR_health insurance: 1.44, 95% CI: 1.09, 1.9, $p < 0.05$).

Effects	Barriers to breast screening			
	Crude OR	95% CI	AOR	95% CI
Age (Year)	1.01	1.00, 1.02	1.01	0.99, 1.02
Region (ref. rural)	1.24	0.95, 1.61	0.91	0.66, 1.26
Marital status (ref: single)				
Married	1.04	0.81, 1.34	0.62**	0.42, 0.91
Discovered/Separated/Widowed	1.74	0.89, 3.44	0.94	0.41, 2.11
Educational level (ref: primary school)				
Junior High School	0.80	0.42, 1.54	0.79	0.40, 1.55
Senior High School	0.88	0.53, 1.45	1.26	0.70, 2.26
Bachelor Degree	0.65	0.39, 1.06	0.84	0.46, 1.52
Postgraduate School	0.58	0.24, 1.38	0.62	0.24, 1.62
Monthly household income (ref: <2,000,000 IDR(<152 USD**))				
2,000,000 to 6,000,000 IDR (152 to 457 USD)	0.85	0.63, 1.15	0.87	0.60, 1.26
≥ 6,000,000 IDR (≥ 457 USD)	0.94	0.28, 3.15	1.03	0.30, 3.50
Religion (ref: Muslim)				
Christians	0.40	0.30, 0.53	2.07	0.89, 4.85
Others	1.42	0.38, 5.23	2.87	0.67, 12.28
Occupation (ref: farmer)				
No employment (include housewives)	1.36	0.68, 2.71	1.26	0.61, 2.60
Trader	1.16	0.60, 1.26	1.12	0.55, 2.3
Labor	0.90	0.49, 1.66	1.09	0.54, 2.18
Government /Official/Enterprise/ Business	0.84	0.47, 1.51	0.99	0.52, 1.90
Student	0.57	0.31, 1.05	0.78	0.38, 1.59
Health insurance (ref: no having health insurance)	0.79	0.61, 1.02	0.89	0.67, 1.18
Smoking history (ref: no smoking history)	0.98	0.42, 2.30	0.84	0.33, 2.15
Alcohol history (ref: no alcohol history)	0.67	0.31, 1.41	1.02	0.45, 2.29
Province (ref: Yogyakarta)				
East Nusa Tenggara	0.37	0.26, 0.53	0.17***	0.07, 0.41
South of Sumatera	1.09	0.79, 1.51	1.10	0.75, 1.62

[Table/Fig-4]: The adjusted odds of the ordered logistic regression model for barriers to breast cancer screening among Indonesian women
***=p<0.001; **=p <0.01; *p<0.05

DISCUSSION

Breast cancer screening has been known to reduce breast cancer mortality [20,21]. However, mass screening with Clinical Breast Examination (CBE) and mammography utilized in developed countries cannot be equally applied to Indonesia due to limited health-care resources [22]. Moreover, a breast cancer screening of population is not Indonesia's public health agenda as the country's first concern is eradicating communicable disease. This is the first Indonesian study exploring knowledge regarding awareness of the breast cancer, barriers, and behaviours of breast cancer screening using large sample of Indonesian women. Increasing public knowledge and awareness of both risk factors and signs and symptoms of the breast cancer is the key point in early detection of cancer, particularly in developing countries like Indonesia. Inadequate knowledge of breast cancer awareness and barriers of breast cancer screening were associated with how to perform breast screening resulting in most patients of breast cancer being diagnosed in advanced stage [23].

The study result revealed that urban women were associated with the significantly higher knowledge level of a risk factor of breast

Effects	Health behavior related to breast cancer screening			
	Crude OR	95% CI	AOR	95% CI
Age (Year)	0.99	0.98, 1.00	1.00	0.98, 1.01
Region (ref. rural)	0.65	0.50, 0.84	0.61**	0.44, 0.83
Marital status (ref: single)				0.65, 1.35
Married	0.83	0.64, 1.07	0.94	0.35, 1.76
Discovered/Separated/Widowed	0.56	0.29, 1.09	0.78	0.77, 3.17
Educational level (ref: primary school)				1.56, 5.19
Junior High School	1.60	0.81, 3.17	1.56	1.87, 6.41
Senior High School	2.60	1.54, 4.36	2.84**	2.41, 16.06
Bachelor Degree	3.36	2.00, 5.64	3.46***	0.89, 1.82
Postgraduate School	6.62	2.85, 15.38	6.22***	1.00, 12.80
Monthly household income (ref: <2,000,000 IDR(<152 USD**))				0.46, 2.30
2,000,000 to 6,000,000 IDR (152 to 457 USD)	1.47	1.09, 1.97	1.27	0.89, 1.82
≥ 6,000,000 IDR (≥ 457 USD)	3.79	1.14, 12.51	3.58*	1.00, 12.80
Religion (ref: Muslim)				
Christians	1.22	0.93, 1.60	1.03	0.46, 2.30
Others	1.25	0.43, 3.62	0.72	0.22, 2.38
Occupation (ref: farmer)				
No employment (include housewives)	0.41	0.20, 0.83	0.43*	0.21, 0.90
Trader	0.81	0.41, 1.57	0.72	0.35, 1.48
Labor	1.03	0.55, 1.93	0.54	0.27, 1.08
Government /Official/Enterprise/ Business	0.84	0.46, 1.55	0.67	0.35, 1.28
Student	0.96	0.51, 1.80	0.70	0.34, 1.42
Health insurance (ref: no having health insurance)	1.36	1.05, 1.76	1.44*	1.09, 1.90
Smoking history (ref: no smoking history)	2.54	1.04, 6.21	3.08*	1.18, 8.01
Alcohol history (ref: no alcohol history)	0.86	0.41, 1.81	0.62	0.28, 1.38
Province (ref: Yogyakarta)				
East Nusa Tenggara	1.70	1.20, 2.41	0.98	0.42, 2.29
South of Sumatera	1.66	1.20, 2.28	1.24	0.85, 1.82

[Table/Fig-5]: The adjusted odds of the ordered logistic regression model for health behavior related to breast cancer screening among Indonesian women
***=p<0.001; **=p <0.01; *p<0.05

cancer compared to rural area, while barriers of breast screening found no difference between those areas. The educational level was significantly associated with the higher knowledge level of both breast cancer risk factors and signs and symptoms of breast cancer in urban areas. These results are consistent with previous studies [24] that higher educated women are naturally expected to have ability for obtaining more and effective source of information about risk factors [25], screening method [16] or awareness signs of breast cancer as we saw that women with higher education level completed university level and high school compared with less educated ones. Previous study revealed that women attending mammography screening were influenced by higher levels of their education [26]. Interestingly, the trend of study result was the same for educational level but unlike married women, could only be demonstrated statistically significantly different in urban [27].

According to WHO, health insurance is not widespread and there is unequal universal health coverage in several developing countries [23]. In our findings, the majority of participants did not have health

insurance. Health insurance itself was significantly associated to decrease a higher level of behaviour related to breast screening in rural women in particular. However, in terms of achievement of all ten indicators (participant characteristics) in urban women for the level of behaviour of breast screening, it was found that only isolated urban women (East Nusa Tenggara) and no alcohol consumption could be shown to be significantly associated with a better behaviour for breast cancer prevention. Lack of positive attitude likely triggers the diagnosis of breast cancer in advanced stage [28].

Interestingly, the present study adds new information that two variables affected barriers regarding breast cancer, such as women who were married and lived in the remote area, especially in East Nusa Tenggara, were significantly associated with higher barriers of breast screening. Previously study in women in sub-Saharan Africa revealed that marital status lead to difficulties in seeking health services regarding breast cancer screening, importantly in remote areas [7]. Several barriers to breast screening are stipulated.

Furthermore, women who resided in urban areas showed poor health behaviour of breast cancer screening, meanwhile, the level of knowledge of risk factor for breast cancer was adequate when compared to a rural setting. Poor understanding/or misinformation about the mammography and clinician process and women's fear of health experience reflected a denial of breast cancer screening [29]. Lack of understanding the benefit of breast cancer screening can considerably increase the stage of breast cancer diagnosed, shortening breast cancer survival [9,30]. Furthermore, in urban women, this varied with monthly income, where higher monthly income increased better health behaviour of breast cancer screening. This tends to impact the performances of clinical breast screening or mammography resulting in late diagnosis in many women.

The strength of this study reflects comprehensive assessment of the various themes identified and carried out using a relatively large sample of the general Indonesian population. This study employed the instrument with good psychometric validation which was adjusted in Asian women with an appropriate sample size [18,31]. Lastly, present findings covered wide spectrum of Indonesian socio-demographic culture and comparatively rural-urban combination for awareness of breast cancer screening in Asian women, particularly in Indonesian women.

LIMITATION

While, this study is limited by cross-sectional data, so measures of five domains of awareness regarding breast cancer screening and participant characteristics were measured concurrently. There was no information about the history of their beliefs for seeking help for disease (for example, they may have several reasons and difficulties to visit the medical doctor to check their breast or lack of their knowledge about early symptoms of breast cancer).

CONCLUSION

Finally, it can be concluded that study demonstrated adequate level of knowledge regarding breast cancer among urban women, while lacking of behaviour related to breast cancer screening especially clinical breast examination and mammography. The present findings emphasized understanding the benefits of early detection and presentation of breast cancer was poor among women. Several participant characteristics such as marital status and women residing in remote areas identified as barriers to women's screening of breast cancer. Improving their knowledge of cancer screening particularly of breast cancer in the future is necessary and urgent, especially for women aged 35 years and above.

ACKNOWLEDGMENT

The authors would like to thank Khon Kaen University for providing a scholarship for the Doctor of Public Health Program and all of the participants for their cooperation. This research was supported by

the Kopertis Wilayah 5, Ministry of Research Technology and Higher Education, Yogyakarta, Indonesia.

REFERENCES

- Ghoncheh M, Pournamdar Z, Salehiniya H. Incidence and mortality and epidemiology of breast cancer in the World. *Asian Pac J Cancer Prev*. 2016;17(S3):43–46.
- Ghoncheh M, Momenimovahed Z, Salehiniya H. Epidemiology, incidence and mortality of breast cancer in Asia. *Asian Pac J Cancer Prev*. 2016;17(S3):47–52.
- Youlden DR, Cramb SM, Yip CH, Baade PD. Incidence and mortality of female breast cancer in the Asia-Pacific region. *Cancer Biol Med*. 2014;11(2):101–15.
- Hossain MS, Ferdous S, Karim-Kos HE. Breast cancer in South Asia: A Bangladeshi perspective. *Cancer Epidemiol*. 2014;38(5):465–70.
- Oeffinger KC, Fontham ETH, Etzioni R, Herzig A, Michaelson JS, Shih Y-CT, et al. Breast Cancer Screening for Women at Average Risk: 2015 Guideline Update From the American Cancer Society. *JAMA*. 2015;314(15):1599–614.
- Mamdouh HM, El-Mansy H, Kharboush IF, Ismail HM, Tawfik MM, El-Baky MA, et al. Barriers to breast cancer screening among a sample of Egyptian females. *J Fam Community Med*. 2014;21(2):119–24.
- Akuoko CP, Armah E, Sarpong T, Quansah DY, Amankwaa I, Boateng D. Barriers to early presentation and diagnosis of breast cancer among African women living in sub-Saharan Africa. *PLOS ONE*. 2017;12(2):e0171024.
- Leung J, Martin J, McLaughlin D. Rural-urban disparities in stage of breast cancer at diagnosis in Australian women. *Aust J Rural Health*. 2016;24(5):326–32.
- Saadatmand S, Bretveld R, Siesling S, Tilanus-Linthorst MMA. Influence of tumour stage at breast cancer detection on survival in modern times: population based study in 173 797 patients. *BMJ*. 2015;351:h4901.
- Da RCV, Biller G, Uemura G, Ruiz CA, Curado MP. Breast cancer screening in developing countries. *Breast cancer screening in developing countries*. Clinics. 2017;72(4):244–53.
- Donnelly TT, Khater A-HA, Kuwari MGA, Al-Bader SB, Al-Meer N, Abdulmalik M, et al. Do socioeconomic factors influence breast cancer screening practices among Arab women in Qatar? *BMJ Open*. 2015;5(1):e005596.
- Renganathan L, Ramasubramaniam S, Al-Touby S, Seshan V, Al-Balushi A, Al-Amri W, et al. What do Omani women know about breast cancer symptoms? *Oman Med J*. 2014;29(6):408–13.
- Tupper R, Holm K. Screening mammography and breast cancer reduction: examining the evidence. *J Nurse Pract*. 2014;10(9):721–28.
- Sherman SM, Lane EL. Awareness of risk factors for breast, lung and cervical cancer in a UK student population. *J Cancer Educ*. 2015;30(4):660–63.
- Niksic M, Rachet B, Warburton FG, Wardle J, Ramirez AJ, Forbes LJL. Cancer symptom awareness and barriers to symptomatic presentation in England—are we clear on cancer?. *Br J Cancer*. 2015;113(3):533–42.
- Gupta A, Shridhar K, Dhillon PK. A review of breast cancer awareness among women in India: Cancer literate or awareness deficit?. *Eur J Cancer Oxf Engl*. 1990. 2015;51(14):2058–66.
- Al-Sharabati SS, Shaikh RB, Mathew E, Al-Biate MA. Assessment of breast cancer awareness among female University students in Ajman, United Arab Emirates. *Sultan Qaboos Univ Med J*. 2014;14(4):e522–29.
- Rakkapao N, Promthet S, Moore MA, Solikhah S, Hurst C. Assessing Breast Cancer Awareness in Thai Women: Validation of the Breast Cancer Awareness Scale (B-CAS). *Asian Pac J Cancer Prev*. 2017;18(4):995–1005.
- Epstein J, Santo RM, Guillemin F. A review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus. *J Clin Epidemiol*. 2015;68(4):435–41.
- Nelson HD, Fu R, Cantor A, Pappas M, Daeges M, Humphrey L. Effectiveness of breast cancer screening: systematic review and meta-analysis to update the 2009 US preventive services task force recommendation. *Ann Intern Med*. 2016;164(4):244–55.
- Lauby-Secretan B, Scoccianti C, Loomis D, Benbrahim-Tallaa L, Bouvard V, Bianchini F, et al. Breast-cancer screening — viewpoint of the IARC working group. *N Engl J Med*. 2015;372:2353–58.
- Li J, Shao Z. Mammography screening in less developed countries. *Springer Plus*. 2015;4(615):2–12.
- Mills A. Health care systems in low- and middle-income countries. *N Engl J Med*. 2014;370(6):552–57.
- Tazhibi M, Feizi A. Awareness levels about breast cancer risk factors, early warning signs, and screening and therapeutic approaches among Iranian adult women: a large population based study using latent class analysis. *Bio Med Res Int*. 2014;2014:306352.
- Liu Y, Zhang J, Huang R, Feng W-L, Kong Y-N, Xu F, et al. Influence of occupation and education level on breast cancer stage at diagnosis, and treatment options in China: A nationwide, multicenter 10-year epidemiological study. *Medicine (Baltimore)*. 2017;96(15):e6641.
- Damiani G, Basso D, Acampora A, Bianchi CBNA, Silvestrini G, Frisicale EM, et al. The impact of level of education on adherence to breast and cervical cancer screening: Evidence from a systematic review and meta-analysis. *Prev Med*. 2015;81:281–89.
- Latif R. Knowledge and attitude of Saudi female students towards breast cancer: A cross-sectional study. *J Taibah Univ Med Sci*. 2014;9(4):328–34.
- Hajian Tilaki K, Auladi S. Awareness, attitude, and practice of breast cancer screening women, and the associated socio-demographic characteristics, in Northern Iran. *Iran J Cancer Prev*. 2015;8(4):e3429.

- [29] Marmarà D, Marmarà V, Hubbard G. Health beliefs, illness perceptions and determinants of breast screening uptake in Malta: a cross-sectional survey. *BMC Public Health*. 2017;17(416):2–19.
- [30] Fei X, Wu J, Kong Z, Christakos G. Urban-rural disparity of breast cancer and socioeconomic risk factors in China. *PLOS ONE*. 2015;10(2):e0117572.
- [31] Solikhah S, Promthet S, Rakkapao N, Hurst CP. Validation of an Indonesian Version of the Breast Cancer Awareness Scale (BCAS-I). *Asian Pac J Cancer Prev*. 2017;18(2):515–22.

PARTICULARS OF CONTRIBUTORS:

1. Faculty of Public Health, Universitas Ahmad Dahlan, Yogyakarta 55164, Indonesia.
2. Faculty of Nursing, Ratchathani University, Udonthani, Thailand.
3. Department of Epidemiology and Biostatistics, Faculty of Public Health, Khon Kaen University, Khon Kaen, Thailand.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Solikhah,
Faculty of Public Health, Universitas Ahmad Dahlan, Yogyakarta-55166, Indonesia.
E-mail: solikhah@ikm.uad.ac.id

Date of Submission: **Apr 26, 2018**

Date of Peer Review: **Jun 06, 2018**

Date of Acceptance: **Aug 29, 2018**

Date of Publishing: **Nov 01, 2018**

FINANCIAL OR OTHER COMPETING INTERESTS: As declared above.