ORIGINAL ARTICLE

Knowledge of Breast Cancer Among Urban Women in the South of Peninsular Malaysia

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ABSTRACT

Introduction: : Breast cancer (BC) is the most commonly diagnosed cancer globally and it is the leading cause of cancer mortality in Malaysian women. Increasing women knowledge of BC and breast self-examination (BSE) leads to increased compliance in early diagnosis and treatment. This study aims to determine the level of knowledge on BC and its association with socio-demographic characteristics among urban women. **Methods:** A cross-sectional study was conducted among 270 urban women in the South of Peninsular Malaysia using the adapted Breast Cancer Awareness Measure. Data were analyzed through SPSS software version 26.0. **Results:** Of the participants, 53.7% (n=145) had poor knowledge of BC warning signs, 50.7% (n=137) of BSE and 55.6% (n=150) of risk factors. High education was associated with better BC knowledge on warning signs (p=0.006) and risk factors (p=0.048). Chinese women have poor BC knowledge on warning signs (p=0.005) and BSE (p<0.001) than other ethnicities. Age (p=0.024) and marital status (p=0.028) were statistically significant with BC knowledge on breast self-examination (BSE) while family history of BC (p=0.019) and duration of seeking medical advice (p=0.041) were associated with BC knowledge on the risk factor. **Conclusion:** The findings of this study may give insight into effective health education strategies for urban women concerning breast cancer awareness.
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INTRODUCTION

Breast cancer is the most common cancer among women globally and locally in Malaysia. The incidence rates remain highest in the developed countries, but the mortality rate is relatively higher in developing countries such as Malaysia as the women presented at the late stage of the disease (1). In 2020, it was recorded that 19.3 million new cancer cases worldwide with 10.0 million deaths due to cancer were found within one year of the diagnosis and 58.3% of the cancer mortality had been found in Asia (2).

In Malaysia, 8418 (17.3%) female BC cases were newly diagnosed in 2020 with 3503 (11.9%) of the cancer deaths were due to BC (3). The Malaysian National Cancer Registry Report showed that from 2007 to 2011, 32.1% of all cancer among females was contributed by BC. Johor recorded the third-highest age-standardized rate (ASR) of BC with 39.8 incidences per 100,000, after Penang and Federal Territory of Kuala Lumpur/ Putrajaya

(4). Among all cancer incidence in Johor, 18.2% were newly diagnosed with BC (4). The Malaysia National Cancer Register reported that 43% of the women had been diagnosed in an advanced stage of BC which is 23% presented in stage III and 20% in stage IV in Malaysia (3). Johor Cancer Registry reported that almost half of the BC patients were diagnosed as late-stage that is Stage III (26.7%) and Stage IV (20.8%) (5).

Previous studies found that delay in seeking medical help and delayed diagnosis that contributed to the late stage of the presentation were low awareness of the risk factors and warning signs of BC, misinformation and perceived symptoms is not serious, sociocultural beliefs, preference of complementary and alternative medicine rather than the conventional medical treatment and barrier to access for healthcare (1,5–7).

Previous studies in China, Egypt and Poland found that the incidence of BC was higher in urban women compared to rural regions (8-11). Urban women tend to have high BC risks due to the higher socio-economic status, higher BMI values, reproductive factor (later age at first birth, lower parity), high alcohol intake, exposure to hormone replacement therapy and oral contraceptive, higher exposure to estrogens, carcinogens and other

environment endocrine disruptors (EEDs), urban lifestyles (physically inactive and dietary pattern with high calorie and high-fat food) (9-10,12). These dietary patterns may lead to overweight or obese conditions and early menarche.

Although with a high risk of developing BC, studies showed that urban women had poor knowledge regarding the risk factors of BC (12,14). In addition, several researchers mentioned that level of BC knowledge is significantly related to the early detection of BC (15-16). Early detection of cancer could improve the prognosis and survival rate of women (16). Thus, this study aims to determine the level of knowledge on BC and the association between socio-demographic characteristics and knowledge among urban women in the South of Peninsular Malaysia.

MATERIALS AND METHODS

A cross-sectional study was conducted among urban women in the South of Peninsular Malaysia using an adapted Breast Cancer Awareness Measure. By using a single proportion formula with an anticipated population proportion (p) of 81.2%, the calculated sample size was 270 participants (17). The subjects were selected using convenience sampling at a shopping mall in the urban area. The subjects were included if they were 18 years old and above, living in an urban area of the South of Peninsular Malaysia and able to understand, speak and write in Malay or English. The exclusion criteria were women who had been diagnosed with BC or any psychiatric illness. The survey instrument used in this study was adapted from the Breast Cancer Awareness Measure (BCAM) UK toolkit Version 2 (18). The questionnaire is free to use for non-commercial purposes and is available online. The research instrument consisted of two parts, socio-demographic and knowledge on BC.

Socio-demographic data comprised of age, occupation, household income, ethnicity, marital status, education level, family history of BC, training of breast self-examination (BSE) and duration to seek medical advice. The second part had a total of 3 questions with three main domains: knowledge of BC warning signs (11 items), breast self-examination (6 items) and a risk factor for BC (10 items). The questions in Domain 1 and 3 were adapted from the Breast CAM UK toolkit Version 2 while Domain 2 was adapted from the literature review. Participants answered items based on a five-point Likert-type scale, ranging from 1 to 5 in all 3 questions (1= strongly disagree, 2 = not sure, 3 = neutral, 4 = agree, and 5 = strongly agree) which indicate the option "strongly disagree" is 1 point, "disagree" is 2 point, "not sure" is 3 point, "agree" is 4 point and "strongly agree" is 5 point.

The Malay version of BCAM was established by a "forward-backwards" translation. A pilot test was done on 30 women aged 18 years old or above residing in the East Coast of Peninsular Malaysia to prevent contamination of the participants. Cronbach's alpha of the pilot study falls into the range of 0.67 to 0.82 for each domain. The final Malay edition of BCAM was established by considering those comments and suggestions from the subjects in the pilot test.

An approval from the Human Research Ethics Committee (HREC) Universiti Sains Malaysia (USM/JEPeM/19110781) and relevant authority of the shopping area were obtained before data collection. The data collection was conducted from January to March 2020. For the recruitment of the participants, the researcher seated at the main corner on the ground floor of the shopping complex centre, the main area of visitors. The researcher approached and invited visitors that fulfilled the inclusion criteria to participate in the study. The researcher explained the study purpose by providing participants' information sheets. Participants who agreed to join the study were given informed consent to read, fill up and sign. Following, participants were brought to the closest sitting area for them to fill up the questionnaire comfortably. The time taken to complete the questionnaire was approximately 15 to 20 minutes.

The data analysis was done using the Statistical Package for Social Science (SPSS) version 26.0 and tested for normality distribution. Descriptive statistics were used to analyze a single categorical variable and to describe participants socio-demographic data. The raw scores of knowledge were summed up to 100%. The researcher adopted the scoring method of (19) to categorize the knowledge level into 'good knowledge' and 'poor knowledge' by taking the median score for each domain as the cut-off point. The scores above the median was considered as good, scores below the median were considered poor. Pearson chi-square test was done to identify the association between knowledge on BC (warning signs, BSE and risk factors) and socio-demographic characteristics. The null hypothesis was rejected if the p-value is <0,05 at the 5% level of significance.

RESULTS

The total number of participants recruited in the study were 270. Most of the participants are Chinese (76.3%, n=260) with a mean age of 27.67 (SD=9.55) ranging from 18 to 60 years old. The majority of them are employed, 55.6% (n=150) with a median monthly household income of RM3000. The details of the socio-demographic characteristics of the participants are shown in Table I.

Table II demonstrated the poor knowledge of all BC domains, warning signs, BSE and risk factors. The majority of the participants agreed localized symptoms

Table I: Socio-demographic characteristics of participants (n=270)

Variables		n	%
Age (Years)			
≤ 28		184	68.1
> 28		86	31.9
Range	18-60		
Mean (SD)	27.67 (9.55)		
Occupation			
Unemployed		120	44.4
Employed		150	55.6
Household income			
≤ RM3000		139	51.5
> RM3000		131	48.5
Median	3000		
Ethnicity			
Malay		58	21.5
Chinese		206	76.3
Others		6	2.2
Marital status			
Single/Widowed		197	73.0
Married		73	27.0
Highest education level			
Low		117	43.3
High		153	56.7
Family history of BC			
Yes		35	13.0
No		235	87.0
BSE training			
Yes		105	38.9
No		165	61.1
Duration to seek for medical advice			
Immediately		94	34.8
Within 1 month		124	45.9
More than 1 month		52	19.3

Table II: Description of BC knowledge (n=270)

Knowledge Domains	n	%
Warning signs of BC		
Poor	145	53.7
Good	125	46.3
Breast self-examination		
Poor	137	50.7
Good	133	49.3
Risk factors of BC		
Poor	150	55.6
Good	120	44.4

in the breast and axilla are the warning signs of BC. However, only 28.9% of the participants agreed that changes in breast size are one of the warning signs. On the knowledge of BSE, the majority of them agreed that BSE should be done at least once a month but they disagree that women are confident about noticing the change in the breast. For the knowledge on BC risks, the majority of the participants agreed that genetic and history of BC could increase the risk of BC. The description of the participants' Likert score on the BC domains, warning signs, BSE and risk factors is depicted in Table III.

There was a significant association between ethnicity (p=0.005), highest education level (p=0.007) and BSE training (p < 0.001) with knowledge on warning signs of BC among urban women in Johor Bahru, Johor. For the

association between socio-demographic characteristics and knowledge on BSE, age (p=0.024), ethnicity (p < 0.001), marital status (p = 0.028) and BSE training (p < 0.001) showed significant findings. Based on the results presented in Table IV, there was a significant association between level of education (p=0.048), family history of BC (p=0.019), training on BSE (p=0.019) and duration seeking for medical advice (p=0.041) with the knowledge on risk factors of BC.

DISCUSSION

Our result demonstrated that most of the urban women residing in the South of Peninsular Malaysia have poor BC knowledge in terms of warning signs, BSE and risk factors. When comparing our results to previous studies, the finding was incoherent whereby 65% of their participants have good knowledge about the warning signs and risk factor domains (20). This difference could be related to the different age groups of the participants in our study. Most of the participants in our study were young (≤ 28 years old) whereas the participants in the previous study were from the older population. A possible explanation for this is that the younger population may perceive that they are not at risk and still young to have an illness, so they are not interested in health-related information, thus their knowledge level was low. Therefore, improving knowledge of breast cancer is very significant focused on the young women in the urban area to create breast cancer awareness for early detection and treatment, thus improving BC survival and decreasing BC mortality rates effectively (21).

The finding of this study on the knowledge BC warning signs is consistent with previous study findings that women can identify the common localized BC warning signs, including the presence of breast lump, breast pain, nipple discharge, armpit lump and change in the shape and size of the breast or nipple (22). Apart from the breast lump, participants in this study agreed that breast pain may indicate the BC but not on the painless signs. However, breast pain was found rare in the initial development of the BC. A qualitative study demonstrated that only one out of eight patients presented breast lump with pain while the rest had painless lumps and only 3/11 women presented with vague symptoms (23). The study showed evidence that women perceived painless lump as not a warning sign until pain or skin changes occur to trigger their health-seeking behaviours. Therefore, poor BC knowledge may lead to misinterpretation of the danger signs of BC as benign at the beginning which further lead to the delayed presentation with poor prognosis and survival rates (24). Hence, future health promotion should pay more attention to the other atypical breast signs to allow the community to become proficient to check and suspect BC.

Although BSE knowledge was poor among the participants in this study, most of them agreed that

Table III: Knowledge on BC warning signs, BSE and risk factors (n=270)

Items	n (%)				
	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
Warning signs of BC					
Changes in the position of your nipple	26(9.6)	22(8.1)	104(38.5)	68(25.2)	50(18.5)
Pulling of your nipple	33(12.2)	27(10.0)	93(34.4)	77(28.5)	40(14.8)
Pain in one of your breasts or armpits	9(3.3)	13(4.8)	45(16.7)	92(34.1)	111(41.1)
Puckering or dimpling of your breast skin	21(7.8)	26(9.6)	103(38.1)	76(28.1)	44(16.3)
Discharge or bleeding from your nipple	17(6.3)	16(5.9)	56(20.7)	76(28.1)	105(38.9)
A lump or thickening in your breast	5(1.9)	13(4.8)	47(17.4)	62(23.0)	143(53.0)
Nipple rash	19(7.0)	24(8.9)	118(43.7)	65(24.1)	44(16.3)
Redness of your breast skin	21(7.8)	32(11.9)	103(38.1)	65(24.1)	49(18.1)
A lump or thickening under your armpit	14(5.2)	17(6.3)	58(21.5)	81(30.0)	100(37.0)
Change in the size of your breast or nipple	11(4.1)	25(9.3)	76(28.1)	80(29.6)	78(28.9)
Change in the shape of your breast or nipple	11(4.1)	16(5.9)	69(25.6)	82(30.4)	92(34.1)
Breast self-examination					
Breast self-examination should be done at least once a month.	14(5.2)	25(9.3)	64(23.7)	85(31.5)	82(30.4)
Armpit should be included during breast self-examination.	11(4.1)	7(2.6)	66(24.4)	89(33.0)	97(35.9)
Any unusual change in shape and size of breasts need to be observed.	7(2.6)	12(4.4)	38(14.1)	96(35.6)	117(43.3)
Every woman is confident that they would notice a change in their breasts.	23(8.5)	47(17.4)	78(28.9)	64(23.7)	58(21.5)
People avoid from performing BSE because they are worried about having breast cancer.	18(6.7)	41(15.2)	79(29.3)	71(26.3)	61(22.6)
If anyone notices a change in their breasts, they will immediately see a doctor.	12(4.4)	23(8.5)	82(30.4)	77(28.5)	76(28.1)
Risk factors of BC					
Having a past history of breast cancer	30(11.1)	11(4.1)	44(16.3)	70 (25.9)	115(42.6)
Using HRT (Hormone Replacement Therapy)	35(13.0)	16(5.9)	117(43.3)	61(22.6)	41(15.2)
Drinking more than 1 unit of alcohol a day	55(20.4)	41(15.2)	99(36.7)	47(17.4)	28(10.4)
Being overweight (Body mass index over 25)	43(15.9)	47(17.4)	112(41.5)	39(14.4)	29(10.7)
Having a close relative with breast cancer	28(10.4)	12(4.4)	46(17.0)	106(39.3)	78(28.9)
Having children later on in life or not at all	44(16.3)	49(18.1)	96(35.6)	47(17.4)	34(12.6)
Starting your periods at an early age	54(20.0)	51(18.9)	106(39.3)	36(13.3)	23(8.5)
Having a late menopause	56(20.7)	35(13.0)	124(45.9)	33(12.2)	22(8.1)
Doing less than 30 mins of moderate physical activity 5 times a week	46(17.0)	35(13.0)	108(40.0)	54(20.0)	27(10.0)
Older woman is most likely to get breast cancer	49(18.1)	43(15.9)	96(35.6)	56(20.7)	26(9.6)

BSE should be done at least once a month, armpit area and unusual changes in breast size should be observed during BSE. This indicates they are aware of the frequency of BSE and location to be checked generally. However, this result contradicted the previous studies which found that less than half of the respondents knew that BSE should be done every month and armpit should be included during BSE (25,26). On another note, participants in this study disagreed that every woman was confident to notice a change in their breasts and the reason for not performing BSE are worried about having breast cancer. The finding on the fear of the BSE outcome was in line with the previous study that mentioned women did not perform BSE due to the fear of a positive outcome (27). Besides, they were uncertain that women will immediately see a doctor if they notice a change in their breasts. Similarly, participants in this

study will wait and observe the detected lump for some time for any further changes before seeking a doctor's advice (25). The finding of this study suggested that a delayed presentation of BC could be due to the inability to recognize BC symptoms and not being confident enough to notice changes and delay in seeking medical advice after notice changes.

It was expected that urban women will have a good knowledge of the risk factor domains, however, it was not shown in this study. Most of the women in this study agreed that genetic factors (personal and family history of breast cancer) will increase the risk of BC rather than the other potential predisposing factor. Women in this study did not recognize hormonally related factors, such as using HRT, nulliparous, early menarche and late menopause could put the women at higher risk

Table IV: Association between socio-demographic characteristics and knowledge on BC warning signs, BSE and risk factors (n=270)

Variables	n (%)		X^2 value (df)	P value
	Poor	Good		
Knowledge on BC warning signs				
Age			3.54 (1)	0.060[a]
≤ 28 years old	106 (73.1)	78 (62.4)		
>28 years old	39(26.9)	47 (37.6)		
Occupation			0.13 (1)	0.723[a]
Unemployed	63 (43.4)	57 (45.6)		
Employed	82 (56.6)	68 (54.4)		
Household Income (RM)			2.41 (1)	0.121[a]
≤ RM 3000	81 (55.9)	58 (46.4)		
> RM 3000	64 (44.1)	67 (53.6)		
Ethnicity			10.67 (2)	0.005[b]
Malay	21 (14.5)	37 (29.6)		
Chinese	122 (84.1)	84 (67.2)		
Others	2(1.4)	4 (3.2)		
Marital status			2.05(1)	0.153[a]
Married	34 (23.4)	39 (31.2)		
Other than married	111 (76.6)	86 (68.8)		
Education level			7.57 (1)	0.006[a]
Low	74 (51.0)	43 (34.4)		
High	71 (49.0)	82(65.6)		
Family history of BC			3.04 (1)	0.081[a]
No	131 (90.3)	104 (83.2)		
Yes	14 (9.7)	21 (16.8)		
Training on BSE			28.68 (1)	<0.001[a]
No	110 (75.9)	55 (44.0)		
Yes	35 (24.1)	70 (56.0)		
Duration to seek for medical advice			4.344 (2)	0.114[b]
Immediately	46 (31.7)	48 (38.4)		
Within 1 months	75 (51.7)	49 (39.2)		
More than 1 months	24 (16.6)	28 (22.4)		
Knowledge on BSE				
Age			5.09 (1)	0.024[a]
≤ 28 years old	102 (74.5)	82 (61.7)		
>28 years old	35 (25.5)	51 (38.3)		
Occupation			1.57 (1)	0.211[a]
Unemployed	66 (48.2)	54 (40.6)		
Employed	71 (51.8)	79 (59.4)		
Household Income (RM)			0.017 (1)	0.897[a]
≤ RM 3000	70 (51.1)	69 (51.9)		
> RM 3000	67 (48.9)	64 (48.1)		
Ethnicity			17.513 (2)	<0.001[b]
Malay	17 (12.4)	41 (30.8)		
Chinese	119 (86.9)	87 (65.4)		
Others	1(0.7)	5 (3.8)		
Marital status			4.86 (1)	0.028[a]
Married	29 (21.2)	44 (33.1)		
Other than married	108 (78.8)	89 (66.9)		
Education level			0.80 (1)	0.372[a]
Low	63 (46.0)	54 (40.6)		
High	74 (54.0)	79 (59.4)		
Family history of BC			0.20 (1)	0.653[a]
No	118 (86.1)	117 (88.0)		
Yes	19 (13.9)	16 (12.0)		
BSE training			16.52 (1)	<0.001[a]
No	100 (73.0)	65 (48.9)		
Yes	37 (27.0)	68 (51.1)		
Duration to seek for medical advice			2.59 (2)	0.274 [b]
Immediately	42 (30.7)	52 (39.1)		
Within 1 months	69 (50.4)	55 (41.4)		
More than 1 months	26 (19.0)	26 (19.5)		
Knowledge on risk factors				
Age			<0.01 (1)	0.953[a]
≤ 28 years old	102 (68.0)	82 (68.3)		
>28 years old	48 (32.0)	38 (31.7)		
Occupation			1.32 (1)	0.250[a]
Unemployed	62 (41.3)	58 (48.3)		
Employed	88 (58.7)	62 (51.7)		
Household Income (RM)			0.30 (1)	0.586[a]
≤ RM 3000	75 (50.0)	64 (53.3)		
> RM 3000	75 (50.0)	56 (46.7)		
Ethnicity			4.84 (2)	0.089[b]
Malay	25 (16.7)	33 (27.5)		
Chinese	122 (81.3)	84 (70.0)		
Others	3 (2.0)	3 (2.5)		
Marital status			0.02 (1)	0.902[a]
Married	41 (27.3)	32 (26.7)		
Other than married	109 (72.7)	88 (73.3)		
Education level			3.91 (1)	0.048[a]
Low	73 (48.7)	44 (36.7)		
High	77 (51.3)	76 (63.3)		
Family history of BC			5.52 (1)	0.019[a]
No	137 (91.3)	98 (81.7)		
Yes	13 (8.7)	22 (18.3)		
BSE training			5.50 (1)	0.019[a]
No	101 (67.3)	64 (53.3)		
Yes	49 (32.7)	56 (46.7)		
Duration to seek for medical advice			6.38 (2)	0.041[b]
Immediately	47 (31.3)	47 (39.2)		
Within 1 months	79 (52.7)	45 (37.5)		
More than 1 months	24 (16.0)	28 (23.3)		

[a] Pearson's Chi-Square test, b Fisher Exact test

while lifestyle factors such as alcohol consumption, overweight and less physical activity may increase the chance of getting BC. This result was consistent with the previous findings whereby most commonly identified correctly was a family history of breast cancer (84.2%), followed by personal history (82.2%) (27). Thus, health education programs should pay more attention to reinforcing the risk factor of breast cancer among urban women, especially the obese, nulliparous and older women as they might put themselves as a low-risk group and educate the public to eliminate or minimize the risk of BC by changing the lifestyle behaviours.

There was a significant association between ethnicity and level of knowledge on BC warning signs in this study (p=0.005) and Chinese women demonstrated poor knowledge in this aspect. This statement could be clarified as the Chinese women in Malaysia had the highest overall cumulative risk (4.5) compared to Malay and Indian in 2012-2016 (4). High prevalence among Chinese women could be due to the lowest fertility rate, most frequent contraceptive user, highest BRCA1 and 2 genetic mutation incidences, a lower dietary fibre intake, had a lower practice of breastfeeding, higher alcohol intake that increased the breast cancer risk among Chinese population (28). However, it should be noted that in our study, the number of Chinese recruited were higher and 50% of the visitors to that public area is Chinese which may cause the results of the imbalance in the sociodemographic characteristics among the participants (29).

This study demonstrated that there was a significant association between educational level and knowledge on BC warning signs (p=0.006). The finding was consistent with a study done in Nigeria which reported a positive relationship between educational attainment and knowledge of BC (30). This could be elaborated with the explanation that the higher education group showed a positive attitude about the health-seeking behaviours and they demonstrated a better understanding when reading the information from a variety of resources than the low education group.

Besides, an association was found between the formal BSE training and high knowledge on BC warning signs (p<0.001). These findings had been consistent with a previous randomized control trial study that showed those receiving proper training have higher knowledge compared to the control group (31). This finding could be because those without formal training on BSE were unsure of the aspects of BSE since they have no or limited knowledge of it.

While this study has contributed to a preliminary understanding of knowledge of BC among urban women in the South of Peninsular Malaysia, it has some limitations. The findings of this study could not be generalized and represented all urban women. Besides,

a risk of misinterpreting the statements or questions in the questionnaire by the participants as a bilingual questionnaire had been established rather than a vernacular language of Chinese ethnicity as most of the participants are Chinese. While the strength of the study is the evidence of using a well-validated questionnaire with Cronbach's Alpha 0.67 to 0.82 (by domains) indicates that it is appropriate for basic research of evaluation studies.

CONCLUSION

Most of the urban women in the South of Peninsular Malaysia demonstrated poor knowledge of BC warning signs, BSE and its risk factors. Therefore, health education should not only focus on rural women but also urban women as they may not realize they have a high BC risk. Meanwhile, the overall knowledge on warning signs is higher than BSE and risk factor domains which signal the need for tailored educational interventions to enhance knowledge among urban women. An increase in BC incidence and mortality rates in Malaysia had shown a warning phrase and prompt interventions should be done to increase knowledge of BC both among rural and urban with special considerations on our local culture. Additional long-term efforts were still needed by the support and cooperation from the multidisciplinary team to improve the survival and reduce the mortality BC rate by increasing the BC knowledge for early detection and treatment of BC.

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REFERENCES

1. Cheng ML, Ling DY, Nanu PKP, Nording H, Lim CH. Factors influencing late stage of breast cancer at presentation in a district Hospital - Segamat Hospital, Johor. Med J Malaysia. 2015;70(3):148–52.
2. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021 May 1;71(3):209–49. doi: 10.3322/caac.21660
3. Azizah AM, Nor Saleha IT, Nor Hashimah A, Asmah ZA, Mastulu W. MALAYSIAN NATIONAL CANCER REGISTRY REPORT 2007-2011: Malaysia, Cancer Statistics, Data And Figure. 2016.
4. Yusmah M, Tan YJ, Sharliza R, Norbiha AM, Mawaddah A. M. JOHOR CANCER REGISTRY REPORT 2007-2011 Johor Cancer Statistics – Data and Figure [Internet]. 2014 [cited 2019 Sep 16]. Available from: http://jknj.jknj.moh.gov.my/ncd/

cancer.pdf

5. Agbokey F, Kudzawu E, Dzodzomenyo M, Ae-Ngibise KA, Owusu-Agyei S, Asante KP. Knowledge and Health Seeking Behaviour of Breast Cancer Patients in Ghana. Int J Breast Cancer. 2019 Apr 1;2019:1–9. doi: 10.1155/2019/5239840

6. Odongo J, Makumbi T, Kalungi S, Galukande M. Patient delay factors in women presenting with breast cancer in a low income country. BMC Res Notes. 2015 Dec 22;8(1):467. doi: 10.1186/s13104-015-1438-8.

7. Espina C, McKenzie F, Dos-Santos-Silva I. Delayed presentation and diagnosis of breast cancer in African women: a systematic review. Ann Epidemiol. 2017 Oct 1;27(10):659-671.e7. doi: 10.1016/j.annepidem.2017.09.007.

8. Dey S, Soliman AS, Hablas A, Seifeldein IA, Ismail K, Ramadan M, et al. Urban-rural differences in breast cancer incidence in Egypt (1999-2006). Breast. 2010;19(5):417–23. doi: 10.1016/j.breast.2010.04.005

9. 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. doi: 10.1371/journal.pone.0117572

10. Paszko A, Krzyżak M, Charkiewicz AE, Ziembicka D, Żendzian-Piotrowska M, Szpak AS, et al. Inequalities in breast cancer incidence and stage distribution between urban and rural female population in Świętokrzyskie Province, Poland. Ann Agric Environ Med. 2019;26(1):159–64. doi: 10.26444/aaem/102380

11. Nagrani RT, Budukh A, Koyande S, Panse NS, Mhatre SS, Badwe R. Rural urban differences in breast cancer in India. In: Indian Journal of Cancer. Medknow Publications and Media Pvt. Ltd.; 2014. p. 277–81. doi: 10.4103/0019-509X.146793.

12. Islam RM, Bell RJ, Billah B, Hossain MB, Davis SR. Awareness of breast cancer and barriers to breast screening uptake in Bangladesh: A population based survey. Maturitas. 2016 Feb 1;84:68–74. doi: 10.1016/j.maturitas.2015.11.002

13. Solikhah S, Promthet S, Hurst C. Awareness level about breast cancer risk factors, barriers, attitude and breast cancer screening among Indonesian women. Asian Pacific J Cancer Prev. 2019;20(3):877–84. doi: 10.31557/APJCP.2019.20.3.877.

14. Cruz-Castillo AB, Hern6ndez-Valero MA, Hovick SR, Campuzano-Gonz6lez ME, Karam-Calderyn MA, Bustamante-Montes LP. A Study on the Knowledge, Perception, and Use of Breast Cancer Screening Methods and Quality of Care Among Women from Central Mexico. J Cancer Educ. 2015 Sep;30(3):453–9. doi: 10.1007/s13187-014-0722-y.

15. Dey S, Mishra A, Govil J, Dhillon PK. Breast Cancer Awareness at the Community Level among Women in Delhi, India. Asian Pac J Cancer Prev. 2015;16(13):5243–51. doi: 10.7314/apjcp.2015.16.13.5243.

16. World Health Organisation. Early Diagnosis and Screening [Internet]. WHO. World Health Organization; 2017 [cited 2019 Oct 14]. Available from: https://www.who.int/cancer/prevention/diagnosis-screening/en/

17. Al-Dubai SAR, Qureshi AM, Saif-Ali R, Ganasegeran K, Alwan MR, Hadi JIS. Awareness and knowledge of breast cancer and mammography among a group of malaysian women in shah alam. Asian Pacific J Cancer Prev. 2011;12(10):2531–8.

18. Linsell L, Forbes LJL, Burgess C, Kapari M, Thurnham A, Ramirez AJ. Validation of a measurement tool to assess awareness of breast cancer. Eur J Cancer. 2010 May 1;46(8):1374–81. doi: 10.1016/j.ejca.2010.02.034

19. Dinegde NG, Xuying L. Awareness of breast cancer among female care givers in tertiary cancer hospital, China. Asian Pacific J Cancer Prev. 2017;18(7):1977–83. doi: 10.22034/APJCP.2017.18.7.1977.

20. Dadzi R, Adam A. Assessment of knowledge and practice of breast self-examination among reproductive age women in Akatsi South district of Volta region of Ghana. PLoS One. 2019;14(12). doi: 10.1371/journal.pone.0226925.

21. Altintas Y, Bayrak M. Association of knowledge and cultural perceptions of women with delay in breast cancer diagnosis: A single center experience. Ann Med Res. 2018;1. doi: 10.5455/annalsmedres.2018.10.226

22. Schilling MPR, da Silva IF, Opitz SP, Borges MF de SO, Koifman S, Koifman RJ. Breast cancer awareness among women in western Amazon: A population based cross-sectional study. Asian Pacific J Cancer Prev. 2017 Mar 1;18(3):847–56. doi: 10.22034/APJCP.2017.18.3.847.

23. Bonsu AB, Ncama BP. Recognizing and appraising symptoms of breast cancer as a reason for delayed presentation in Ghanaian women: A qualitative study. PLoS One. 2019 Jan 1;14(1). doi: 10.1371/journal.pone.0208773

24. Alsaraireh A, Darawad MW. Breast cancer awareness, attitude and practices among female university students: A descriptive study from Jordan. Health Care Women Int. 2018 May 4;39(5):571–83. doi: 10.1080/07399332.2017.1368516.

25. Fondjo LA, Owusu-Afriyie O, Sakyi SA, Wiafe AA, Amankwaa B, Acheampong E, et al. Comparative Assessment of Knowledge, Attitudes, and Practice of Breast Self-Examination among Female Secondary and Tertiary School Students in Ghana. Int J Breast Cancer. 2018;2018:1–10. doi: 10.1155/2018/7502047

26. Toan DTT, Son DT, Hung LX, Minh LN, Mai D Le, Hoat LN. Knowledge, Attitude, and Practice Regarding Breast Cancer Early Detection Among Women in a Mountainous Area in Northern Vietnam. Cancer Control. 2019 Jan 23;26(1). doi:

10.1177/1073274819863777.

27. Rahman SA, Al-Marzouki A, Otim M, Khayat NEHK, Yousef R, Rahman P. Awareness about breast cancer and breast self-examination among female students at the University of Sharjah: A cross-sectional study. Asian Pacific J Cancer Prev. 2019 Jun 1;20(6):1901–8. doi: 10.31557/APJCP.2019.20.6.1901.

28. ABDULLAH N, MOHAMED N. Influence of cultural practices on breast cancer risks, stage at presentation and outcome in a multi-ethnic developing country. Oncol Lett [Internet]. 2021 Nov 1 [cited 2021 Dec 22];22(5). doi: 10.3892/ol.2021.13067.

29. Kesion. AEON Customer Data | KESION MALAYSIA SDN. BHD. [Internet]. Kesion Malaysia Sdn. Bhd. 2015 [cited 2021 Dec 20]. Available from: http://www.kesionmalaysia.com.my/customerdata/

30. Nwaneri, A., Osuala, E. O., Okpala, P. U., Emesowum, A., & Iheanacho, P. (2017). Knowledge and awareness of breast cancer among rural women in Umuowa Orlu Local Government Area Imo State, South East, Nigeria. Nigerian Journal of Clinical Practice, 20(4), 489–494. doi:10.4103/1119-3077.204374

31. Akhtari-Zavare, M., Juni, M. H., Said, S. M., Ismail, I. Z., Latiff, L. A., & Ataollahi Eshkoor, S. (2016). Result of randomized control trial to increase breast health awareness among young females in Malaysia. BMC Public Health, 16(1), 738. doi:10.1186/s12889-016-3414-1