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RESEARCH ARTICLE

Knowledge Level towards Breast Cancer and Breast Self-Examination among Medical Students of Indonesia

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Abstract

Breast cancer is a life-threatening disease among Indonesian women. The etiology of breast cancer is still uncertain, and therefore adequate primary prevention is difficult. Early diagnosis improves cancer prognosis while also reducing medical costs, substantially reducing mortality rates. Knowledge and awareness of breast cancer risk factors and their screening may help women take preventive measures. The community service program aimed to assess the level of understanding of undergraduate medical students on breast cancer and breast self-examination (BSE). It was a one-group pretest-postest quasi-experimental study to measure the level of knowledge of 100 medical students in Indonesia from August 20th, 2020, to February 27th, 2021. The participants were asked 36 questions, which was an adaptation of previous questionnaires. A mini-lecture managed the program that focuses on risk factors and early detection. Furthermore, pretest and post-test were conducted to analyze the knowledge level before and after the dissemination. The participants included in this study were mostly 20 years and above (62%). The average recognition of breast cancer and its early detection was not high. The knowledge of breast cancer among medical students was found to be moderate. The efficacy of dissemination among medical students was apparent in knowledge change. However, good cancer awareness, especially breast cancer, needs to be established and integrated through effective cancer educational programs in the medical curricula. Hence, modification of the medical curriculum through extensive training on breast cancer preventive measures and early diagnosis is required.

Keywords: Cancer awareness, cancer education, dissemination, early detection, screening

Introduction

Breast cancer is a malignant tumor that develops within the breast tissue.[1] Breast cancer is one of the foremost common sorts of cancer in women.[1] Breast cancer can happen in any region, but the incidence rate is higher in developed areas.[2] In Southeast Asia, there are 137,514 new breast cancer cases, with Indonesia as the most significant contributor with 58,256 new cases and cause of death for 22,692 women.[3] Various factors contribute to its occurrences, such as population structure, lifestyle, genetics, and environment.[4] From the data presented above, efforts are needed to prevent and control breast cancer. Early detection with proper management can significantly reduce mortality in breast cancer.[5]

Cancer is usually due to disruption of the molecular activity of genes so that abnormalities in cell division occur. Breast cancer also happens in some patients with hormonal anomalies that initiate cellular modification and tumor advancement.[6] Approximately 5% to 10% of the cases are innate, and most of the cases were related to the BRCA1 or BRCA2 gene mutation.[7] However, some studies found breast cancer cases in non-BRCA mutation patients.[8,9] The breast cancer cases in these patients tend to be caused by other causes that can initiate cancer development.[8] The risk factors are separated into individual, family history, reproductive, and modifiable environmental factors.

Breast cancer can be detected by breast self-examination (BSE).[10] BSE is a vital screening measure for breast cancer detection which is easy,

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inexpensive, and simple to perform and does not depend on a health practitioner's assistance.[10–12] In Indonesia, a study of 1967 women in Surabaya showed that 44.4% of women had performed BSE at least once, and 55.6% of women had never performed BSE. This study also shows that older women with high educational backgrounds and breast cancer history in family members were more likely to perform BSE practice.[13] This indicates BSE is still rarely done by women due to a lack of education regarding breast cancer.[10,14] By educating the young generation on breast cancer and BSE will increase awareness among their family and friends so that the morbidity and mortality of the breast cancer incidence may be reduced.[10]

A medical student is a person enrolled in medical school so that they have a high awareness of health. However, the National Standard Competencies of Indonesian Medical Doctors contain only 5% cancer topics of the overall competency assigned to Indonesian medical doctors. Moreover, cancer is in the advanced stage of the specialist program. Thus, undergraduate medical students can not imagine simple modalities to detect breast cancer earlier.

The objective of this study was to assess the level of knowledge of undergraduate medical students on breast cancer and BSE after dissemination and input for stakeholders to address BSE concepts in medical curricula.

Methods

This study used a quasi-experimental one-group pretest-posttest research design on medical students of Indonesia. Undergraduate medical students aged 18–24 years were included in this study. We conducted a self-administered electronic survey to collect information on respondents' knowledge of breast cancer and BSE. The online survey was developed through Google Forms and distributed on social media messaging apps (WhatsApp) and social platforms (Instagram and Facebook). The survey was spread through colleagues, acquaintances, and personal contacts with an indication to send randomly. Data collection was set by limiting the number of possible responses to 1 per participant.

All participants provided consent to participate and received an electronic link via Google Form, accompanied by a cover letter stating study, privacy, anonymity, confidentiality, possible risks and benefits, voluntary rights, length of the survey, and the primary investigator's name and contact. All collected data were kept anonymous, de-identified, and exported to Microsoft Excel for analyses, protected by passwords, and only the primary investigator and statistician had access to the data.

The questionnaire's items were designed to obtain information on sociodemographic characteristics, knowledge of symptoms, risk factors, BSE, management, and perceptions of breast cancer. It was adapted and modified from the United Kingdom Breast Cancer Awareness Measure[15] and a study by Grunfeld et al.[16] The questionnaire was delivered in Bahasa and was revalidated in a smaller sample (not included in the final sample). The final validated questionnaire was used in this study.

The method used in the study was carried out as previous study[17] using a pre-and post-survey method to assess the knowledge of online information literacy (dissemination) on breast cancer and BSE. The research was conducted from August 20th, 2020, to February 27th, 2021. The measurement of knowledge used the Guttman scale, in which the number of true and false answers to the item was identified.[18] Each true answer was scored one mark, and an incorrect answer was zero. The total score obtained by each information in this study was converted to a percentage. Interpretation of the level of knowledge is arbitrarily measured through the cumulative number of valid scores to the total score. A higher cumulative score signifies a higher level of knowledge, with the interpretation of the percentage scale of >75%, 50–75%, and <50% as good, sufficient, and evil, respectively.

All data were analyzed using SPSS version 22 (SPSS Inc., U.S.A.) and Microsoft Excel. The t test was used to distinguish the proportions of the pretest and posttest. The level of statistical significance was set at $p<0.05$.

This study has received ethics approval from the Health Research Ethics Committee of Universitas Padjadjaran Bandung, number 614/UN6.KEP/EC/2020. Furthermore, respondents had received informed consent regarding their participation in this study.

Results

Two hundred and twelve respondents filled in the study registration. However, only 100

respondents filled out all the required forms completely. Therefore, we excluded respondents who did not fill out, complete, or send the research questionnaire. Data on the characteristics of the respondents who participated in the study were obtained through the information filled by respondents in the Google Form. The data taken includes the respondents' gender, age, religion, family income, family history of having breast cancer, scholarship recipients, exposure to information about breast cancer, and the respondent ethnicity, which can be seen in Table 1. The majority of respondents were women (87%) aged 20 years old (37%), Islam and Javanese tribes dominated the religion and ethnicity of respondents (83% and 34%, respectively), and family income mainly was above 5 million per month (79%), most of the respondent did not have any history of familial breast cancer (90%), and no scholarship was owned by the majority of respondents (74%). In addition, most respondents heard of breast cancer (94%).

Table 1 Respondent Characteristics

Characteristics	n=100 (%)
Gender	
Men	13 (13)
Women	87 (87)
Age (year)	
<18	1 (1)
18	10 (10)
19	27 (27)
20	37 (37)
21	16 (16)
22	2 (2)
23	3 (3)
≥24	4 (4)
Religion	
Islam	83 (83)
Protestant	6 (6)
Catholic	6 (6)
Hinduism	5 (5)
Family income (IDR)	
<5,000,000	21 (21)
5,000,000–10,000,000	38 (38)
10,000,000–15,000,000	14 (14)
15,000,000–20,000,000	13 (13)
20,000,000–25,000,000	4 (4)
>25,000,000	10 (10)
Family history of breast cancer	
Yes	10 (10)
No	90 (90)
Scholarship grantee	
Yes	26 (26)
No	74 (74)
Tribes	
Sundanese	22 (22)
Javanese	34 (34)
Bataknese	3 (3)
Buginese	3 (3)
Minangnese	7 (7)
Betawis	3 (3)
Balinese	6 (6)
Lampungnese	2 (2)
Banjarnese	1 (1)
Chinese	3 (3)
Padang	1 (1)
Palembang	1 (1)
Sumatera	1 (1)
Papua	1 (1)
Aceh	1 (1)
Others (Madurese, Dayak, Bantenese, Lampung, Gorontaloan, Torajan, Butonese, Sangirese, and Bungku)	11 (11)
Exposed to information	
Yes	94 (94)
No	6 (6)

Table 2 shows the data regarding the sources of previous information exposure received by the respondents. Of the 100 respondents, 94 respondents had heard about breast cancer through various sources. Most sources of information exposure were through online video platforms such as YouTube (73.95%), followed by social media Instagram (15.62%). Meanwhile, other sources such as journals, webinars, e-books, online, and Twitter are the sources which information has the minor exposure to the respondents (under 5%).

The assessment of the level of knowledge of different symptoms of breast cancer before and after the dissemination can be seen in Table. Table 3 showed that regarding symptoms, meaningful changes were recorded in the understanding of breast size similarity, breast injury healing speed, nipple size and position change, nipple rash, abnormal discharge from

Table 2 Previous Information Source

Media	n=100 (%)
Online video platforms (YouTube, etc.)	71 (71)
Instagram	15 (15)
Journal	3 (3)
Webinar	2 (2)
E-book	1 (1)
Line	1 (1)
Twitter	1 (1)
No prior information exposure	6 (6)

Table 3 Knowledge of Breast Cancer

Knowledge of Breast Cancer	Pretest Score (%)	Posttest Score (%)	Asymp. Sig.
Symptoms			
A lump or thickening in the breast that can spread to the armpit area and surrounding	100	96	0.046
Discharge from nipple even though not breastfeeding	58	90	0.000
Similar breast size	4	87	0.000
A lump in the breast is a definite symptom	23	1	0.000
Injury at the breast heals rapidly	4	80	0.000
Puckering or dimpling of breast skin	56	85	0.000
Swelling and lesion that does not heal on breast	78	94	0.028
The nipple became inward to the breast	42	90	0.000
Change of nipple position	55	91	0.000
Pain in the armpit area	75	91	0.007
Nipple rash	48	95	0.000
Redness of breast skin	48	92	0.000
Change in size of breast or nipple	72	87	0.000
Changes in the shape of the breast or nipple	83	94	0.012
Age-related and lifetime risk			
A 70-year-old woman is more likely to get breast cancer than a woman in their thirty or fifty	33	59	0.000
Every 1 in 8 women will develop breast cancer in their lifetime	64	96	0.000
Risk factors			
Breastfeeding lowers the risk of breast cancer	65	86	0.000
Smoking	89	97	0.021
Birth control pill consumption	34	95	0.000
Having a close relative with breast cancer	85	94	0.003
A married woman with no child has a higher risk of breast cancer	31	89	0.000
Having menopause at the age of 50 years old	35	87	0.000
Consuming grilled food prevents breast cancer	13	85	0.000
Alcohol consumption prevents breast cancer	6	88	0.000
Exercise prevents breast cancer	94	99	0.059
Excessive work prevents breast cancer	6	93	0.000
First menstruation happened >13 years old is one of the factors in breast cancer	14	80	0.000

the nipple, and abnormality of breast skin symptoms of breast cancer. Interestingly, most respondents correctly identified breast lumps and the alteration of breast or nipple shape as breast cancer symptoms. Moreover, a significant increase in knowledge was not recorded ($p>0.05$) on questions about the non-healing lesion on the breast, and pain in the armpit area, suggesting a good prior understanding of breast cancer symptoms. Meanwhile, only one respondent was aware that a breast lump is a definite symptom of breast cancer after dissemination.

Knowledge of age-related and lifetime risk of breast cancer was well-aware among respondents, as seen in the second section of Table 3. After dissemination, respondents correctly recognized one-eighth of all women having a lifetime risk of developing breast cancer (96%) and the susceptibility of senior women to get breast cancer compared to a woman in their 30s or 50s (59%).

The percentage of women who identified breast cancer risk factors was also shown in Table 3. Understanding risk factors may help women in taking preventive measures. Most respondents believed smoking (97%), genetic inheritance (94%), and a sedentary lifestyle (93%) lead to breast cancer. However, knowledge of important biological risk factors like alcohol consumption (6%), workaholic (6%), age of menstruation

Table 4 Knowledge of Breast Self-examination

Question about Breast Self-examination	Pretest Score (%)	Posttest Score (%)	Asymp. Sig.
Breast self-examination prevents breast cancer	4	100	0.000
Breast self-examination is an observation that one does to her breast every month	89	95	0.109
Regular monthly breast self-examination will not help in detecting changes in the breast	11	92	0.000
The shape and density of the breast can not change	8	88	0.000

(14%), grilled food (13%), married women without children (31%), birth control pill consumption (34%), premature menopause (35%) were low prior dissemination, although they had heard of breast cancer.

Of all 100 respondents, before dissemination, only 4% knew that BSE prevents breast cancer (Table 4). Around eleven out of one hundred said breast cancer could be detected through BSE. Our results showed that most of the respondents have good knowledge that BSE should be done monthly. However, most of the respondents (92%) think that BSE may change the shape and density of the breast, but after dissemination, they were aware that it is not altered (88%).

Good knowledge of breast cancer management was understandable by respondents, as seen in Table 5. First, they had heard modalities for breast cancer management was chemotherapy. Subsequently, their knowledge was significantly increased regarding light therapy and surgery to manage breast cancer.

Our results showed the good knowledge of respondents on curative activities to recognize the first symptom that initiates medical consultation (Table 5). But the level of respondents' insecurity about telling the doctor about their changes was quite prominent (67%).

Table 6 indicates medical students of Indonesia had good knowledge of breast cancer and BSE. T test results show that p=0.000. Hence, it can be concluded that there was a significant

Table 5 Knowledge of Breast Cancer Management and Behavior in Seeking Medical Help

Management Knowledge and Behavior in Seeking Medical Help	Pretest Score (%)	Posttest Score (%)	Asymp. Sig.
Questions about breast cancer management			
Light therapy is one of the treatments for breast cancer	74	93	0.000
The only treatment for breast cancer is surgery	11	92	0.000
Chemotherapy is one of the treatments for breast cancer	94	97	0.257
Questions about seeking medical help			
If I find any sign of changes in my breasts, I will immediately consult a doctor	95	98	0.180
I feel there are obstacles for me to telling the doctor about changes in my breasts such as lack of confidence, fear, etc.	46	67	0.015

Table 6 Analysis of Knowledge Level before and after Dissemination

	n	Average±s.b.	Average Difference±s.b.	95% CI	p*
Pretest score	100	51.08±32.23	40±30.02	0.29529–0.50582	0.000
Posttest score	100	84.81±22.17			

Note: *Paired t test; CI: confidence interval

increase in knowledge among medical students after breast cancer and BSE dissemination.

Discussion

Breast cancer incidence and mortality are rapidly growing worldwide, including in Indonesia.[2,3,19] The etiology of breast cancer is still uncertain, and therefore, adequate primary prevention is uneasy. Moreover, breast cancer in Indonesia has mainly been diagnosed much later.[20] Early diagnoses improve cancer outcomes while also reducing the cost of various treatments such as chemotherapy and radiotherapy, which could substantially reduce mortality rates.[21] Therefore, early cancer detection programs are essential in Indonesia.

Knowledge of breast cancer and BSE is one strategy for early breast cancer detection, especially in low- and middle-income countries. In contrast, resources for early detection methods, such as mammography and ultrasonography, are unavailable.[22] Indonesia National Movement for Prevention and Early Detection of Breast and Cervical Cancer Program was launched in 2015. This program encourages women aged 20 and older to visit primary health care centers once a month.[23] Public education and awareness is the basic level of resources to develop cultural sensitivity for target populations to convey the value of early detection, breast cancer risk factors, and breast health awareness.[24]

Over half of the participants in our study were aged 20 and older. Although early screening and diagnosis would not decrease the incidence of breast cancer, it may improve the prognosis and treatment outcomes.[21] A study in Turkey of women in various age groups showed that BSE is unfamiliar and insufficiently practiced.[25] Our results showed that breast cancer knowledge among medical students was poor. Health education significantly improves knowledge levels on breast cancer and BSE among participants. The rate of correct answers increases between 51.1% and 84.8%. Similarly, a previous study on nursing students demonstrates a good level of knowledge after training.[26]

It is the first study conducted on medical students in Indonesia. Our study reveals valuable insight to address the knowledge gap on breast cancer and screening using the Breast Cancer Awareness Measure.[15] It contains 36 questions with five domains, including signs and symptoms, risk factors, BSE, management, and seeking medical health for breast cancer in female medical students in Indonesia.

Our result shows a lack of knowledge in all domains questioned before intervention in this study. The incidence of breast cancer increases past the age of 35, while the prognosis of the disease acquired at an earlier age is markedly worse due to late screening. Therefore, developing awareness of breast health and BSE among young women in their twenties, such as medical students, is very significant.[27]

Different published reports highlight an increased risk in the numerous type of cancer, including breast cancer. Although the relationship between breast cancer and alcohol consumption or smoking has not been clearly explained, some studies on the two are reported.[28,29] Low awareness of these risk factors was also found in the studies among female health care professionals in Saudi Arabia.[30]

The risk for a woman with familial history of breast cancer is reported to be 1.7–2.5 fold in a first-degree relative, while the bilateral involvement in a mother or sister's history of breast cancer increases the risk to 5–6 fold.[29] Familial breast cancer was present in 10% of our sample population. Therefore, enhancing students' awareness of the familial history of this disease is essential for early detection and prevention.

Among the subjects in our study who were aware of routine BSE practice, only four indicated BSE was a preventive measure, and eleven recognized BSE as a screening method. Moreover, a study in Malaysia showed prevalence rate for regular BSE practice among female medical students aged 20 was 24.4%.[31] These results emphasize that even if they were aware of the existence of BSE from an online video platform, they lacked sufficient knowledge and needed additional information through their medical curricula.

Conclusions

This study revealed a poor level of knowledge regarding breast cancer among medical students. However, after being given health education about breast cancer and BSE and assessed using the Breast Module of the Cancer Awareness Measure, correct answers were increased. Thus, it is necessary to address this gap on an educational level by modifying the medical curriculum to

include extensive training on breast cancer preventive measures and early diagnosis.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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