Journal of Chemical Health Risks

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JCHR (2024) 14(5), 986-993 | ISSN:2251-6727

Effects of RANAS on Breast Self Examniation as A Way of Early Breast Cancer Detection Among Women in Bengkulu, Indonesia: A PlS-SEM Approach

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(**Received**:14 June 2024 **Revised**: 01 July 2024 **Accepted**: 18 August 2024)

KEYWORDS

Breast Self-Examination, Behavior, RANAS

ABSTRACT:

Introduction: In 2020, breast cancer caused 685,000 fatalities among women worldwide. Breast self-examination (BSE) is well recognised as a primary tool for early diagnosis of breast cancer. However, the actual adherence of women to performing breast self-examination remains significantly low.

Objectives: This study aims to assess the impact of RANAS (risk, attitude, norm, ability, and self-regulation) on breast self-examination behaviour.

Methods: This study utilised an analytical survey methodology with a cross-sectional framework. The sample exclusively comprised women aged 26 to 35 residing in Bengkulu city. The sample strategy employed was stratified sampling.

Results: The PLS calculation findings suggest that there is an indirect influence between the variables. If the p value is less than 0.05, it signifies a significant indirect influence, however if it is greater than 0.05, it suggests no significant indirect influence. The risk factor for breast self-examination is statistically significant, as indicated by a p-value of 0.048, which is less than the threshold of 0.05. Similarly, self-regulation is also statistically significant for the ability factor, with a p-value of 0.000, which is also less than 0.05. Self-regulation is a crucial factor in doing breast self-examination, as indicated by a statistically significant p value of 0.002, which is below the threshold of 0.05.

Conclusions: The prevalence of breast self-examination activity remains low due to various factors, including risk factors, attitude, social norms, capability, and self-regulation.

1. Introduction

During the year 2020, the global death toll from breast cancer amounted to 68,500 individuals, while 2.3 million women were diagnosed with the disease. By 2070, it is projected that there will be approximately 4.4 million instances, as stated by Isabelle Soerjomataram in 2021.(1) As of the conclusion of 2020, breast cancer emerged as the prevailing ailment worldwide, with a staggering 7.8 million ladies successfully enduring the condition following a diagnostic inside the preceding five years (2). Due to its high prevalence, breast cancer imposes a substantial strain on healthcare resources and leads to a large increase in expenses (3).

The prognosis for breast cancer is crucial for early detection and appropriate treatment. The treatment for breast cancer is determined by the clinical stage of the tumour (4). Patients in stage 0 exhibit a 100% 5-year survival rate. The 5-year survival rates for patients diagnosed with stage II and stage III breast cancer are 93% and 72% respectively. However, as the disease metastasizes, the outlook becomes significantly more unfavourable; just 22% of stage IV breast cancer patients manage to survive for a period of five years (5). Moreover, BC patients may experience

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psychological symptoms, which can be a source of distress(6). This emphasises the importance of promptly identifying and diagnosing these symptoms to reduce the negative impact on health and the risk of death (7)

Multiple methods can be employed to detect breast cancer, such as mammography, breast self-examination (BSE), and clinical breast examination (CBE) (8). Out all these procedures, mammography is the sole method that has been scientifically confirmed to be effective. However, this method is only economically viable and practical in nations with well-developed healthcare systems. Only nations possessing advanced healthcare systems have the financial means and capability to implement and carry out mammography, a proven effective medical treatment. Performing breast self-examination is the most effective approach to identify any deviations from the typical look that could be suggestive of breast diseases and changes (9). The citation "Esfahani" (10) refers to a publication by Esfahani and colleagues in the year 2018. Performing breast self-examination is a crucial healthcare practice that should be carried out by women of all ages. Engaging in breast self-examination (BSE) and promoting breast cancer awareness can contribute to the effective management and timely identification of cancer .(11)

The American Cancer Society recommends utilising Breast Self-Examination (BSE) as a screening method for breast cancer due to its simplicity, privacy, safety, and lack of necessity for specialised equipment. Moreover, according to the American Cancer Society, BSE has the ability to identify detectable abnormalities, which is why it is strongly advised as a method of choice in countries that are still in the process of development, such as Indonesia (8). Performing a breast self-examination is a noninvasive and cost-effective approach of identifying breast cancer. Acquiring knowledge about breast self-examination simplifies the detection of breast problems at an early stage, so substantially reducing the likelihood of developing breast cancer and associated ailments and fatalities(12). Indeed, women who regularly undertake breast self-examination (BSE) detect 90% of all breast tumours. While the majority of breast lumps, around 80%, are benign, detecting significant malignant changes early on greatly improves the likelihood of survival. Women should possess knowledge regarding the procedural stages, significance, and probable results of a Breast Self-Examination (BSE) to guarantee precise and regular execution of the examination (13).

The RANAS model functions as a tool for identifying the factors that impact changes in health behaviour, such as the practice of completing breast examinations. Previous studies have exclusively concentrated on counselling without ongoing monitoring. In order to induce long-lasting changes in societal behaviour, researchers employ the RANAS (risk, attitude, norms, ability, and self) approach to behaviour modification training (14). Generally, RANAS interventions aim to modify the mindset of individuals such that their beliefs, attitudes, perceived norms, and emotions towards the specific activity become favourable. This adjustment in viewpoint leads to a modification in conduct. An intervention specifically alters the behavioural elements that are most closely linked to influencing the target behaviour (15). This study seeks to ascertain the impact of RANAS on conscious behaviour, encompassing both direct and indirect effects.

2. Methods

Study design

This study utilises the analytical survey approach as its research methodology. This study utilises the analytical survey approach as its research methodology. More precisely, the researcher conducts an interview-based survey by administering a questionnaire to gather data from a selected group of participants. The research subject employs a cross-sectional methodology to concurrently assess and gather the dependent and independent variables.

Respondent

This study mainly focuses on married women as the target respondents. Married women face a greater likelihood of having breast cancer compared to young and unmarried women. The Lameshow formula was used to determine the total number of participants, which resulted in 382 individuals who met the main requirement of being between 26 and 35 years old. We selected the sample technique, namely random simple sampling, among 20 different regional sectors spread across Bengkulu City.

Time and place

This study was conducted in Bengkulu City, Indonesia, over a period of 4 months to examine the impact of heat on the behaviour of respondents during breast self-examination. Monthly assessments will be conducted to monitor the progress of each responder

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in doing breast self-examination. The assessments will take place at the beginning and end of each month.

Instruments

This study employs a research instrument in the form of a questionnaire sheet comprising six primary indicators. The initial indicator comprises three questions related to a risk factor. The subsequent indicator comprises three questions related to a cyclic factor. The third indicator pertains to the norm factor and includes two questions. The fourth indicator encompasses an ability factor and includes three question items. The fifth indicator encompasses a self-regulation factor and includes three question items. Lastly, the final indicator focuses on breast self-examination behaviour and includes three question items. The questionnaire questions employ a Likert scale, which encompasses a scoring range from 0 to 4.

Data analysis

The data was examined by a computer in numerous stages, using chi-squared tests for both univariate and bivariate analysis. This study utilises the partial least squares (PLS) method for data analysis, using the smart PLS software version 4.1.0.3. The Sem route diagram visually represents the relationships between the variables being studied. In structural equation modelling (SEM), the arrangement of connections between variables is populated by observable variables, latent variables, and indicators.

Ethical consideration

The Ethics Committee of the Faculty of Health Sciences at Dehasen University approved this study under the reference number 0002/D-KEPK/FD/II/2024

3. Results

Table 1 The mean score for each item (N=382)

Variable	Item	Scale	Mean ± SD
Risk Factor	R1	0-4	2,60 ± 0,614
	R2	0-4	2,62 ± 0,669
	R3	0-4	2,63 ± 0,617
Attitude Factor	AT1	0-4	2,84 ± 0,702
	AT2	0-4	2,88 ± 0,734
	AT3	0-4	2,77 ± 0,653
Norm Factor	N1	0-4	2,73 ± 0,787
	N2	0-4	2,67 ± 0,855
Ability Factor	AB1	0-4	2,81 ± 0,679
	AB2	0-4	2,89 ± 0,729
	AB3	0-4	2,95 ± 0,697
Self Regulation Factor	S1	0-4	2,87 ± 0,619
	S2	0-4	2,96 ± 0,722
	S3	0-4	2,79 ± 0,761
Breast Self Examination Behavior	B1	0-4	2,76 ± 0,743
	B2	0-4	2,87 ± 0,648
	B3	0-4	2,65 ± 0,626

The results of the factor loading values (Table 2) show that each indicator or dimension forming the latent variable can produce better values, namely by obtaining a high value factor loading value where each indicator is above the test criteria of 0.5

Tabel 2 Factor loadings

Variable	Item	Factor loadings	p-Value
Risk Factor	R1	0.716	0,000
	R2	0.844	0,000
	R3	0.844	0,000
Attitude Factor	AT1	0.863	0,000
	AT2	0.847	0,000
	AT3	0.734	0,000

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Norm Factor	N1	0.887	0,000
	N2	0.757	0,000
	AB1	0.725	0,000
Ability Factor	AB2	0.959	0,000
	AB3	0.953	0,000
	S1	0.760	0,000
Self-Regulation Factor	S2	0.792	0,000
	S3	0.838	0,000
	B1	0.710	0,000
Breast Self-Examination Behavior	B2	0.907	0,000
	B3	0.749	0,000

The results of the factor loading values (Table 2) show that each indicator or dimension forming the latent variable can produce better values, namely by obtaining a high value factor loading value where each indicator is above the test criteria of 0.5

Based on table 3, it can be concluded that the Cronbach alpha value is ≥ 0.7, the composite reliability value is ≥ 0.7. This shows evidence that the variable has met the reliability test criteria, and the AVE value so that the indicator has met the criteria and is said to be valid

Table 3 : Construct Reliability and Validity (N=382)

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Ability Factor	0.735	0.780	0.845	0.646
Attitude Factor	0.755	0.794	0.857	0.667
Breast Self Examination	0.721	0.838	0.835	0.629
Norm Factor	0.906	0.909	0.955	0.914
Risk Factor	0.716	0.729	0.839	0.636
Self Regulation Factor	0.712	0.830	0.834	0.629

Tabel 4 Discriminant validity

	Ability Factor	Attitude Factor	Breast Self Examination	Norm Factor	Risk Factor	Self Regulation Factor
Ability Factor						
Attitude Factor	0.372					
Breast Self Examination	0.760	0.331				
Norm Factor	0.123	0.037	0.107			
Risk Factor	0.518	0.241	0.164	0.109		
Self Regulation Factor	0.898	0.632	0.490	0.035	0.367	

Tabel 5 Structural model results: Direct effects

Variabel	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Decison
Ability Factor -> Attitude Factor	0.063	4.528	0.000	Significant
Ability Factor -> Breast Self Examination	0.068	11.698	0.000	Significant
Attitude Factor -> Breast Self Examination	0.061	2.174	0.030	Significant
Norm Factor -> Breast Self Examination	0.044	2.991	0.003	Significant
Risk Factor -> Attitude Factor	0.061	1.292	0.197	Not Significant
Risk Factor -> Breast Self Examination	0.061	1.981	0.048	Significant

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Self Regulation Factor -> Ability Factor	0.025	29.957	0.000	Significant
Self Regulation Factor -> Breast Self Examination	0.080	3.037	0.002	Significant

The explanation in table 5 is that the ability factor is significant for attitude with a p value of 0.000 < 0.05. The ability factor is significant for breast self-examination with a p value of 0.000 < 0.005. Attitude is significant for breast self-examination with a p value of 0.030 < 0.05. The risk factor is not significant on attitude with a p value of 0.197 > 0.00. The risk factor is significant for the breast self-examination with a p value of 0.048 < 0.05 and self regulation is significant for the ability factor with a p value of 0.000 < 0.05. Self regulation is significant for breast self examination with a p value of 0.002 < .05

Tabel 6 Structural model results: Indirect effects

Variabel	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Decison
Ability Factor -> Attitude Factor -> Breast Self Examination	0.019	2.018	0.044	Significant
Risk Factor -> Attitude Factor -> Breast Self Examination	0.012	0.904	0.366	Not Significant
Self Regulation Factor -> Ability Factor -> Attitude Factor	0.048	4.449	0.000	Significant
Self Regulation Factor -> Ability Factor -> Breast Self Examination	0.050	11.833	0.000	Significant
Self Regulation Factor -> Ability Factor -> Attitude Factor -> Breast Self Examination	0.014	1.994	0.046	Significant

Table 6 shows the results of the PLS calculation which states the indirect influence between variables. It is said that there is an indirect influence if the p value is <0.05 and it is said that there is no indirect influence if the p value is >0.05

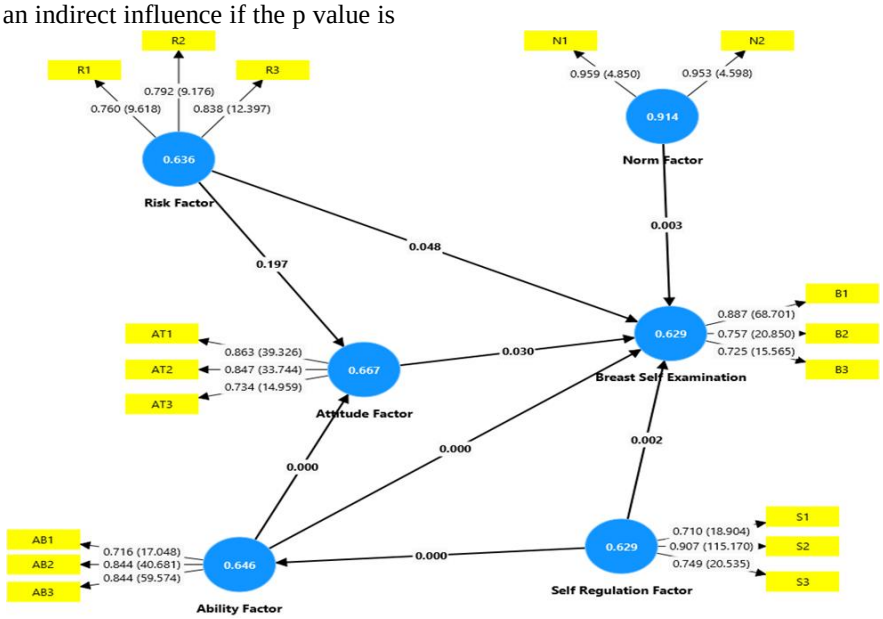

Fig 1 PLS-SEM path model

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Fig. 1 displays the conceptual model together with our proposed hypothesis. Drawing on the limited extant literature as expounded in the paper's introduction, we delineate three categories of hypotheses for exploratory analysis: three types of effects: moderate, indirect, and direct

4. Discussion

The findings of this study demonstrate a clear correlation between risk variables and the practice of breast self-examination. Risk variables in research encompass characteristics such as health literacy, susceptibility, and the degree of severity. Among the 382 participants, 192 individuals (50.3%) were acquainted with BSE and its research, as reported by (16). Based on a mean score of 68.9 and a standard deviation of 6.5, it can be concluded that only 44.2% of the participants demonstrated a high level of knowledge regarding breast cancer (BC) and breast self-examination (BSE). This suggests that the total knowledge score is relatively low. In a study conducted by (17), it was discovered that among the patients surveyed, 29 individuals lacked knowledge about BSE, whereas 71 individuals were aware of it. Online resources, particularly social media, play a crucial role in providing information on BSE 42 sufferers. Out of the total of 100 patients, 20 engage in BSE practices regularly, 11 do so intermittently, and 69 do not engage in BSE activities at all. Out of the total sample size, 173 individuals (45.3%) were at risk of developing breast cancer due to their familial predisposition. (5) offer evidence for this claim by referring to a family lineage of 162 individuals and a scarcity of 305 instances. The survey findings indicated that 23 individuals (6% of the sample) expressed the belief that obtaining a breast examination has the capacity to decrease the probability of acquiring breast cancer. The study conducted by (18) found that action signals, perceived severity, and perceived susceptibility had no impact on BSE intention.

The research found a notable correlation between attitude and the behaviour of performing breast self-examinations. Out of the responses, 58 individuals (15.2%) strongly agreed that it is crucial for adult women to maintain ongoing attention regarding breast cancer. According to the findings of (19), almost 97% of participants hold the belief that detecting breast cancer at an early stage enhances the chances of successful recovery. Out of the 541 individuals who participated in the survey, 46.0% (95% CI: 42–52) expressed positive views towards breast self-examination, and 60.3% of the respondents considered it to be crucial (20). The study's findings indicated that 222 individuals, accounting for 58.1% of the participants, agreed that doing breast self-examination was a simple task. The survey found that 224 (53.2%) women held the belief that conducting breast self-examination would be a straightforward endeavour (21). Engaging in self-care activities positively influenced women's attitudes towards breast self-examination (BSE) with a coefficient (b) of 0.092 and a significance level (p) of 0.001. Conversely, shyness had a negative connection with women's attitudes towards BSE, indicated by a coefficient (b) of -2.60 and a significance level (p) of 0.001. Additionally, other cultural factors were also found to have a negative association with women's attitudes towards BSE, as reported by (22). Normative influences exert an influence on breast self-examination behaviour, with positive support from immediate family members having a significant impact on an individual's behaviour. The study's findings indicate that subjective norms significantly influenced the prediction of BSE behaviour, with 193 individuals (50.5%) expressing agreement to perform breast self-examination (23)

Researchers in (24), Nepal discovered that among a group of 500 women, 3.4% had received mammography, 7.2% had undertaken clinical breast examination (CBE), and 14.4% had performed breast self-examination (BSE). According to (24), women who had positive attitudes, strong subjective norms, and greater behavioural control were more likely to undertake screening. Additionally, this study revealed that 160 persons, accounting for 41.9% of the participants, experienced a profound sense of personal duty to acknowledge it. Furthermore, the likelihood of them taking appropriate action increased in proportion to the level of personal significance they attached to it. The research findings demonstrate a substantial correlation between elements related to one's abilities and the behaviour of conducting breast self-examinations. Out of the total, 109 individuals (28.5%) were unaware of how to accomplish the task due to their uncertainty, whereas 71 individuals (18.6%) indicated certainty in their capability to do so.

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Similarly, a study conducted by (25) revealed that out of 262 participants, a significant number (65.64%) claimed being unaware of it, while a smaller proportion (16.41%) stated a lack of knowledge on how to perform it. According to the research conducted by (26), more than half of the participants (55.3%) had a lack of information regarding BSE, just a quarter (27.1%) showed awareness, and the majority (39.0%) exhibited poor habits. The findings of this study reveal that 223 participants, which accounts for 58.4% of the sample, had a sense of assurance in their ability to carry out BSE in the coming times. The research findings suggest that the participants possess a high level of self-assurance in their capacity to successfully execute the activity. Out of the total, 75 individuals, which accounts for 19.6% of the sample, express confidence in their ability to continue doing it. In the future, there will be an intensity of 26.5%(27). (28) conducted research which found that 58% of the participants stated that they have been taught how to carry out BSE (Breast Self-Examination).In 2023, a survey revealed that 58% of respondents reported receiving instruction on how to achieve their goals

5. Conclusion

Our study investigated the impact of RANAS components (risk factor, attitude, norm, ability, and self-regulation) on women's breast self-examination activity. We employed a PLS-SEM-based approach to analyse the data. The study's findings indicate a substantial correlation between RANAS and breast self-examination behaviour. Moreover, there is no substantial impact on the indirect correlation between risk variables, attitude factors, and breast self-examination

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