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Preoperative Shoulder Exercise Knowledge and Practice Regarding Seroma Formation after Modified Radical Mastectomy for Patients Breast Cancer

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ABSTRACT

Background: Modified radical mastectomy is the most common treatment for invasive breast cancer. Shoulder exercises are very important during the initial period to achieve the best possible outcome and a good prognosis. **Aim:** To assess preoperative knowledge and practice of shoulder exercises in relation to seroma formation after modified radical mastectomy in patients with breast cancer. **Design:** A quasi-experimental research design was utilized in this study. **Setting:** Data were collected from the Surgical Oncology Department and the Surgical Outpatient Clinic at the Oncology Institute in Sohag. **Samples:** A purposive sample of 80 adult female patients with breast cancer who were scheduled for modified radical mastectomy. The patients were divided into two equal groups, with 40 patients in each group. **Tools:** Four tools were utilized for data collection **Tools: (I)** A structured interview questionnaire, **(II)** A Structured Exercise Assessment Questionnaire, **(III)** Seroma Formation Assessment and **(IV)** Shoulder Functional Ability Assessment Questionnaire **Results:** The results of this study showed that 76% of the study group had an unsatisfactory total level of knowledge, and 82% had an unsatisfactory total level of practice. **Conclusion:** The current study concluded that the majority of the study group had an unsatisfactory level of knowledge and practice. Additionally, there was a statistically significant relationship between patients' knowledge, practice, and demographic characteristics. **Recommandations:** A simplified and comprehensive booklet and procedure manual should be developed, including guidelines on basic information and skills related to hygienic measures for bedridden patients.

Keywords: *Modified radical mastectomy, Seroma formation, Shoulder exercises*

Introduction

Breast cancer is the most common cause of cancer-related morbidity and mortality among females worldwide. It is usually treated with surgery, which may be followed by chemotherapy, radiation therapy, or both. A multidisciplinary approach is preferable for optimal management. Mastectomy is a surgical procedure to remove one or both breasts, and there are several types, including simple mastectomy, subcutaneous mastectomy, radical mastectomy, and modified radical mastectomy **(Winer, 2022)**.

Modified radical mastectomy is the most common treatment for invasive breast cancer. It involves the removal of all breast tissue from the affected breast, along with the removal of lymph nodes from the armpit on the same side of the body. This surgery also includes the removal of both the nipple and areola. Several complications may occur following a modified radical mastectomy, such as restricted shoulder mobility, shoulder dysfunction, wound infection, stiffness, seroma formation, pain, and lymphedema **(Coughlin, 2022)**

Seroma formation is the most common complication following modified radical mastectomy, occurring in 3% to 85% of cases. A seroma is defined as a collection of serous fluid under the skin flaps or in the axillary dead space following mastectomy and axillary

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dissection. Although seroma is not life-threatening and can be detected either clinically or through sonography, it may lead to significant morbidity, including wound hematoma, delayed wound healing, wound infection, wound dehiscence, prolonged hospitalization, delayed recovery, impaired shoulder function, pain, and a delay in the initiation of adjuvant therapy **(Shin & Whitman, 2021)**

Seroma formation occurs as a result of lymphatic fluid collection or acute inflammatory exudates in response to surgical trauma and acute phase of wound healing. Seroma can lead to a number of serious complications including wound infection, wound hematoma, delayed wound healing, pain, fatigue, flap necrosis, prolonged hospitalization, as well as delay in initiation of adjuvant therapy **(Winer, 2022)**.

There are several techniques in practice that have been reported to prevent or reduce seroma formation such as sclerotherapy, compression dressing, use of drains and shoulder exercises. Treatment options vary from conservative, measure to consecutive evacuating procedures through percutaneous needle aspiration or even re-insertion of a new drainage tube **(Stordal, 2023).**

Many women experience impairment in shoulder movement, which can significantly affect their daily functioning and quality of life. Restriction of shoulder movement is a common complication following modified radical mastectomy and axillary lymph node dissection, often resulting from nerve and tissue damage. To minimize the loss of strength and mobility, shoulder exercises are commonly prescribed. Women may also experience pain around the incision site and under the arm after breast surgery due to tissue trauma caused during the procedure. Fatigue is the most common side effect of breast cancer treatment **(Singh & Kumar, 2023).**

Early physiotherapy, especially shoulder exercises, is a common approach to prevent shoulder dysfunction and restricted mobility. A physical therapist can recommend and guide patients through post-mastectomy exercises that help restore movement and strength in the arm and shoulder, reduce stiffness, and improve quality of life. Patients may be able to begin gentle exercises within a few days after surgery, depending on their condition and the surgeon's recommendations **(Ellis & Mahadevan, 2023).**

Nurses are the largest group of health professionals and are closest to the patient, playing a vital role in improving shoulder function, preventing seroma formation, and restoring the full range of motion in the shoulder and arm after modified radical mastectomy. They do so by providing specific instructions and guidance regarding postoperative exercises and protective care measures to prevent shoulder dysfunction. Nursing management of breast cancer patients includes assessing the patient's needs, making appropriate nursing diagnoses, initiating care plans, helping the patient cope with emotions, and providing both information and psychological support **(Kim, 2023).**

Significance of the study

Worldwide, breast cancer is the most common invasive cancer in women, affecting approximately 12% of women globally **(World Cancer Report, 2022).** According to the American Cancer Society's estimates for 2019, about 231,840 new cases of invasive breast cancer were expected to be diagnosed in women in the United States, and approximately 40,290 women were projected to die from the disease **(American Cancer Society, 2021).**

In Egypt, according to official statistics of the Egyptian cancer institute, breast cancer accounts for 35.1% of the total female cancer cases in Egypt and is the most prevalent cancer among Egyptian women **(Faisal, et al., 2022).** According to oncology institute in sohag statistical records in 2020, the commonest sites of cancer in Sohag Governorate were cancer breast (29.9%) and incidence of breast cancer were about 490 patients (483 females and 7

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males) **(Statistical Records in Sohage Medical Journal, 2023).**

According to the International Cancer Control data in Egypt, breast cancer is the most common malignancy among women, accounting for 38.8% of cancer cases in this population. The estimated number of breast cancer cases was nearly 22,700 in 2020 and is forecasted to reach approximately 64,000 by 2050. It is estimated that the breast cancer mortality rate is around 11%, making it the second leading cause of cancer-related mortality after liver cancer **(Ibrahim, et al., 2022).**

From researcher observation, observed that there is an increase in the incidence of breast cancer in oncology institute in Sohag at, about 490 patients (2020) and modified radical mastectomy is a common surgical procedure in breast cancer. After surgery, the most common postoperative complications are shoulder dysfunction, restricted shoulder mobility, seroma formation, pain and fatigue. To reduce or prevent these complications, shoulder exercises are usually prescribed **(Statistical Records in Sohage Medical Journal, 2023).**

AIM OF STUDY:

The aim of this study is to assess of Preoperative shoulder exercise Knowledge and Practice regarding seroma formation after modified radical mastectomy for patients breast cancer.

Research question:

What is the level of preoperative knowledge and practice regarding shoulder exercises in relation to seroma formation after modified radical mastectomy among patients with breast cancer?

SUBJECTS AND METHODS

Research Design:

A quasi-experimental research design was utilized for conducting this study.

Setting:

This study was conducted in the surgical oncology department and surgical outpatient clinic at the Oncology Institute in Sohag. The institute consists of two buildings, a surgical building, and an oncology building.

Subject:

Type of sample:

Purposive sample was used in this study.

Sample Size:

The sample size included 80 adult female patients with breast cancer scheduled for modified radical mastectomy within period of nine months, from February 2023 to October 2023.

Tools for data collection:

Four tools were used after reviewing the related literature putting into considerations the aim of the study and the data needed to be collected from the studied subject.

Tool (I): A structured interviewing questionnaire:

This tool was designed by the researcher. It was written in simple Arabic language including the following three parts:

Part (I): Socio-demographic data of the studied women:

This part composed of (5 Questions) aimed to collect data related to age, marital status, level of education, occupation and place of residence.

Part (II) Clinical data: It was adapted from ***Loh & Musa (2019).*** This part composed of the following two mean categories aimed to collect data related to; a) Medical history (6 questions) such as diagnosis, date of admission, date of discharge, site of breast cancer, family history and relative relationship. b) Predisposing risk factors of breast cancer (7 questions) such as age of menarche, menopause, age of menopause, age of 1st pregnancy, use the breast feeding, use of pills (oral contraceptive) and number of years for use of pills (oral contraceptive)

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Part III: Patient's knowledge assessment: It was adapted from ***Loh & Musa (2019).*** It was translated into simple Arabic by the researcher it consisted of 13 questions.

Tool II: Structured Exercise Assessment Questionnaire:

It was developed by the researcher after reviewing the current related literature adapted from **McRae (2020)** and it was used to assess preoperative shoulder exercise practice included 14 steps.

Tool (III): Seroma Assessment Questionnaire:

It was adapted from **Shaaban (2019)** and it was used to assess patients' clinical manifestations of seroma formation after mastectomy.

Tool (IV) - Shoulder Functional Ability Assessment Questionnaire:

This tool was adapted from the American Shoulder and Elbow Surgeons' Shoulder Evaluation Form, originally developed by **McRae (2020),** and was used to assess preoperative shoulder functional abilities. It was translated into Arabic by the researcher and included 13 questions.

Validity:

Revision of the tools for clarity, relevance, comprehensiveness, understanding, and applicability was done by a panel of five experts in Medical and Surgical Nursing department, Faculty of Nursing at Helwan University and to measure the content validity of the tools and the necessary modifications were done accordingly.

Reliability:

This table describes that, there was good internal consistency (reliability) of the tools with Cronbach's alpha coefficients ranging from 0.754, 0.927, 0.791. It was assessed using Cronbach's alpha reliability coefficient. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (More than 0.7) denote acceptable reliability.

Reliability analysis:

Items	Cronbach's Alpha	P-value
Tool (I): Structured interview	0.754	<0.001
Tool (II): Exercise assessment	0.927	<0.001
Tool (III): Shoulder functional ability assessment	0.791	<0.001

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee at the Faculty of Nursing, Helwan University. The researcher explained the aim of the study to the women involved in order to gain their confidence and trust. Informed written consent was obtained from all participants. The researcher assured participants that their anonymity and the confidentiality of their data would be maintained. The women were informed that participation was voluntary and that they had the right to withdraw from the study at any time without any consequences.

II- Operational design:

Preparatory phase:

It included reviewing of past, current, national, and international related literature, and theoretical knowledge of various aspect of the study using books, articles, internet, and magazines to develop tools for data collection. The researcher constructed and prepared the different data collection tools.

Pilot study:

A pilot study was carried on 10% (10) of women under study based on sample criteria, it has been conducted to test the applicability, clarity of questions and understand ability of the tool. Then the tool was modified according to the result of the pilot study, so all of subjects who were shared on the pilot study were excluded from the studied sample.

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Field work:

The researcher interviewed the patients with breast cancer who were scheduled for modified radical mastectomy preoperatively at the surgical oncology department to explain purpose and nature of the study and get their oral consent to participate in the study.

The researcher visited the study setting three days per week (Saturday, Monday and Wednesday) in the morning and afternoon shifts.

The researcher interviewed 80 patients, who agreed to be involved in the study sample. Data collection lasted for nine months, from 1st of February 2023 to 30th of October 2023.

First, the researcher assessed patient's knowledge regarding seroma formation post mastectomy at Oncology Institute in Sohag by collected the knowledge from the patients using tool I part III and Tool III it took about 30: 45 minutes

The researcher collected baseline data from patients using tool (II) measure exercise. In addition, functional abilities of the shoulders were measured by asking the patients to perform specific activities using tool (IV)

III-**Administrative design:**

An official letter from the Dean of the Faculty of Nursing, Helwan University was directed to the administrators of Sohag oncology institute to obtain an official approval to carry out the study after explanation of the aim of the study. This permission was obtained before the initiation of the data collection.

IV-**Statistical design:**

Numerical data were presented as mean and standard deviation (SD) values. Qualitative data were presented as frequencies (n) and percentages (%). Reliability of the questionnaire was assessed using Cronbach's alpha reliability coefficient. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (More than 0.7) denote acceptable reliability. Chi-square was used to compare between studied variables. Spearman's correlation coefficient was used to determine correlations between different variables. The significance level was set at $P \leq 0.05$. Statistical analysis was performed with IBMSPSS Statistics Version 26 for Windows through the study without giving any reasons.

IV- Statistical Design:

Data collected from the studied sample was analyzed and tabulated using the Statistical Package for Social Science (SPSS) version 20. Qualitative data was presented as numbers and percentages. The statistical tests used the chi-square test, means, slandered deviation, and Correlation test which showed good internal consistency construct validity.

RESULTS

Table (1): Number and percentage distributions of socio-demographic characteristics for both groups (n=80).

Socio-demographic characteristics	Study group (n=40).		Control group (n=40).		P- value
	N.	%	N.	%	
Age:					
• 18 < 30 year	0	0	0	0	0.633*
• 30 < 40 year	12	30	14	35	
• 40 ≤ 60 year	28	70	26	65	
Mean ± S.D	**45.5 ± 11.7**		**44.8 ± 10.8**		**0.782***
Marital status:					
• Single	0	0	0	0	

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• Married	28	70	30	75	0.837*
• Divorced	4	10	4	10	
• Widow	8	20	6	15	
Level of education					
• Illiterate	22	55	20	50	
• Read and write	6	15	6	15	
• Primary education	8	20	6	15	0.788*
• Secondary education	2	5	4	10	
• University education	2	5	4	10	
Occupation					
• House wife	34	85	32	80	
• Employee	6	15	8	20	0.556*
Residence					
• Rural	30	75	26	65	
• Urban	10	25	14	35	0.329*

Table (1) indicates that,, (70 % and 65%) respectively among study and control group, their ages ranged between (40 – 60) years with mean ages (45.5 ± 11.7) for the study & (44.8 ± 10.8) for the control group. (70%, 75% and 55%, 50%) of the women in the study and control groups respectively were married and illiterate respectively. Regarding occupation, were housewives respectively (85% and 80%). When housewives in both group respectively (75% and 65%) of study and control group were living in rural areas. Finally, the table showed that there was no statistical difference between the study and control groups regarding socio-demographic characteristics (P > 0.05).

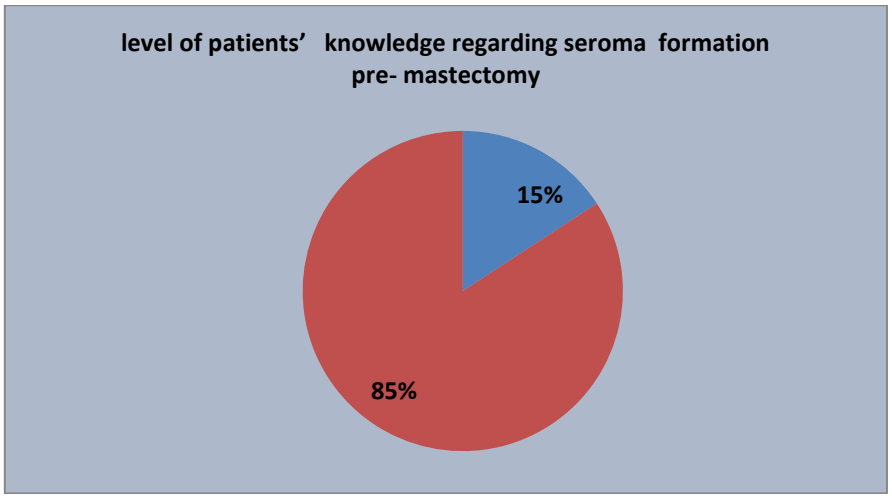

Figure (1): Frequency and percentage distribution of the total level of patients' of knowledge regarding seroma formation pre- mastectomy (pre-operative) (n=80).

Figure 1 showed that, 85% of the studied patients had unsatisfactory level of knowledge regarding shoulder exercise pre-mastectomy (pre-operative), while, 15% of them had satisfactory level of knowledge regarding shoulder exercise pre-mastectomy (pre-operative).

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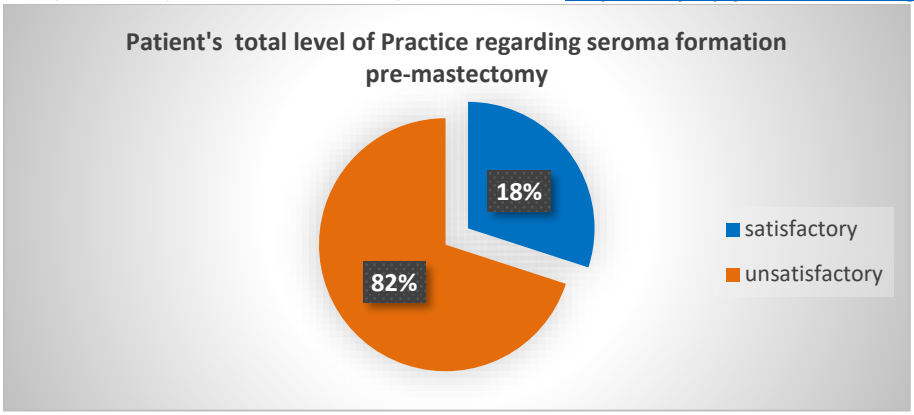

Figure (2): Frequency and percentage distribution of the total level of patient's practice regarding shoulder exercise (pre-operative) (n=80).

Figure 2 showed that, 82% of the studied patients had unsatisfactory level of practice regarding shoulder exercise pre-mastectomy (pre-operative), while, 18% of them had satisfactory level of practice regarding shoulder exercise pre-mastectomy (pre-operative).

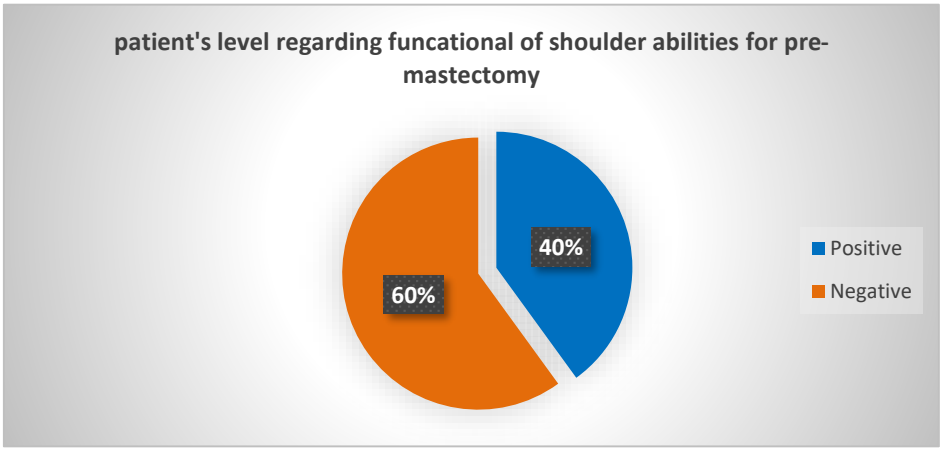

Figure (3): Frequency and percentage distribution of the level of shoulder functional abilities for (pre-mastectomy) (preoperative) (n= 80)

Figure (3) showed that **(60%)** of the studied patient's had negative level of shoulder functional abilities for (pre-mastectomy) (preoperative). While, **(40%)** of them had positive level of shoulder functional abilities for (pre-mastectomy) (preoperative).

Table (2): Correlation between overall patients' level of knowledge regarding shoulder exercise (pre-operative) and their practice(n=80)

Knowledge	Practice				P-value	r- test
	Satisfactory (n=10)		Unsatisfactory (n=70)			
	No.	%	No.	%		
Satisfactory (n=12)	4	40	10	14		
Unsatisfactory (n=68)	6	60	60	86	0.002	0.720

Table 2 showed that, there is strongly positive correlation between the patients' level of knowledge and their level of practice regarding regarding shoulder exercise (pre-operative), where r-test 0.720 and P value was at 0.002.

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DISCUSSION

Breast cancer is the most common malignancy among women. Modified radical mastectomy is a common surgical procedure used as a therapeutic intervention in patients with breast carcinoma involving the axillary lymph nodes. After surgery, the most common postoperative complications include reduced shoulder range of motion, seroma formation, muscle weakness, shoulder dysfunction, pain, and fatigue. To reduce these complications, shoulder exercises are routinely prescribed **(Potter, 2021).**

Part I: Demographic characteristics of the studied breast cancer women's.

Regarding marital status, most of the women of the study and the control groups were married. This result was in agreement with **Girmenia (2022),** in a study entitled "A review on breast cancer and its management"**,** who mentioned that the majority of the women in studied groups were married.

In relation to the educational level, most of the women in both groups were illiterate and more than half of the women in both groups were living in rural areas. This is due to the fact that illiteracy rate is higher among women in Egypt accounting (69%) of the total number of illiterate people in Egypt. This result was in accordance with **Tiwari (2021),** in a study entitled "Effect of educational program regarding therapeutic exercises on women's pain, fatigue and shoulder function undergoing mastectomy", who reported that more than one third of the study group and one-half of the control group were illiterate. This finding contradicted with **Rizk (2022),** in a study entitled "The efficacy of protocol of care on post mastectomies women outcomes"., who revealed that women with the highest educational level had increased incidence of breast cancer when compared to the women with lower education.

The current study found that the occupation, the majority of the women in both groups were housewives. It could be due to high rate of illiteracy among Egyptian women. This result was in agreement with **Bastiaannet & Liefers (2020),** in a study entitled "Breast cancer incidence and case fatality among women in relation to social and ethnic background", who reported that most of both groups were housewives. In addition, this study finding was in accordance with **Azmi (2023),** in a study entitled "Effectiveness of exercise programmers on shoulder mobility and lymphedema after axillary lymph node dissection for breast cancer", who presented that the majority of the studied women were housewives.

Finding of the study the residence area, more than half of the women of the study and the control groups were living in rural areas. This finding was in agreement with **Turner (2020),** in a study entitled "Systematic review of exercise effects on health outcomes in women with breast cancer", who reported that about half of the study group and more than half of the control group were residence in rural areas.

Part II: Breast cancer women' reported knowledge about shoulder exercise before modified radical mastectomy:

Concerning patients' total level of knowledge, the present study revealed that, the majority of patients in the study and control groups had an unsatisfactory level of knowledge regarding shoulder exercise preoperative. According to the opinion of the researcher, the level of knowledge was insufficient due to in not availability of training programs, lacking continuous educations and most health care providers did not routinely counsel women or providing them with written information about mastectomy and self-care practice. This study result was in agreement with **Sechopoulos (2022)** who showed that there was a statistically significant difference regarding the mean knowledge score at three different

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intervals pre, post and follow up intervention regarding breast cancer as a disease as well as post-mastectomy exercises

Part III: Breast cancer women' reported practice about shoulder exercise before modified radical mastectomy:

According the level of practice for nurses regarding shoulder exercise preoperative. The present results showed that, about two thirds of study had unsatisfactory level of practice regarding shoulder exercise preoperative. This may be due to that, studied patients do not adhere to the effective measures for shoulder exercise units. The finding is consistent with **Sharma (2020)**, who reported that, the majority of the study subjects had poor adequate practice regarding shoulder exercise preoperative

Part V: Correlation between level of knowledge and their level of practice:

Regarding correlation between practices level and knowledge level pre-instructional program, the findings of current study revealed a significance positive relationship between participants practice and knowledge scores. This result supported by **Sechopoulos (2022)** and revealed that there was a positive correlation between total knowledge of the studied breast cancer women and their total reported practices.

Regarding relationship between knowledge level pre-instructional program across demographic characteristics, the current study demonstrate statistically significant difference in knowledge scores based on various demographic factors pre the instructional program notably age groups, education levels, these findings suggest that the instructional program had varying impact on knowledge acquisition depending on these demographic characteristics. The observed statistical significance highlights the importance of considering these factors when designing and implementing instructional program to ensure effectiveness across diverse population. This result aligns with **Maheen (2022)**, who studied "Assessing women Knowledge about breast cancer prevention and treatment" and observed a positive relationship between women s' knowledge about modified radical mastectomy

Concerning relationship between practices level pre and post instructional program across demographic characteristics, the current study illustrated statistically significant difference in practice scores pre and post the instructional program across various demographic characteristics as: age groups, education level, occupations, all exhibited significant variations in practice scores. This indicates that the intervention had varying impact on practice improvement depending on these demographic characteristics. The observed statistical significance underscores the importance of tailoring educational interventions to specific demographic groups to enhance effectiveness of the intervention in promoting desired behaviors. This result was in accordance with **Elsayed (2023)** who studied "Assessment of breast cancer Care toward post mastectomy" and concluded that there were statistically significance relations between the total women breast cancer knowledge and practice scores and their age at detection of the disease, where poor knowledge was more encountered among those women's.

CONCLUSION

In light of the present study, it can be concluded that the research revealed that the total patients' knowledge more than three quarters had unsatisfactory level of total knowledge and the majority of them had unsatisfactory level of total practice regarding shoulder exercise preoperative

RECOMMENDATIONS

Based on the findings of the study results, the following recommendations were advocated:

1. Implementing education programs to enhance awareness of women breast cancer.

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2. Conducting future studies with a larger sample size including different regions or diverse population in order to produce more representative evidence.

Further studies:

Conducting further researches on a larger scale and across multiple centers can provide more robust and reliable conclusions by capturing a diverse range of demographic, geographic, and healthcare contexts.

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