

## Aspects Allied with Quality of Life among El-Beheira Governorate Post-Mastectomy Women: A Mobile-Based Health Education

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### Abstract

**Background:** Women's health is mostly affected by their quality of life; when it comes to breast cancer in particular, the loss of a breast traumatically affects a women's quality of life. Health education and community health support are aids to improve these group health as well as their quality of life. **The aims of this study** are to determine aspects allied with quality of life among El-Beheira Governorate post-mastectomy women and assess the levels of women's satisfaction regarding mobile-based health education. **Research design:** a descriptive research design was used. **Settings:** This study was carried out in Damanhour Oncology Center (DOC). **Subjects:** this study was carried out on a convenient sample of 200 women. **Data collection tools:** data were collected using two tools: the women's structured interview questionnaire sheet and the Quality-of-Life Assessment Instrument (WHOQOL-100). **Results:** More than half of the studied women (56.0%) had poor quality of life, and the physical domain received the lowest percent score (45.24±16.07) followed by the spiritual domain (47.28±18.70). **Conclusion:** the study concluded that the Quality of life of post-mastectomy women on hormonal therapy may be positively affected in the domains of environment, and level of independence. Otherwise, it may be affected negatively in physical and spiritual health domains. Women were satisfied by the mobile-based health education delivered to them. **Recommendations:** Mobile-based health education must be intensified to raise public awareness and raise their QoL. Health education interventions to improve the quality of life of post-mastectomy women should be focused on the physical and spiritual health domains.

**Keywords:** Aspects, Allied with, Quality of life, Mobile-based education, and Postmastectomy

### Introduction

Worldwide, there were 2.3 million women diagnosed with breast cancer and 685 000 deaths globally. As of the end of 2020, there were 7.8 million women alive who were diagnosed with breast cancer in the past 5 years, making it the world's most prevalent cancer (*World Health Organization, 2021*). In Egypt, there were 22 .038 women diagnosed with breast cancer and 9. 148 deaths. As of the end of 2020, there were 61 .160 women alive who were diagnosed with breast cancer in the past 5 years. Breast cancer occupied the second position after liver cancer by cancer site (*World Health Organization, International Agency for Research on Cancer: Egypt, December 2020*).

Breast cancer patients experience physical symptoms and psychological distress which can negatively affect their quality of life. The main purpose of different cancer treatments

is to improve the quality of life of the client either by curing or alleviating the adverse symptoms as much as possible. The quality of Life of patients with breast cancer is investigated in different studies mainly in developed countries (*Perry et al, 2007; Kulesza-Bronczyk et al, 2014*). However, there is a knowledge gap concerning the relationship between breast cancer and the quality of life among patients in Africa (*Tigeneh et al, 2015*).

Today, quality of life is considered a consequence of the treatment of diseases and is evaluated as a determining indicator. The physical domain is related to the mental evaluation of health and body performance status (e.g., pain, fatigue, incontinence) and the emotional domain includes mental performance including positive and negative indicators of mood (e.g., stress, and depression symptoms). Furthermore, emotional problems in the life of the individual can restrict her perception of

health and performance status of the body. Social domains generally include the effect of disease on socio-personal roles and the perception of social support in the individual (*Knobf, 2011; Yanez et al, 2011*).

Understanding the impact of breast cancer treatment on the QoL of patients is not only important for patients and their healthcare providers but also critical for policymakers to evaluate the cost-effectiveness of cancer treatments. There are several reasons for assessing QoL in cancer research and in clinical settings. Quality of Life is an important indicator in measurements of treatment outcome because the treatment can affect the patient's everyday life and can cause serious harm to the patient, which can outweigh the advantages it is supposed to give. Clinicians have become increasingly aware of the centrality of maintaining and improving the patient's QoL in the treatment of cancer (*van der Steeg et al, 2008*).

Research in the field of mobile learning is on the rise, mobile learning, as represented by the FRAME model (*Koole, 2009*), could be implemented, and sustained in independent nursing practice education settings. The Social Technology intersection describes how mobile devices enable communication and collaboration and raise health awareness (*Kenny et al, 2009*).

Community health nurses work at all levels in caring for breast cancer patients before and after surgical treatment, providing a continuum of service which starts with promoting health and awareness, and continues through to the specialist and expert work in settings that provide services to them including health centers, hospitals, and homes. Caring for breast cancer patients encompasses a wide range of medical and surgical procedures and also involves the psychological issues of trauma, separation, chronic pain, and repeated stressful therapeutic procedures. Nursing personnel contribute different skills as part of the multidisciplinary team; they have an important role to play in the physical and psychological care of breast cancer patients, as they have more contact with patients than any other member of the health team. Community health nurses play multidimensional roles beginning from prevention, early detection, diagnosis, management, and end-of-life care of breast

cancer patients after receiving special treatment (*Hariprasad et al, 2018; Cruickshank et al, 2008*).

#### **Significance of the study:**

Mastectomy is considered one of the advances in breast cancer treatment that aims to cure, prolong life and improve the quality of life for patients. The loss of a breast traumatically affects a woman's life and reflects negatively on her quality of life (*Shao et al, 2019*). Assessing the quality of life helps to consider women's problems more urgently and to reshape the techniques of treatment. Many studies conducted to assess factors affecting the quality of life among women with breast cancer treated by mastectomy and adjuvant therapy such as chemotherapy and radiotherapy but few studies concerning hormonal therapy treatment after mastectomy and its effect on women's quality of life. From this point of view, the researchers decided to conduct this research to recognize the factors that affect post-mastectomy women's quality of life to gain evidence-based data that can help for establishing health education interventions to enhance the quality of life among women after mastectomy. Mobile-Based Health Education is essential in the era of advanced technology use, which facilitates raising community awareness regarding the factors allied with post-mastectomy women's quality of life.

#### **Aims of the study**

##### **The current study aimed to**

1. Determine the aspects allied with quality of life among El-Beheira Governorate post-mastectomy women.
2. Assess the levels of women's satisfaction regarding mobile-based health education.

##### **Research Question:**

- What are the aspects allied with quality of life among El-Beheira Governorate post-mastectomy women?
- What are the levels of women's satisfaction regarding mobile-based health education?

##### **Theoretical and Conceptual Framework:**

- **Koole (2009)** wrote a book chapter entitled “A Model for Framing Mobile Learning” in “Mobile Learning: Transforming the Delivery of Education and Training Book”. **Koole** declared that mobile learning is characterized by the convergence of mobile technologies, human learning capacities, and social interaction, as described in the Framework for the Rational Analysis of Mobile Education (FRAME). Accordingly, pedagogical issues of information overload, knowledge navigation, and collaboration are addressed. It can serve as a guide for developing future mobile devices, designing learning materials, and designing teaching and learning strategies for mobile learning (Figure 1) (**Koole, 2009**).

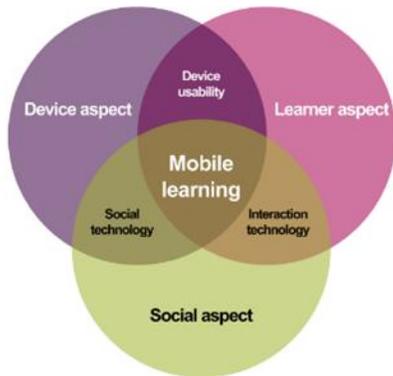


Figure (1) Koole’s FRAME Mobile Learning Framework (**Koole, 2009**)

In **Koole’s** model, the three circles represent three aspects: device (D), learner (L), and social (S). In intersections where two circles overlap, attributes from both aspects are present. Mobile technology’s affordances are described by the intersection of device usability (DL) and social technology (DS). The intersection labeled interaction learning (LS) contains instructional and learning theories based on social constructivism. Throughout the Venn diagram, all three aspects overlap at the primary intersection (DLS). Device Aspect (D) (**Figure 2**).

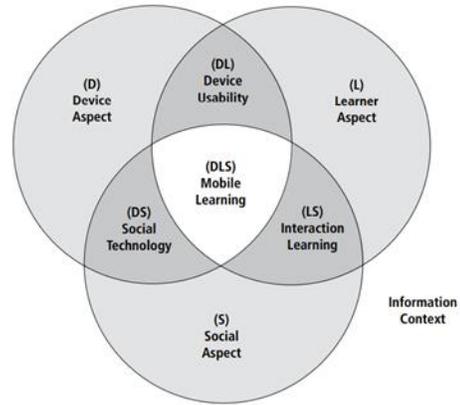


Figure (2) The Framework for the Rational Analysis of Mobile Education (FRAME) Model (**Koole, 2009**)

The FRAME Model Aspects:	Description
<b>D- Device Aspect</b>	The device aspect (D) refers to the physical, technical, and functional characteristics of mobile device. The hardware and software design of the devices affect the user’s physical psychological comfort levels.
<b>L- Learner Aspect</b>	Individuals’ cognitive abilities, memory, prior knowledge, emotions, and motivation considered as the learner aspect (L).
<b>S- Social Aspect</b>	Social interaction and cooperation are considered in the social aspect (S). To extend information, acquire knowledge, and sustain cultural practices, individuals must follow rules of cooperation.
<b>DL- Device Usability Intersection</b>	Both the device (D) and learner (L) aspects are represented in the intersection of device usability. The purpose of this section is to relate the characteristics of mobile device cognitive tasks related to manipulating and storing information. Cognitive load, inform access, and the ability to physically move between different locations can all affect a psychological comfort and satisfaction.
<b>DS- Social Technology Intersection</b>	While the device usability intersection in the FRAME model describes the relation between the learner and the device, the social technology intersection (DS) describes mobile devices enable communication and collaboration amongst multiple individual systems. Many mobile devices come equipped with various technical capabilities, such as short messaging service (SMS), telephony, and access to the Internet through wireless networks.
<b>LS- Interaction Learning Intersection</b>	The interaction learning intersection (LS) represents a synthesis of learning and instructional theories but relies very heavily upon the philosophy of social constructivism.
<b>DLS- Mobile Learning Process</b>	Effective mobile learning, the primary intersection of the FRAME model, results from integration of the device (D), learner (L), and social (S) aspects. Mobile learning promotes enhanced collaboration among learners, access to information, and a deeper contextualization of learning.

## SUBJECTS AND METHOD

### Materials:

### Study Design:

A descriptive research design was used to carry out this study.

**Study Setting:**

Damanhour Oncology Center (DOC) is located in Damanhour city in El-Beheira Governorate, Egypt. It provides outstanding work as a team in order to provide oncology services distinct in the treatment of tumors. The center targets, customer satisfaction, access healing rates to global proportions, raise the efficiency of the performance of employees at the center, and the improvement and development of the quality system. The services are not limited to Damanhour residents but also are provided to Elbeheira Governorate residents as well as Kafr El-Sheikh Governorate residents.

**Study Subjects:**

Women with a mastectomy who attend the previously mentioned setting and who fulfilled the following inclusion criteria:

- At reproductive age.
- Married and living with her husband.
- Has no history of chronic disease.
- Absence of any disability
- Conducted mastectomy surgery at least one month ago.
- Receiving hormonal therapy only.

**Sampling technique**

Non-probability sampling method was utilized to draw a convenient sample of 200 women who participated in the study.

**Sample size**

It was calculated by using Epi-info 7 sample size estimation software programs for a population of 350 women attending the oncology center/month according to the last year's recorded statistics, expected frequency of 50%, margin of error of 5%, confidence interval of 95%, creating a minimum sample size of 184 women.

**Tools of the study:**

Three tools were used to identify factors associated with the quality of life among women with post-mastectomy as well as their levels of satisfaction by mobile-based health education:

**Tool I: Women structured interview questionnaire sheet:**

This tool was developed by the researchers after reviewing the recent literature review. This tool includes the following two parts:

**Part I: Socio-Demographic Data:**

- This part consisted of questions asked about socio-demographic characteristics of women which include; age, occupation, education, residence, insurance, and type of family.
- Social class was assessed by using Family Socioeconomic Status Scale (SES). This scale was updated and validated by *Fahmy and El-Sherbini in 2015*. The total score was transferred into percentage and classified into three social classes as follow: <40% was considered low class, 40 % to <70% was medium class and  $\geq 70\%$  was considered high class

**Part II: Women's obstetric and breast cancer history:**

This part covered the following data: family history of breast cancer, menstrual history as the age of menarche, regularity of menstruation, obstetric history as gravida, para, use of oral contraceptive pills, women with breastfed (frequency, duration), history of current cancer as the stage of cancer, lymph node status, use of breast prosthesis.

**Tool II: WHO Quality of Life Assessment Instrument -100 (WHOQOL-100):**

The WHOQOL-100 was a comprehensive health-related QoL assessment scale that was defined by the *WHO Quality of Life Group (1995)*. It consisted of 100 questions reflecting six domains and facets as the following:

- 1- **Physical health domain:** included 3 facets; Pain and discomfort, Energy and fatigue, and Sleep and rest.
- 2- **Psychological Health domain:** included 5 facets; positive feelings, thinking and concentration, self-esteem, bodily image appearance, and negative feelings.
- 3- **Level of independence domain:** included 4 facets; mobility, activities of

daily living, dependence on medication, and work capacity.

- 4- **Social relationships domain:** included 3 facets; personal relationships, social support, and sexual activity.
- 5- **Environment domain:** included 8 facets; physical safety and security, home environment, financial resources, health and social care, opportunities for acquiring new information and skills, recreation/leisure, physical environment, and transport.
- 6- **Spirituality domain:** it was a single facet that contained spirituality/religion/personal beliefs questions such as do your personal beliefs give meaning to your life? to what extent do you feel your life is meaningful?

#### Scoring system:

- The WHOQOL domains contained 100 questions divided into 24 facets plus a general facet (Overall quality of life and general health questions): How would you rate your quality of life? how satisfied are you with the quality of your life? in general, how satisfied are you with your life? how satisfied are you with your health?
- Each question of the WHOQOL-100 had five answer choices on an ordinal Likert scale that included not at all (1), a little (2), a moderate amount (3), very much (4), and an extreme amount (5).
- All facets and domains scores were transformed to reflect a scale from 0-100 with higher scores denoting better quality of life.
- Facets are scored through summative scaling and then classified; as poor quality of life if the score was 0 - <50, fair quality of life if at 50- <75, and
- good quality of life at 50- <75.

#### Tool III: Women's Satisfaction regarding Mobile-Based Health Education Assessment Tool:

This tool was developed by the researchers after a thorough review of recent literature in order to assess the level of women's satisfaction regarding mobile-based health education using a three-point Likert scale

ranging from dissatisfied (0), partially satisfied (1), and satisfied (2). It includes three main sections.

**Section (I):** assesses the level of women's satisfaction regarding the effectiveness of mobile-based health education messages. It includes 7 questions regarding the healthy message's effectiveness such as the message's clarity, applicability, information, completeness and up to expectation, self-illustrative, easily run and recommended to others, and the pictures are well illustrative.

**Section (II):** assesses the level of women's satisfaction regarding the efficiency of mobile-based health education messages. It includes 3 questions regarding saving money, effort, and time.

**Section (III):** assesses the level of women's satisfaction regarding mobile-based health education interfaces. It includes 4 questions to assess if the interface is friendly-user, attractive, easy to use, and compatible with android and iOS (iPhone Operating System).

#### Methods:

The study was implemented according to the following steps:

#### Administrative process

- Official letter from the faculty of Nursing, at Damanhour University was directed to the director of the oncology center to take their permission for conducting the study after clarification of the research objective.
- Approval was obtained to collect the data from the selected outpatient clinics.

#### Validity and reliability of study tools:

- Tools I, II, and tool III were tested for validity by exposing them to a jury composed of five experts in the field of community health nursing (CHN), nursing education, medical-surgical nursing, and obstetric and gynecological

nursing for content validity. The experts' opinions & suggestions were taken into consideration and recommended modifications were done accordingly.

- Tools II and III were tested for reliability using the Cronbach Alpha test. Tool II had a reliability of ( $\alpha = 0.864$ ) and tool III had a reliability of ( $\alpha = 0.877$ ) which means that the tools were highly reliable

#### **Pilot study**

- A Pilot study was carried out on 10 % of the subject which was composed of 20 women who were chosen randomly and excluded from the study Later on in the study, some necessary modifications to questions were introduced as adding (Yes or No) to (physical, psychological and social) health problems associated with the illness (onset – duration-severity) those were introduced because not all women had the same health problems.

#### **Collection of data:**

##### **Three phases of data collection**

##### **Phase I: Assessment phase (which aimed to assess women's general characteristics as well as factors allied with their QoL using tools I and II)**

- The data collection process was carried out in the waiting area of the oncology center after the patient's follow-up appointment.
- The data was collected individually by interviewing every woman after a brief explanation of the purpose and the nature of the research in order to gain their cooperation and confidence.
- Establishment of confidence relationships with women was the first step done before data collection.
- Each interview took almost 40-60 minutes.
- Personal contact information was asserted (WhatsApp number, Telegram account, Instagram account, and or

messenger account), and the researchers clarified the importance of contact with the women to proceed to the implementation phase to deliver the mobile-based health education messages.

##### **Phase II: implementation phase (which aimed to deliver important health messages derived from the researcher's analysis of the allied factors affecting postmastectomy women QoL)**

- During this phase the researchers sent different health education messages to the studied women through the available social media contact. These messages are tailored based on the assessment phase covering the allied factors affecting the QoL's different domains.
- The main objectives of these messages are to raise awareness regarding postmastectomy care and raise women's health promotion activities affecting their QoL.
- High-quality video series and illustrative pics derived from well-known and officially approved health education media resources are used such as the World Health Organization (WHO), Egyptian Ministry of Health and population: 100 million Seha nationwide initiative, Baheya Foundation, Egypt, Zahra Breast Cancer Association, KSA, Fawzia Sultan Healthcare Network, Kuwait, Qatar Cancer Society.
- Arabic language healthy messages were included "postmastectomy discharge information, exercises, activity, wound care, pain management, follow-up, danger signs, and complications". The website links to the videos were sent to the studied women using their contact information.

Link examples	Source
<a href="https://www.youtube.com/watch?v=MSHHOYcYBKM">https://www.youtube.com/watch?v=MSHHOYcYBKM</a> <a href="https://www.youtube.com/watch?v=8Nqr_1WZ8N4">https://www.youtube.com/watch?v=8Nqr_1WZ8N4</a> <a href="https://www.youtube.com/watch?v=OwldLMFDoys">https://www.youtube.com/watch?v=OwldLMFDoys</a>	World Health Organization WHO Eastern Mediterranean Region
<a href="https://www.youtube.com/watch?v=qarsfS4T4">https://www.youtube.com/watch?v=qarsfS4T4</a> <a href="http://www.100millioncha.eu/page/p/%D8%B3%D8%B1%D8%B7%D8%A7%D9%86-%D8%A7%D9%84%D8%A8%D8%AF%D9%8A">http://www.100millioncha.eu/page/p/%D8%B3%D8%B1%D8%B7%D8%A7%D9%86-%D8%A7%D9%84%D8%A8%D8%AF%D9%8A</a>	Egyptian Ministry of Health and Population, 100 million Sustainable initiative
<a href="https://www.youtube.com/watch?v=Ddn5bklfY">https://www.youtube.com/watch?v=Ddn5bklfY</a> <a href="https://www.youtube.com/watch?v=0Wuv4G7RQ98">https://www.youtube.com/watch?v=0Wuv4G7RQ98</a> <a href="https://www.youtube.com/watch?v=a">https://www.youtube.com/watch?v=a</a> <a href="https://www.youtube.com/watch?v=XVnsCFGzo08">https://www.youtube.com/watch?v=XVnsCFGzo08</a> <a href="https://www.youtube.com/watch?v=WaOQAQ8MeI">https://www.youtube.com/watch?v=WaOQAQ8MeI</a>	Baheya Foundation, Egypt
<a href="https://www.youtube.com/watch?v=Lvh_CNuTok0">https://www.youtube.com/watch?v=Lvh_CNuTok0</a> <a href="https://www.youtube.com/watch?v=c01v66Xdt14">https://www.youtube.com/watch?v=c01v66Xdt14</a>	Zahra Breast Cancer Association, KSA
<a href="https://www.youtube.com/watch?v=3c3ev0v5G_8">https://www.youtube.com/watch?v=3c3ev0v5G_8</a>	Fawzia Sultan Healthcare Network, Kuwait
<a href="https://www.youtube.com/watch?v=G35_IHT6rnY">https://www.youtube.com/watch?v=G35_IHT6rnY</a>	Qatar Cancer Society

**Phase III: Evaluation phase** (which aimed to assess the levels of women's satisfaction regarding the delivered health education messages). Tool III was used.

Finally, data were collected over a period of 6 months (from July 2020 to December 2020).

#### Data processing and analysis:

- Data was entered into and analyzed using the statistical package of social science (IBM SPSS) version 23, and proper statistical tests were done to achieve the study objective.
- Multiple logistic regression factors to detect all predictors affecting the quality of life.
- Graphs were done for data visualization by using the Microsoft office excel program.

#### Ethical considerations

- Permission to conduct the study was obtained from the ethical committee in the faculty of nursing, at Damanshour University.
- Informed consent was obtained from each woman who participated in the study. Confidentiality and privacy of women's responses were maintained.

- Anonymity was guaranteed by using code numbers instead of names.

#### Results:

**Table (1)** shows that the age of the studied women ranged from less than 30 years to equal or less than 45 years with a Mean  $\pm$  SD ( $36.64 \pm 5.33$ ) years, more than one-third (37%) of them had secondary education. Also, the table shows that more than two-thirds (67.5%) of the studied women were housewives and concerning the residence more than half (60%) were living in rural areas and belonged to nuclear families. The majority (85%) of the studied women had no health insurance, and 56.5% of them belonged to nuclear families.

**Figure (3):** Distribution of the studied women according to their socioeconomic score. It reveals that, the highest percent of studied women (55%) belonged to medium social class, while (25%) of them were high class, and the rest of them (20%) belonged to the low class.

**Figure (4)** Distribution of the studied women according to their family history of cancer. It portrays that, the highest percent of the studied women (28.5%) had a family history of different types of cancer as colon, liver, lung, bone, and stomach. While exactly one-fifth (20.0%) of them had a family history of cancer in reproductive organs and one-tenth (10.0%) of them had a family history of breast cancer.

**Table (2):** Distribution of the studied women according to their menstrual and obstetric history: the table clarifies that two-fifths (38.0%) of the studied women began their menstruation at age of twelve to less than fourteen years. It is also observed from the table that, the majority (77.5%) of the studied women had irregular menstruation. The table shows that the majority (90%) of studied women had previous pregnancies, and about half (52.2%) of them had three deliveries or more. Also, the table indicates that (43.3%) were using family planning methods, and (47.2 %) of them used oral hormonal contraceptive pills. In addition. Regarding the breast cancer stages, more than half (55.0%) of studied women reached a stage (II), more than one-third (35.0%) at stage (I) and (10.0%) at stage (III).

**Figure (5)** Distribution of the studied women according to breast prosthesis use. The figure demonstrates that the majority (84.5%) of studied women didn't use the breast prosthesis and only (15.5%) of them were using it.

**Table (3)** Descriptive analysis of the studied women according to their scores of qualities of life: The table shows that environment and level of independence domains, received the highest scores with mean percent scores ranging from (53.82±12.39) and (53.23±8.34) respectively, followed by social relationships and psychological health domains with mean percent scores ranging from (52.09±12.65) and (50.0 ±14.46) respectively. On the other hand, the physical domain received the lowest percent score (45.24±16.07). In addition, the general quality of life and the spirituality domains were associated with lower QoL mean percent scores as well (48.88±18.47 and 47.28±18.70) respectively.

**Figure (6)** portrays that, more than half (56.0%) of the studied women had poor quality of life, while (42.0%) had a fair quality of life and only (2.0) had a good quality of life with a mean percent score of 51.27±10.75.

**Table (4)** Based on the findings, the model was statistically significant ( $P \leq 0.05$ ), in case of ( $P > 0.05$ ), they considered also factors affecting the quality of life among women undergoing hormonal therapy post-mastectomy, but their effect was found similar with each other that means they had a low effect on the quality of life among women undergoing hormonal therapy post-mastectomy, but cannot be ignored because they can be risk factors if combined with other factors.

According to the model, factor was considered a risk factor for the poor quality of life among women undergoing hormonal therapy post mastectomy if  $OR > 1$ , while If  $OR < 1$  these factors play as a protective factor for good QoL.

The most independent risk factors associated with poor QoL are women's education ( $OR = 4.545$ ,  $P = 0.017$ ) in which lower educated is more risk for poor QoL (4) fold than higher educated, monthly income ( $OR = 4.936$ ,  $P = 0.002$ ) in which not enough income is more risk for poor QoL (4) fold than who have enough income, using of family planning methods ( $OR = 6.431$ ,  $P = 0.001$ ) in which

Non-user is more at risk for poor QoL (6) fold than the user, stage (III) in which the tumor spread beyond the breast tissue, and reaches the lymph node near to chest bone ( $OR = 16.010$ ,  $P = 0.004$ ) is more risk for poor QoL (16) fold than other locations and the presence of sores in the breast skin ( $OR = 1.192$ ,  $P = 0.006$ ) in which women who had this signs are a risk for poor QoL (1) fold than other signs.

The most independent protective factors associated with good QoL are women's age ( $OR = 0.837$ ,  $P = 0.015$ ) in which old age is (80%) protective for good QoL than young age occupation ( $OR = 0.201$ ,  $P = 0.017$ ) in which worker women are (20%) protective factors associated with good QoL than non-worker, number of children ( $OR = 0.709$ ,  $P = 0.011$ ) in which women who have a higher number of children are (70.0%) protective for good QoL than women have a lower number of children.

**Table (5)** presents the distribution of the studied women according to their satisfaction regarding the message's effectiveness and efficiency and the quality of the mobile-based health education interface. The levels of women's satisfaction regarding the effectiveness of the mobile-based healthy messages, they ranked that the delivered message is informative, easily run and recommended to others, self-illustrative, clear, the message pics are well illustrative, complete and up to my expectation, and practical and applicable (83%, 83%, 82%, 79%, 74%, 72%, and 68% respectively). Regarding the efficiency of the mobile-based health education message, they described it as it saves their money, time, and effort (83%, 82%, and 81% respectively). Lastly, the studied women described that the interface is attractive, easy to use, user-friendly, and compatible with android and iOS (iPhone Operating Systems) (74%, 74%, 70%, and 69% respectively). Furthermore, figure (7) illustrates the total satisfaction levels of the studied women regarding mobile-based health education, where 82% were satisfied by the efficiency of the healthy messages followed by 77.3% who were satisfied by the effectiveness of the healthy messages, and 71.8% who satisfied by the message interface.

**Table (1): Distribution of the studied women according to their socio-demographic characteristics (n=200).**

Socio-demographic characteristics of women	No.	%
<b>Age (years)</b>		
< 30	25	12.5
30 –≤ 40	93	46.5
more than 40 years	82	41.0
Mean ± SD.	36.64 ± 5.33	
<b>Education</b>		
Illiterate	38	19.0
Basic education	32	16.0
Secondary education	74	37.0
University education	56	28.0
<b>Occupation</b>		
Housewife	135	67.5
Working	65	32.5
<b>Residence</b>		
Urban	80	40.0
Rural	120	60.0
<b>Presence of health insurance</b>		
Yes	30	15.0
No	170	85.0
<b>Type of family</b>		
Nuclear	113	56.5
Extended	87	43.5

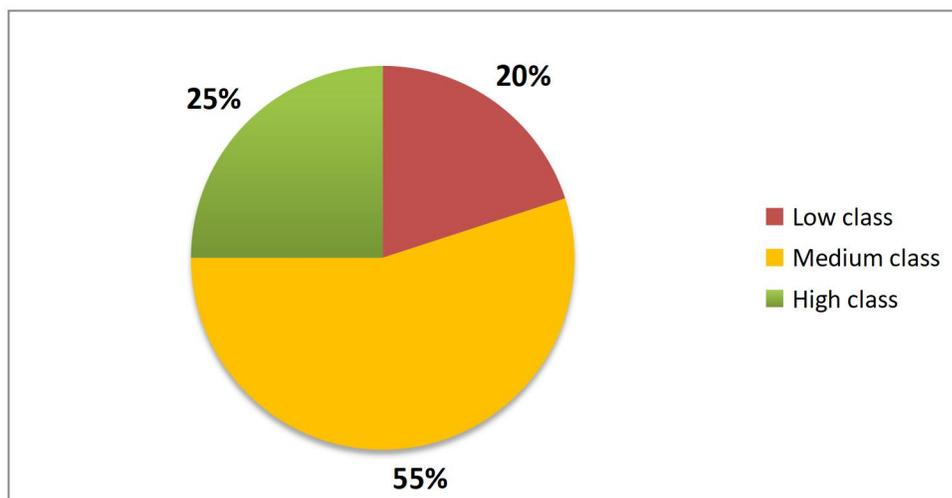


Figure (3): Distribution of the studied women according to their socioeconomic score.

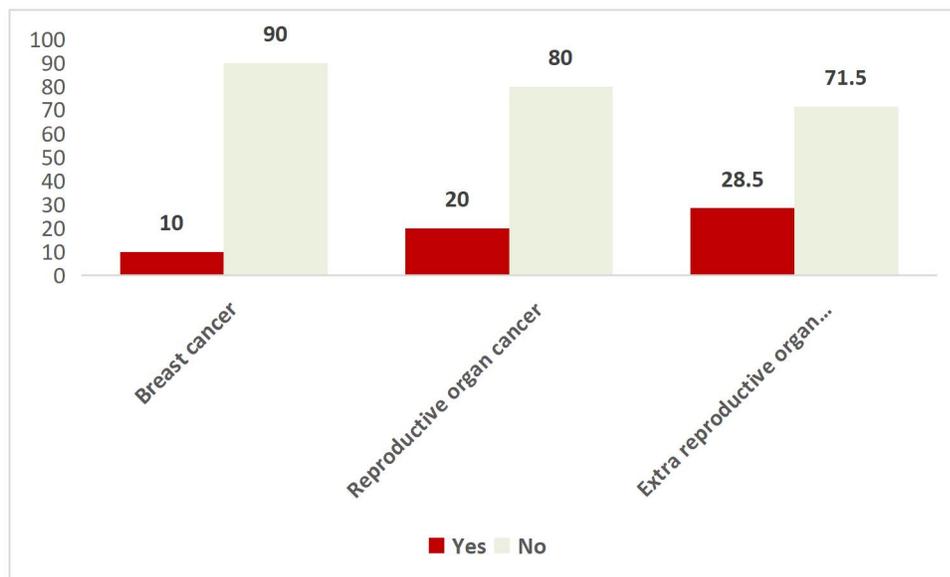


Figure (4): The family history of cancers among the studied women (n=200)

Table (2): Distribution of the studied women according to their menstrual and obstetric history (n.200)

Menstrual and Obstetric history	No.	%
<b>Age of menarche (Years)</b>		
- Less than 12	52	26.0
- 12 <14	76	38.0
- 14 <16	43	21.5
- 16+	29	14.5
<b>Regularity of menstruation</b>		
- Regular	45	22.5
- Irregular	155	77.5
<b>Previous pregnancy</b>		
- No	20	10.0
- Yes	180	90.0
<b>Number of deliveries(n=180)</b>		
- 1	32	17.8
- 2	54	30.0
- 3 or more	94	52.2
<b>Use of family planning methods (n=180)</b>		
- Yes	78	43.3
- No	102	56.7
<b>Previous use of oral hormonal contraceptive pills</b>		
- Yes	85	47.2
- No	95	52.8
<b>Breastfeeding (n=200)</b>		
- Yes	162	81.0
- No	38	19.0
<b>Stage of cancer</b>		
- Stage (I).	70	35.0
- Stage (II)	110	55.0

Menstrual and Obstetric history	No.	%
- Stage (III)	20	10.0

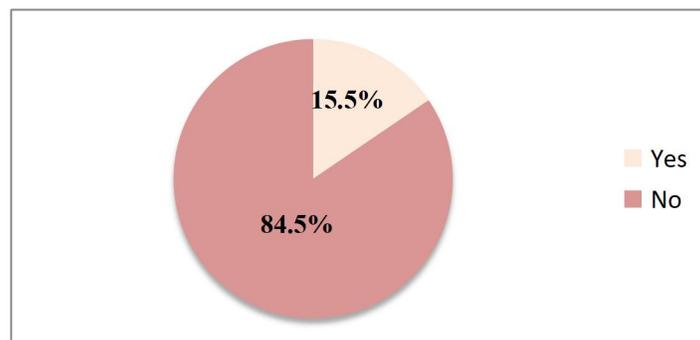


Figure (5): Using of prostheses among the studied women(n=200)

Table (3) Descriptive analysis of the studied women according to their scores of quality of life (n=200).

Quality of Life Assessment Instrument	Total Score	% Score
	Mean $\pm$ SD.	Mean $\pm$ SD.
- General Quality of life	11.82 $\pm$ 2.95	48.88 $\pm$ 18.47
- Physical health	33.72 $\pm$ 7.72	45.24 $\pm$ 16.07
- Psychological health	60.0 $\pm$ 11.56	50.0 $\pm$ 14.46
- Level of independence	50.07 $\pm$ 5.34	53.23 $\pm$ 8.34
- Social relationships	37.01 $\pm$ 6.07	52.09 $\pm$ 12.65
- Environment	100.90 $\pm$ 15.86	53.82 $\pm$ 12.39
- Spirituality	11.57 $\pm$ 2.99	47.28 $\pm$ 18.70
Overall Quality of life	305.07 $\pm$ 43.01	51.27 $\pm$ 10.75

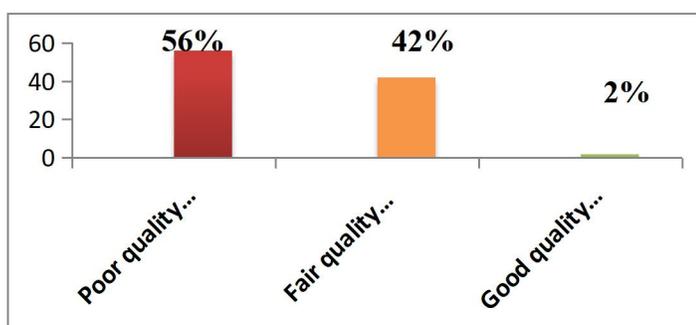


Figure (6) Distribution of the studied women according to their levels of quality of life (n=200)

Table (4) Multivariate analysis logistic regression for factors affiliated with quality of life among post-mastectomy women

Factors Allied with quality of life among post-mastectomy women	P	OR	95% C.I	
			L.L	U.L
Age (years) (Old age)	0.015*	0.837	0.725	0.965
Education (Lower education)	0.017*	4.545	1.310	15.776
Occupation (Worker)	0.017*	0.201	0.054	0.753
Number of children (Higher number)	0.011*	0.709	0.544	0.923
Monthly income (Enough)	0.002*	4.936	1.822	13.373
Use of family planning methods (n=180) (non-User)	0.001*	6.431	2.189	18.897
The presence of sores in the breast skin.	0.006*	1.192	0.059	0.621

Factors Allied with quality of life among post-mastectomy women	P	OR	95% C.I	
			L.L	U.L
Stages of cancer (Stage III)	0.004*	16.010	2.479	103.404
<b>Time of mastectomy surgery:</b>				
- Less than 1 y	0.206	2.961	0.550	15.945
- 1-<2 y	0.078	4.123	0.854	19.904
<b>Hormonal therapy treatment time:</b>				
- 3 years	0.142	3.526	0.657	18.924
- 5 years	0.703	1.355	0.285	6.443
Using of breast prosthesis	0.326	0.493	0.120	2.023

OR: Odds ratio CI: Confidence interval LL: Lower limit UL: Upper Limit  
 @: reference group \*: Statistically significant at  $p \leq 0.05$

**Table (5) Distribution of The Studied Women According To Their Levels of Satisfaction Regarding the Message's Effectiveness And Efficiency And The Quality Of The Mobile-Based Health Education Interface**

Satisfaction domains	Dissatisfied		Partially satisfied		Satisfied	
	No.	%	No.	%	No.	%
<b>Level of women's satisfaction regarding the effectiveness of mobile-based education messages:</b>						
The message is informative.	8	4.0	26	13.0	166	83.0
The message is easily run and recommended to others.	12	6.0	22	11.0	166	83.0
The message is self-illustrative.	16	8.0	20	10.0	164	82.0
The message is clear.	16	8.0	26	13.0	158	79.0
The message pics are well illustrative.	8	4.0	44	22.0	148	74.0
The message is complete and up to my expectation.	18	9.0	38	19.0	144	72.0
The message is practical and applicable.	8	4.0	56	28.0	136	68.0
<b>Level of women's satisfaction regarding the efficiency of mobile-based education messages:</b>						
It saves money.	23	11.5	11	5.5	166	83.0
It saves time.	10	5.0	26	13.0	164	82.0
It saves effort.	10	5.0	26	13.0	162	81.0
<b>Level of women's satisfaction regarding the quality of the mobile-based education interface:</b>						
It is attractive.	10	5.0	42	21.0	148	74.0
It is easy to use.	8	4.0	44	22.0	148	74.0
It is user-friendly.	12	6.0	48	24.0	140	70.0
It is compatible with android and iOS ( iPhone Operating System).	8	4.0	54	27.0	138	69.0

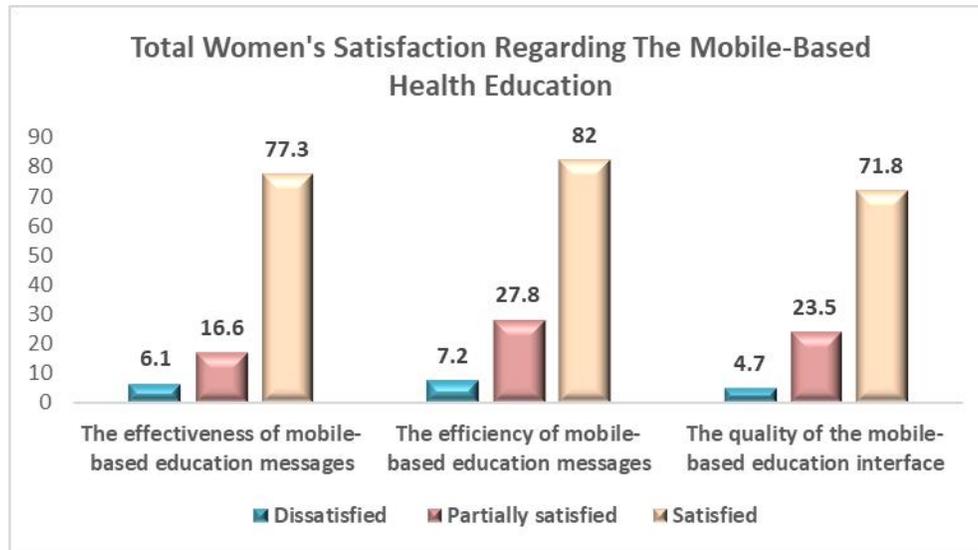


Figure (7) Total Women's Satisfaction regarding The Effectiveness of Mobile-Based Education Messages

## DISCUSSION

In the current study results, the mean age of studied women was  $36.64 \pm 5.33$ , which reflects their young age of them. The current result is consistency with *Center for disease control and prevention (CDC), 2021* which reported that nine percent of all new cases of breast cancer in the United States are in women younger than 45 years. As well, the study conducted in Egypt by *Farouk et al, 2016* found the age ranged between 21 and 35 years and the mean age was  $31 \pm 3$  years among the participants of their study. on the other hand, this result disagrees with the study of *Konieczny et al, 2020* who found the average age of women enrolled in their study was 52.4 (SD = 13.7) years. Also, according to the *National Cancer Institute, in 2019* female breast cancer is most frequently diagnosed in women ages 65 to 74. In addition, the study by *Moey et al, 2020*, found most of the respondents were in the age group of 35 to 40 years.

In the current study, more than half of the studied women were housewives, had a middle socioeconomic class, and belonged to rural areas. As well, the majority of them had no insurance coverage. All of these data reflect a lack of access to healthcare facilities, poor quality of healthcare, and late diagnosis and treatment. These results in the same vein as *Sealy-Jefferson et al, 2019; Moss et al, 2019* who indicated that rural populations face higher levels of poverty, and lack access to insurance and healthcare resources, because of these factors, individuals in rural communities are vulnerable to higher levels of cancer mortality. Also, *Bolin et al, 2020* referred to that, rural communities face deeply rooted challenges not only due to their geographic

location, but also due to racial-ethnic, economic, and healthcare system factors. In contrast with the current study result, the report of *Cancer Atlas of India, 2010* indicated that developing countries show a higher incidence of breast cancer in urban than in rural areas, a pattern that has not been fully explained.

The present findings indicated that the highest percentage of the studied women had a family history of different types of cancer as colon, liver, lung, bone, and stomach. This result is in accordance with the study in China by *Zhou et al, 2014* who found breast cancer aggregates in families with several types of cancer, especially digestive system cancer.

The current study results indicated that one-fifth of studied women had a family history of cancer in reproductive organs and one-tenth of them had a family history of breast cancer which reflects the role of family history in the occurrence of breast cancer. In consistency with the current study result, *Moey et al, 2020* found positive family history of breast cancer among 12.3% of their participants' study. Also, these findings are in accordance with the *CDC, 2021* which mentioned that a woman's risk for breast cancer is higher if she has a mother, sister, or daughter (first-degree relative) or multiple family members on either her mothers or fathers' side of the family who has had breast or ovarian cancer. On the same line, *Breast Cancer Organization, 2021* indicated that women with close relatives who've been diagnosed with breast cancer have a higher risk of developing the disease.

The present study results revealed that two-fifths of the studied women started their menstruation at age of 12 to less than 14 years while more than one-quarter of them started menstruation at the age

below 12 years, which reflects the early menarche among them. These results agree with a study conducted in Morocco by *Khalis et al, 2018* who found women who reached menarche at age  $\leq 13$  years had a significantly higher risk of breast cancer, compared with women who reached menarche after age 13 years. In consistence with the current results the *CDC, 2021* mentioned that starting menstrual periods before age 12 and starting menopause after age 55 expose women to hormones longer, raising their risk of getting breast cancer.

Nearly half of the studied women in the current study had a previous history of using oral contraceptive pills, which reflects the risk factor role of hormonal contraception in getting breast cancer. This result is consistence with the study of *Beaber et al, 2014* who found the use of a recent combined oral contraceptive was associated with a 50% increase in breast cancer compared with never use. As well, *Morch et al, 2017* found that, compared with women who had never used hormonal contraception, the relative risk of breast cancer in current or recent users was increased.

In relation to the stages of breast cancer, more than half of the studied women in the current study reached stage (II) of cancer, and a tenth of them reach stage (III) which reflects the rationale of mastectomy that was performed among them. *American Cancer Society, 2021* supports the current study result and mentioned that most women with breast cancer in stages I, II, or III are treated with surgery, often followed by adjuvant therapy.

Surprisingly, the majority of the studied women in the present study result didn't use breast prostheses, which may be attributed to a lack of motivation and awareness among them or may be due to the cost of the prosthesis. This result at the same point of view of *Fallbjörk et al, 2013* who mentioned that most women with breast cancer after mastectomy do not think of any prosthesis or reconstruction due to fear of recurrence of the disease, society, and because of poor economic status. As well, the study of *Ramu et al, 2015* found more than half of the women in their study were not using any type of prosthesis. In contrast with the current study result of *Włodzisław and Michał, 2021* that found half of the study group felt good wearing a breast prosthesis and used and accepted it. The majority of women who wore and accepted a breast prosthesis believed that the prosthesis improved their quality of life, however, it may be due to different cultures, education, economic state, and sample size of the study.

Concerning the quality-of-life domains, the current study indicates that the environment and level of independence domains received the highest scores of quality-of-life followed by social relationships and

psychological health domains. It may be attributed to most of the women being housewives, married, and having children, which reflects the positive family support role and psychological satisfaction. Also, they were from rural areas which reflects the positive social network relationships, easy request of help, and no exposure to urban overcrowding, and pollution hazards. As well, as limited mobility and activity to household activity. These findings are in accordance with the study of *Barry et al, 2009* who found those living in rural areas reported a greater ability to get both practical help and personal support from neighbors than those living in urban areas. As well as, *Cahir, et al, 2017* found that post-mastectomy women living in rural areas had significantly higher emotional and overall QoL and experienced a lower endocrine symptom burden than those living in urban areas.

On the other hand, the present study results indicated that more than half of the studied women had poor quality of life, especially in the physical and spiritual health domains which reflects the negative consequences (physically and psychologically) of mastectomy surgery. However, these results with in accordance with *Hashemi et al, 2019* who revealed that fewer than one-third of patients (21%) had good QoL. As well, the study of *Araújo Neto et al, 2017* found the lowest score of quality of life observed among women in their study was for the physical domain. Also, the study results of *Türk and Yılmaz, 2018* showed that mastectomy has a negative impact on body image and QoL of women. Also, the study of *Kuliński and Kosno, 2021* found mastectomy affects the ipsilateral upper limb function of women and causes difficulty with activities of daily living, such as cleaning, cooking, brushing hair, bathing, and dressing.

In the same vein as the present result, *Breitbart, 2005* study investigated the spiritual/existential needs of breast cancer patients from the USA and showed that these patients wanted help with overcoming fears finding hope, finding meaning in life, finding spiritual resources, or someone to confide with about finding peace of mind, the meaning of life, and dying and death. Along the same line *Lee et al, 2006* interviewed almost 300 breast cancer patients and found that many patients needed help to find hope and meaning in their lives. These patients are also concerned with issues that caused the most "existential suffering" such as dependency, meaninglessness, hopelessness, being a burden on others, loss of social role, and feeling irrelevant. Also, most women's mastectomies for breast cancer presented spiritual well-being and quality of life as "little or regularly compromised" in the study by *Alvarado et al, 2019*.

The present study revealed that the most independent risk factors associated with poor QoL among post-mastectomy women were low income and low education which reflects a lack of awareness, and access to health care. These results are in the same vein as *Kiadaliri et al, 2012* study who found that having a higher level of education was associated with better HRQoL. Also, the study of *Ahrafzadeh et al, 2017* revealed that having low income, and financial difficulties adversely affected HRQoL among breast cancer women.

Also, the current results indicated that using family planning methods was associated with poor quality of life, it may be due to the more than half were using oral contraceptive pills which influenced their quality of life. These results are in accordance with the study of *Alyahya et al, 2019* which revealed that women who used Intra Uterine Devices and women whose husbands' used condoms had better QoL in the four domains (physical health, psychological health, social relationships, and environment) than those who used Oral Contraceptives. As well, the study of *Shah et al, 2018* found that contraceptive pills is an independent risk factor for QOL in females.

Stage III cancer and the presence of sores in the breast skin also were associated with poor quality of life among the studied women of the current study, it may be attributed to the fear of recurrence, fear of death, and low body image. In the same line *Boquiren et al, 2013* indicated that body image disturbance following the treatment of cancer may be associated with a variety of changes that can have a significant impact on quality of life. In the same vein as the current result the study of *Cohee et al, 2015* found the fear of cancer recurrence is one of the most common and aversive psychological phenomena among breast cancer patients.

The current study results also, indicated that the most independent protective factors associated with good QoL among post-mastectomy women were old age, working, and the increasing number of children, which may be attributed to the feeling of economic safety and achieving the reproductive role among the women. In the same line as the current result, the study conducted in Iran by *Ahmad Kiadaliri et al, 2012* revealed that being employed, and having children were factors found to be associated with better HRQoL. Also, these results agree with the result of the study conducted in Saudi Arabia by *Ahmed, et al. 2017* study which reported a negative association between age and HRQoL among breast cancer women.

Finally, the current study revealed that around three-quarters of the studied women were satisfied by the mobile-based health education that

might affect the quality of life of these women later. This finding goes in line with the results of *El-husseiny et al 2020* who studied the effects of mobile-based education versus booklet-based education on mothers' knowledge and practice toward their children with bronchial asthma and concluded that mobile-based education was more effective than booklet-based education. Therefore, community health nurses must recommend the use of mobile-based education health education to raise public awareness and improve their quality of life.

## CONCLUSION

Based on the findings of the present study, it could be concluded that:

- Quality of life of post-mastectomy women on hormonal therapy may be positively affected in the domains of environment, level of independence, social support, and psychological health domains. Otherwise, it may affect negatively affected on physical and spiritual health domains
- Women's education, monthly income, use of family planning methods, and stage (III) of breast cancer were the most independent risk factors associated with poor QoL. On the other hand, women's age, occupation, and number of children was the most independent protective factors associated with good QoL.
- Around three-quarters of the studied women were satisfied by mobile-based health education.

## RECOMMENDATIONS

Based on the current study findings the following recommendations are proposed:

- 1- Mobile-based health education must be intensified to raise public awareness and raise their QoL.
- 2- Health education intervention to improve the quality of life of post-mastectomy women focuses on the physical and spiritual health domains.
- 3- Community health screening campaigns should be carried out for high-risk women both in urban and rural areas. Appropriate referral should be done based on the screening results.
- 4- Future research to compare factors affecting the quality of life among post-mastectomy women taking different types of adjuvants treatment, chemotherapy, radiotherapy, and hormonal therapy

**Ethical approval and consent to participate**

The Ethics Committee of the Faculty of Nursing, Damanhour University approved this study.

**Human and animal rights**

No animals were used in this research. All human research procedures were followed under the ethical standards of the committee responsible for human experimentation.

**Consent for publication**

Informed consent has been obtained from all the participants.

**Funding**

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**Conflict of interest**

The authors declare no conflict of interest or otherwise.

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**REFERENCES:**

- Alvarado MG, Estrada MCO, Romero MGH, et al. Spiritual well-being and quality of life in advanced age women post-mastectomy for breast cancer operated. *Nurse Care Open Acces J.* 2019;6(1):35-40. [DOI: 10.15406/ncoaj.2019.06.00180](https://doi.org/10.15406/ncoaj.2019.06.00180)
- American Cancer Society. (2021). Treatment of breast cancer stages I-III. <https://www.cancer.org/cancer/breast-cancer/treatment/treatment-of-breast-cancer-by-stage/treatment-of-breast-cancer-stages-i-iii.html>
- Ahmad Kiadaliri, A., Bastani, P., & Ibrahimipour, H. (2012). Health-related quality of life of breast cancer patients in Iran: pooled analysis using generalized estimating equations. *Asian Pacific journal of cancer prevention : APJCP*, 13(3), 941–944. <https://doi.org/10.7314/apjcp.2012.13.3.941>
- Alyahya, M.S., Hijazi, H.H., Alshraideh, H.A. et al. Do modern family planning methods impact women's quality of life? Jordanian women's perspective. *Health Qual Life Outcomes* 17, 154 (2019). <https://doi.org/10.1186/s12955-019-1226-6>
- Ahrafizadeh H., Fayazi S., Kord Z., Farokhpayam M., Farokhpayam H., Kiyani B. (2017). The survey quality of life and its related factors among patients with breast cancer who referred to golestan & amp, Shefa hospitals in ahvaz 2014. *Indo Am. J. Pharm. Sci.* 2017;4:1072–1078. [10.5281/zenodo.579775](https://doi.org/10.5281/zenodo.579775)
- Ahmed, A. E., Alharbi, A. G., Alsadhan, M. A., Almuzaini, A. S., Almuzaini, H. S., Ali, Y. Z., & Jazieh, A. R. (2017). The predictors of poor quality of life in a sample of Saudi women with breast cancer. *Breast cancer (Dove Medical Press)*, 9, 51–58. <https://doi.org/10.2147/BCTT.S125206>
- Beaber, E. F., Buist, D. S., Barlow, W. E., Malone, K. E., Reed, S. D., & Li, C. I. (2014). Recent oral contraceptive use by formulation and breast cancer risk among women 20 to 49 years of age. *Cancer research*, 74(15), 4078–4089. <https://doi.org/10.1158/0008-5472.CAN-13-3400>
- Bolin, J. N., Bellamy, G. R., Ferdinand, A. O., Vuong, A. M., Kash, B. A., Schulze, A., & Helduser, J. W. (2020). Rural Healthy People 2020: New Decade, Same Challenges. *The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association*, 31(3), 326–333. <https://doi.org/10.1111/jrh.12116>
- Breast cancer organization. (2021). Breast Cancer <https://www.breastcancer.org/risk/risk-factors/family-history>
- Barry M.M., Van Lente E., Molcho M., Morgan K., McGee H., Conroy R.M., Watson D., Shelley E., Perry I. SLAN. (2007). Survey of Lifestyle, Attitudes and Nutrition in Ireland. Mental Health and Social Well-Being Report. Department of Health and Children; Dublin, Ireland: 2009. [https://www.ucd.ie/t4cms/slan\\_wellbeing\\_report.pdf](https://www.ucd.ie/t4cms/slan_wellbeing_report.pdf)
- BREITBART, W. (2005). Balancing life and death: Hope and despair. *Palliative and Supportive Care*, 3(1), 57-58. <https://doi.org/10.1017/S1478951505050108>
- Boquiren, V. M., Esplen, M. J., Wong, J., Toner, B., & Warner, E. (2013). Exploring the influence of gender-role socialization and objectified body consciousness on body image disturbance in breast cancer survivors. *Psycho-oncology*, 22(10), 2177–2185. <https://doi.org/10.1002/pon.3271>
- Cahir, C., Thomas, A. A., Dombrowski, S. U., Bennett, K., & Sharp, L. (2017). Urban-Rural Variations in Quality-of-Life in Breast Cancer Survivors Prescribed Endocrine Therapy. *International journal of environmental research and public health*, 14(4), 394. <https://doi.org/10.3390/ijerph14040394>

- Center for disease control and prevention (CDC). (2021). Available at: breast cancer in young women. [https://www.cdc.gov/cancer/breast/young\\_women/bringyourbrave/breast\\_cancer\\_young\\_women/index.htm](https://www.cdc.gov/cancer/breast/young_women/bringyourbrave/breast_cancer_young_women/index.htm)
- Cancer Atlas of India. (2010). National Cancer Registry Program. India: Url: [https://canceratlasindia.org/chapter3\\_1.htm](https://canceratlasindia.org/chapter3_1.htm)
- Center for disease control and prevention. (2021). breast cancer: what are the risk factors of breast cancer? [https://www.cdc.gov/cancer/breast/basic\\_info/risk\\_factors.htm](https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm)
- Cohee, A. A., Adams, R. N., Johns, S. A., Von Ah, D., Zoppi, K., Fife, B., Monahan, P. O., Stump, T., Cella, D., & Champion, V. L. (2017). Long-term fear of recurrence in young breast cancer survivors and partners. *Psycho-oncology*, 26(1), 22–28. <https://doi.org/10.1002/pon.4008>
- Araújo Neto, E. A., Alves, B. C. A., Gehrke, F. S., Azzalis, L. A., Junqueira, V. C. B., Sousa, L. V. A., Adami, F., & Fonseca, F. L. A. (2017). Quality of Life of Post-Mastectomy Women Living in a Semi-Arid Region of Brazil. *International journal of environmental research and public health*, 14(6), 601. <https://doi.org/10.3390/ijerph14060601>
- El-husseiny, HAS, Kamal, FE, El emam, FEH, Garf, FSA, Abd-Allah, RM. (2020). Effect of Mobile-Based Education versus Booklet-Based Education on Mothers' Knowledge and Practice towards their Children with Bronchial Asthma. *Egyptian Journal of Health Care*, 2020 EJHC Vol.11 no.1. [10.21608/EJHC.2020.204766](https://doi.org/10.21608/EJHC.2020.204766)
- Fahmy, S. I., Nofal, L. M., Shehata, S. F., El Kady, H. M., & Ibrahim, H. K. (2015). Updating indicators for scaling the socioeconomic level of families for health research. *The Journal of the Egyptian Public Health Association*, 90(1), 1–7. <https://doi.org/10.1097/01.EPX.0000461924.05829.93>
- Farouk, O., Ebrahim, M. A., Senbel, A., Emarah, Z., Abozeed, W., Seisa, M. O., Mackisack, S., Abdel Jalil, S., & Abdelhady, S. (2016). Breast cancer characteristics in very young Egyptian women  $\leq 35$  years. *Breast cancer (Dove Medical Press)*, 8, 53–58. <https://doi.org/10.2147/BCTT.S99350>
- Fallbjörk, U., Rasmussen, B. H., Karlsson, S., & Salander, P. (2013). Aspects of body image after mastectomy due to breast cancer - a two-year follow-up study. *European journal of oncology nursing : the official journal of European Oncology Nursing Society*, 17(3), 340–345. <https://doi.org/10.1016/j.ejon.2012.09.002>
- Hariprasad R, Arora S, Babu R, Sriram L, Sardana S and Mehrotra R. (2018). Retention of knowledge levels of health care providers in cancer screening through telementoring. *J Glob Oncol*.2018; (4): 1-7. <https://ascopubs.org/doi/full/10.1200/JGO.18.00048>
- Hashemi S M, Balouchi A, Al-Mawali A, Rafiemanesh H, Rezaie-Keikhaie K, Bouya S, Dehghan B., Farahani M.A. (2019). Health-related quality of life of breast cancer patients in the Eastern Mediterranean region: A systematic review and meta-analysis. *Breast Cancer Res. Treat.* 2019;174:585–596. <https://link.springer.com/article/10.1007/s10549-019-05131-0>
- Kulesza-Bronczyk, B., Dobrzycka, B., Piekut, K., Terlikowski, R., Mackowiak-Matejczyk, B., Wojno, A., Terlikowski, SJ. (2014). Quality Of Life During First Year After Breast Cancer Resection. *Progress In Health Science journal*.2014;4(1):124. DOI:10.5539/Gjhs.V3n2p140. <http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-3381f4e9-20de-413e-99ad-84b2901e39d4>
- Koole, M. L. (2009). A model for framing mobile learning. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training*. Athabasca, AB: Athabasca University Press. [https://www.researchgate.net/publication/252714629\\_A\\_Model\\_for\\_Framing\\_Mobile\\_Learning](https://www.researchgate.net/publication/252714629_A_Model_for_Framing_Mobile_Learning)
- Kenny, RF., Van Neste-Kenny, JM.C., Park, CL., Burton, PA., Meiers, J. (2009). Mobile Learning in Nursing Practice Education: Applying Koole's FRAME Model. *JOURNAL OF DISTANCE EDUCATION REVUE DE L'ÉDUCATION À DISTANCE* 2009 VOL. 23, No. 3, 75-96. <https://files.eric.ed.gov/fulltext/EJ865348.pdf>
- Knobf M. T. (2011). Clinical update: psychosocial responses in breast cancer survivors. *Seminars in oncology nursing*, 27(3), e1–e14. <https://doi.org/10.1016/j.soncn.2011.05.001>
- Cruickshank, S., Kennedy, C., Lockhart, K., Dossier, I., & Dallas, L. (2008). Specialist breast care

- nurses for supportive care of women with breast cancer. *The Cochrane database of systematic reviews*, (1), CD005634. <https://doi.org/10.1002/14651858.CD005634.pub2>
- Konieczny M, Cipora E, Sygit K, Fal A. Quality of Life of Women with Breast Cancer and Socio-Demographic Factors. *Asian Pac J Cancer Prev*. 2020 Jan 1;21(1):185-193. doi: 10.31557/APJCP.2020.21.1.185. PMID: 31983183; PMCID: PMC7294011. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7294011/>
- Kuliński, W., & Kosno, M. (2021). QUALITY OF LIFE IN WOMEN AFTER MASTECTOMY. CLINICAL AND SOCIAL STUDY. *Wiadomosci lekarskie (Warsaw, Poland : 1960)*, 74(3 cz 1), 429–435. <https://pubmed.ncbi.nlm.nih.gov/33813445/>
- Khalis M , Barbara C,Véronique C,Sabina R, Aurélie M, Carine B,Laure D, Inge H, Emmanuel F, Nawfel M, Samira E, Hafida C, Chakib N, Isabelle R, Karima E. (2018). Menstrual and reproductive factors and risk of breast cancer: A case-control study in the Fez region, Morocco. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.019133>
- Türk, K. E., & Yılmaz, M. (2018). The Effect on Quality of Life and Body Image of Mastectomy Among Breast Cancer Survivors. *European journal of breast health*, 14(4), 205–210. <https://doi.org/10.5152/ejbh.2018.3875>
- Lee, S. J., Schover, L. R., Partridge, A. H., Patrizio, P., Wallace, W. H., Hagerty, K., Beck, L. N., Brennan, L. V., Oktay, K., & American Society of Clinical Oncology (2006). American Society of Clinical Oncology recommendations on fertility preservation in cancer patients. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*, 24(18), 2917–2931. <https://doi.org/10.1200/JCO.2006.06.5888>
- Moey S-F M, Aaina M A M, Norfariha C M and Nursyahirah S. (2020). The relationship of socio-demographic characteristics and knowledge of breast cancer on stage of behavioral adoption of breast self-examination. *AIMS Public Health*, 7(3): 620–633. <http://www.aimspress.com/journal/aimspub>
- Moss, J. L., Ehrenkranz, R., Perez, L. G., Hair, B. Y., & Julian, A. K. (2019). Geographic disparities in cancer screening and fatalism among a nationally representative sample of US adults. *Journal of epidemiology and community health*, 73(12), 1128–1135. <https://doi.org/10.1136/jech-2019-212425>
- Mørch L S, Skovlund CW, Hannaford P C, Iversen L, Fielding S, Lidegaard Ø. (2017) Contemporary hormonal contraception and the risk of breast cancer. *N Engl J Med*. 2017;377:2228-2239. <https://www.nejm.org/doi/full/10.1056/nejmoa1700732>
- National cancer institute. (2019) Cancer stat facts: female breast cancer. Available at: <https://seer.cancer.gov/statfacts/html/breast.html>
- Perry S, Kowalski TL, Chang CH. Quality of life assessment in women with breast cancer: benefits, acceptability and utilization. *Health Qual Life Outcomes*. 2007 May 2;5:24. doi: 10.1186/1477-7525-5-24. PMID: 17474993; PMCID: PMC1877797. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1877797/>
- R Ramu, D., Ramesh, R. S., Manjunath, S., Shivakumar, Goel, V., Hemnath, G. N., & Alexander, A. (2015). Pattern of External Breast Prosthesis Use by Post Mastectomy Breast Cancer Patients in India: Descriptive Study from Tertiary Care Centre. *Indian journal of surgical oncology*, 6(4), 374–377. <https://doi.org/10.1007/s13193-015-0456-2>
- Shah R, Kiriya J, Shibamura A, Jimba M. Use of modern contraceptive methods and its association with QOL among Nepalese female migrants living in Japan. *PLoS One*. 2018 May 16;13(5):e0197243. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5955577/>
- Sealy-Jefferson, S., Roseland, M. E., Cote, M. L., Lehman, A., Whitsel, E. A., Mustafaa, F. N., Booza, J., & Simon, M. S. (2019). Rural-Urban Residence and Stage at Breast Cancer Diagnosis Among Postmenopausal Women: The Women's Health Initiative. *Journal of women's health (2002)*, 28(2), 276–283. <https://doi.org/10.1089/jwh.2017.6884>
- van der Steeg, A. F., De Vries, J., & Roukema, J. A. (2008). The value of quality of life and health status measurements in the evaluation of the well-being of breast cancer survivors. *European journal of surgical oncology : the journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology*, 34(11),

- 1225–1230.  
<https://doi.org/10.1016/j.ejso.2007.10.009>
- Shao, J., Rodrigues, M., Corter, A. L., & Baxter, N. N. (2019). Multidisciplinary care of breast cancer patients: a scoping review of multidisciplinary styles, processes, and outcomes. *Current oncology (Toronto, Ont.)*, 26(3), e385–e397.  
<https://doi.org/10.3747/co.26.4713>
- Tigeneh, W., Molla, A., Abreha A. , Assefa, M. (2015). Pattern of cancer in tikuranbessa specialised hospital oncology center in ethiopia from 1998-2010.in journal cancer res mol.tech.2015; (103):2381-3318. DOI:http://dx.doi.org/10.16966.  
<https://www.sciforschenonline.org/journals/cancer-research/IJCRMM-1-103.php>
- World Health Organization. (2021). Breast cancer: international agency for research in cancer 2021. [Cited 26 March 2021]. Available from: <https://www.who.int/news-room/factsheets/detail/breast-cancer>
- World Health Organization, International Agency for Research on Cancer: Egypt. (December 2020). Accessed March 5, 2021. Available from: <https://gco.iarc.fr/today/data/factsheets/populations/818-egypt-fact-sheets.pdf>
- World Health Organization quality of life Group (WHOQOL group). (1995). The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization, Social Science & Medicine, Volume 41, Issue 10,1995, Pages 1403-1409, ISSN 0277-9536, [cited 2019 Oct 19] Available from: [https://doi.org/10.1016/0277-9536\(95\)00112-K](https://doi.org/10.1016/0277-9536(95)00112-K)
- Yanez, B., Thompson, E. H., & Stanton, A. L. (2011). Quality of life among Latina breast cancer patients: a systematic review of the literature. *Journal of cancer survivorship : research and practice*, 5(2), 191–207.  
<https://doi.org/10.1007/s11764-011-0171-0>
- Zhou, W., Ding, Q., Pan, H. *et al.* Risk of breast cancer and family history of other cancers in first-degree relatives in Chinese women: a case control study. *BMC Cancer* 14, 662 (2014). <https://doi.org/10.1186/1471-2407-14-662>