

UNIVERSITY OF BAHRAIN

**College of Health and
Sport Sciences**



**Department
of Physiotherapy**

**Arab Gulf Physiotherapists' Perception About the
Importance of Managing Shoulder Dysfunction in
Females Following Mastectomy**

**A Thesis Submitted in Partial Fulfilment of the Requirements for
the Master of Science Degree in Physiotherapy**

Submitted by

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Supervised by

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**(Assistant Professor)
University of Bahrain**

Kingdom of Bahrain

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Abstract

Introduction: Shoulder Dysfunction is a common complication among females post-mastectomy. Physiotherapists play an essential role in addressing shoulder dysfunction, but the level of their knowledge, experience, and applied rehabilitation protocols is not known. This research aimed to explore the physiotherapists' knowledge and opinion on managing shoulder dysfunction in females after mastectomy. It also aimed to evaluate their working environment and learning needs. **Methods:** A cross-sectional online-based survey was conducted over two months, from the end of August to the end of October 2021. Physiotherapists were recruited through the Physiotherapy Associations in Gulf Cooperation Council (GCC) via calls, e-mails, and social media applications. Participants were eligible if they were licensed physiotherapists and residents of GCC. The survey consisted of several sections covering the respondent's demographics, mastectomy knowledge, assessment and preventive procedures, treatment planning, working environment, and learning needs. Social Packages for the Social Sciences (SPSS) software (V26) was used for data analysis. **Results:** A total of 108 physiotherapists participated in the survey, with the highest participation from Bahrain (33.3%) and the United Arab Emirates (20.4%). A gap in the knowledge about the assessment of mastectomy morbidities and management of shoulder dysfunction was observed in 48.2% of the participants. There is a statistically significant difference between gender and perceptions of treatment, males perceived differently than females ($P = 0.03$, significant at 5%). Also, there is a statistical significance between males and females of their learning need perceptions ($P = 0.02$, significant at 5%). Moreover, a statistically significance difference in the treatment perception was seen between the therapists treating in-patients and out-patients ($P = 0.01$, significant at 5%). Lastly, no significant differences were found in perception based on the country of residence ($P = 0.66$) or level of qualifications ($P = 0.891$). **Conclusion:** The results should be used in conjunction with cost-benefit analysis, risk analysis, and assessment of the health requirements of both patients and physiotherapists. Further studies are needed to broaden such findings with larger sample size, propose rehabilitation protocols for treating shoulder dysfunction in female cancer survivors, and set up a specialized physiotherapy practice for the concerned group.

Dedication

To the prophet Muhammed PBUH who encourage us to “Seek knowledge
from the cradle to the grave “

To my husband Mohamed

To my children Ahmed & Amna & Hussain

To my beloved Father & Mother

To my precious sisters, brothers, family, and friends.

Acknowledgments

Praise be to Allah for this success and the knowledges that the almighty has guided me to and for my spiritual guide the prophet Mohammed PBUH for the endless blessings who lead me through this in every single step.

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My sincere tribute and gratitude to my backbone and biggest supporter, my husband Mohamed, for his unparalleled love and support during this journey and to my children for their outstanding support and infinite love. Particular gratitude goes to my father, mother, and family for encouraging me to do this until the last moment.

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My gratitude to my dear colleagues and friends for all the joyful and rich moments and the challenging times we had together throughout this program that only made us stronger.

Finally, we offer a prayer in praise of our lord “Alhamdulilah Rabbil Aalemin”.

“وآخر دعوانا أن الحمد لله رب العالمين”

Declaration

I declare that this research is my own work and that no part of it has been copied from any other previous works on the subject, except in such instances where citation has been made.

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List of Abbreviations

AM	Arm Morbidity
HG	Home program Group
MRM	Modified Radical Therapy
MSD	Mastectomy related to Shoulder Dysfunction
NSM	Nipple Sparing Mastectomy
PDQ	Pain Disability Index
RAC	Routine Axillary Clearance
ROM	Range Of Motion
SLNB	Sentinel Lymph Node Biopsy
SNBM	Sentinel Node Biopsy Management
SSM	Skin Sparing Mastectomy
MSD	Mastectomy Shoulder Dysfunction
TG	Treatment Group
VAS	Visual Analogue Scale
GCC	Gulf Cooperation Council
KSA	Kingdom of Saudi Arabia
UAE	United Arab of Emirates
RCT	Randomized Controlled Trial
DASH	Disability of Arm Shoulder and Hand
COVID-19	Coronavirus disease of 2019

Chapter One

Introduction

1.1 Introduction

Cancer is considered one of the top leading causes of death worldwide. According to recent statistics by the World Health Organization (WHO), cancer is ranked as the second leading cause of death before the age of 70 in above 100 countries worldwide (Bray et al., 2018). Among all cancer types, breast cancer is considered the most common cancer type and the most common cancer in women globally. Breast cancer accounts for 1 in each four cancer cases (Jankowski and Franklin, 2020). Recent statistics showed that female breast cancer is the most diagnosed cancer representing 11.7% of total cancer cases annually in 159 countries worldwide, and is the leading cause of cancer death worldwide (Jankowski and Franklin, 2020).

The incidence rate of breast cancer is increasing rapidly in South America, Africa, and Asia. It also showed a dramatic increase in countries with high income, such as the Gulf Cooperation Countries (GCC), and in developing countries, including the Arab region (Siegel et al., 2013; Torre et al., 2015). Rahman et al. (2018) stated that the Gulf Centre for Cancer Registration reports shows an increase in the number of new breast cancer cases annually by 53.3 cases in Bahrain, 22.8 cases in the United Arab Emirates, 17.5 cases in Saudi Arabia, 48.2 cases in Qatar and 48.6 new cases in Kuwait out of every 100,000 women.

Breast cancer is considered a major health disorder in the GCC and is regarded as one of the most common malignancies of female cancers. It is cancer that develops in the breast and progresses in five stages.

Symptoms may include abnormal, painful masses or lumps in the breast or underarm, along with unconventional thickening of the skin from the surrounding tissues that can be checked by the patient or diagnosed by imaging (Jafari et al., 2017). It is usually treated with mastectomy, a surgery that requires the removal of the whole breast tissue and sometimes the lymph node on the affected side to prevent the spread of the malignant tumors and extend the life expectancy of patients (Jones and Lancaster, 2018). Moreover, Jones and Lancaster (2018) also stated that around 40% of women undergo a mastectomy to treat breast cancer.

In a review investigating upper limb morbidity after mastectomy, Hayes et al. (2012) reported that the surgery usually leads to upper limb morbidity along with functional and sensory impairments to the joint. Moreover, the shoulder joint is affected mainly by mastectomy leading to shoulder dysfunction.

In a study by Shamley et al. (2014) to explore the impact of mastectomy and compare the muscle and movement deviations in survivors compared to the healthy population, a total of 155 survivors with previous unilateral carcinoma compared to the healthy population were enrolled in the study. Differences in scapular tilt between affected shoulders were seen. They were associated with pain and disability and changes in muscle activity in the following measured muscles: pectoralis major, serratus anterior, rhomboid, and upper trapezius muscles. The study offered anatomical and biomechanical evidence supporting the need for an integrated rehabilitation system for shoulder dysfunction following mastectomy.

Physiotherapy can play a vital role in rehabilitating shoulder dysfunction that follows mastectomy. It has been introduced as a non-invasive and conventional intervention consisting of different modalities

and approaches to manage the possible impairments that follow breast cancer treatment. Physiotherapy can reduce the symptoms that develop after breast surgery, like upper limb morbidity or associated shoulder dysfunction. It also improves the quality of life for breast cancer survivors by preventing shoulder dysfunction (Shamley et al., 2005; Cinar et al., 2007; Beurskens et al., 2007).

Therefore, it is essential to explore the perception of the GCC physiotherapists to give insight into their knowledge, awareness level, and learning needs to promote an optimal environment of rehabilitation that would improve the breast cancer patient's outcomes after mastectomy surgery.

1.2 Research Problem

Shoulder dysfunction is a frequent problem among mastectomy patients. The dramatic increase in mastectomy surgeries has increased the prevalence of shoulder dysfunction in females and increased physiotherapy demands. However, the level of the GCC physiotherapist's knowledge, experience, and applied rehabilitation protocols is not known. The potential role that physiotherapy plays in managing shoulder dysfunction following mastectomy highlights the need to evaluate the physiotherapists' knowledge and learning needs with female mastectomy patients with shoulder dysfunction. Also, understanding the role of physiotherapists in managing mastectomy-related shoulder dysfunction will improve patient outcomes and prevent or reduce shoulder dysfunction following mastectomy surgery by setting educational, training, and practical interventions.

1.3 Objectives

Primary Objectives:

1. To assess the Arabian Gulf physiotherapists' knowledge, attitudes, and learning needs on managing shoulder dysfunction in females following mastectomy.
2. To explore the views of Arabian Gulf physiotherapists' on the potential implementation of physiotherapy for females having shoulder dysfunction following mastectomy.

Secondary Objectives:

3. To explore how factors like the geographical location, area of practice, and working environment affect Arabian Gulf physiotherapists' perception towards managing the female patient with shoulder dysfunction following mastectomy.
4. To explore the perception of Arabian Gulf physiotherapists about how physiotherapy management might impact the care that the profession can provide to female patients with shoulder dysfunction following mastectomy.

1.4 Research Questions

1. Are there any differences in perception among physiotherapists from different GCC countries?
2. Are there any differences in perception among physiotherapists from different genders?
3. Are there any differences in perception among physiotherapists with different academic qualifications?

4. Are physiotherapists in the GCC keen and aware of shoulder dysfunction in females following a mastectomy?

1.5 Significance of the Study

The dramatic increase in mastectomy surgeries has increased the prevalence of shoulder dysfunction in females and increased physiotherapy demands. To the researcher's knowledge, this is the first study in the GCC focusing on the perception of physiotherapists and evaluating their expertise in dealing with female patients having shoulder dysfunction following mastectomy. At the professional level, the researcher believes in the importance of studying the physiotherapists' perception of knowledge and learning needs to highlight the aspects that need to be improved for optimizing the beneficial role of physiotherapy with mastectomy patients.

The result of this study would highlight the knowledge perception of the professional practice of GCC physiotherapists and provide some insight into their learning needs, which may play a significant role in creating a more optimal environment in which they practice. It would improve patient outcomes and prevent or reduces the onset and prevalence of shoulder dysfunction following mastectomy surgery in females. It will also allow more efficient use of the time used to treat such cases when the treatment is administered by a therapist well aware of the rehabilitation protocols.

1.6 Research Hypothesis

- There is a difference in perceptions between physiotherapists from different GCC countries regarding knowledge about mastectomy-related shoulder dysfunction and learning needs.
- There is a difference in perceptions between males and females.
- There is a difference in perception among different qualifications and years of experience.
- There is a difference in perception among physiotherapists managing in or out patients.

1.7 Definitions

Perception	Insight or intuitions gained by perceiving or thinking (American heritage dictionary, 2022).
Knowledge	Awareness, consciousness, familiarity, or understanding gained through experience or learning (American heritage dictionary, 2022).
Mastectomy	The surgical removal of all or part of a breast, sometimes including excision of the underlying pectoral muscles, associated skin, and regional lymph nodes, is usually performed as a treatment for cancer (American heritage dictionary, 2022).
Shoulder dysfunction	Impairments, pain, restrictions, or abnormality of the shoulder joint (Miller K., 2003).
Physiotherapist	A practitioner of physiotherapy (Miller K., 2003).

Chapter Two

Conceptual Framework and Literature Review

2.1 Conceptual Framework

The conceptual framework of the thesis explains the factors that can affect the physiotherapists' perception of the management of mastectomy-related shoulder dysfunction. And how they will lead to addressing the physiotherapist's learning needs (Figure 2.1).

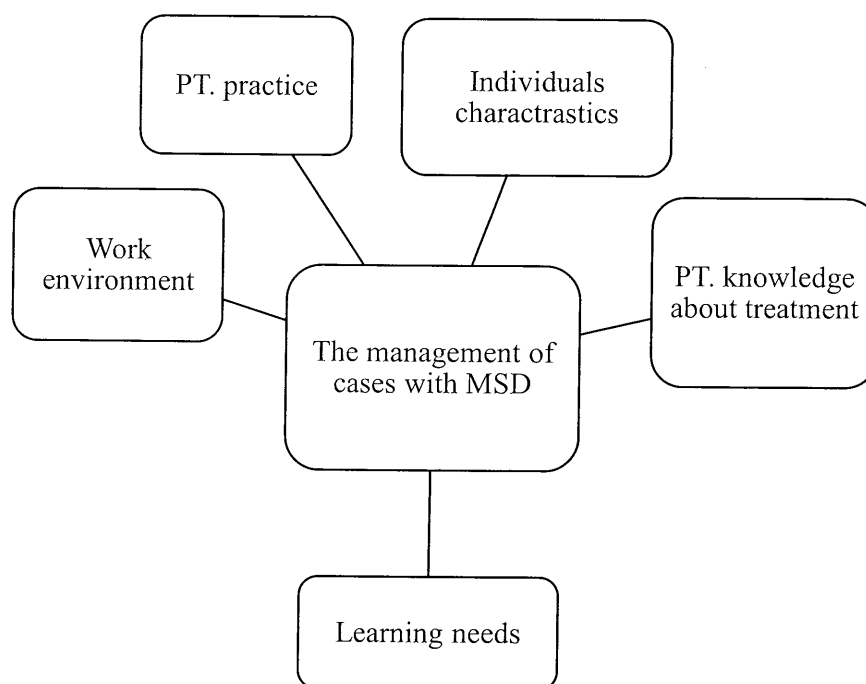


Figure (2.1) - Factors Influencing the Perception of Physiotherapists (PT, physiotherapist; MSD, Mastectomy related shoulder dysfunction).

and Google Scholar; the keywords used were mastectomy, breast cancer, shoulder dysfunction, upper limb morbidity, physiotherapy, rehabilitation, and perception. Table (2.1) summarizes the search strategy used in this review.

Table (2.1) - Literature search strategy

Strategy used	Search specifications
Data bases	PUBMED, NCBI, Google scholar
Search terms	Mastectomy, breast cancer, breast cancer treatment, shoulder dysfunction, rehabilitation
Number of articles reviewed	45
Included articles	26
Inclusion criteria	Articles relevant to the study topic Full-text articles
Exclusion criteria	Abstracts only, articles with no resources
Search language	English
Years of publication	2005 to 2020
Areas of literature search	Bahrain, North America, Canada

2.2.1 Prevalence of Breast Cancer In GCC

Breast cancer is a worldwide public health dilemma and is currently considered the most common cancer globally. Breast cancer is a life-threatening disease in females and is one of the women's leading causes of mortality (Akram et al., 2017).

Knowing the incidence rate of breast cancer in GCC is essential for a broad idea of how common it is in the region. Recent statistics regarding breast cancer in GCC (2018) indicated a high prevalence of cancer cases in each GCC country. According to Gulf Centre Cancer Registration, in every 100,000 women in GCC, there are around 53.3 new breast cancer cases in Bahrain, 22.8 new breast cancer cases in the United Arab of

Emirates, 17.5 in the Kingdom of Saudi Arabia, 48.2 in Qatar, and 48.6 new breast cancer cases registered every year in Oman (Rahman et al., 2018).

2.2.2 Epidemiology of Mastectomy-Related Shoulder Dysfunction

Karmer et al. (2019) stated that Mastectomy related shoulder dysfunction has a high prevalence rate among females after breast cancer surgery. He also stated that most women who undergo mastectomy would experience one of the shoulder morbidity symptoms like pain, numbness, lymphedema, restricted range of motion, disability, and numbness. The same author, Kramer et al. (2019), studied the prevalence of shoulder morbidity after breast cancer treatment. In his study, it was found that three in every four women who underwent breast cancer surgery reported the presence of severe to moderate pain or disability.

2.2.3 Historical Background of Mastectomy treatment

Edwin Smith Papyrus discovered the first case of breast cancer around 3000 BC. Breast cancer was first described as a large, spreading, and hard swelling on the breast. The first mastectomy surgery was followed by the ancient Greek physician Leonidas of Alexandria around 400 BC (Jones and Lancaster, 2018).

In the 1800s, mastectomy surgeries were fatal because of the surgery's sepsis. The first mastectomy operations were highly aggressive, involving the removal of the breast itself and the removal of all the surrounding tissues, skin, and muscles like the pectoralis muscles to

control the cancer spread. Then, the patients were left with large wounds, massive lymphedema, severe shoulder movement restrictions, and chronic pain. The post-operation survival rate remained poor, ranging from 13% to 40% at five years (Jones et al., 2018).

2.2.4 Recent Mastectomy Treatments for Breast Cancer

For the recent treatment of breast cancer, Jones et al. (2018) reported that nearly 40% of all women undergo mastectomy for breast cancer today. They have stated that radical mastectomy is the common treatment of breast cancer through the twentieth century. The author also stated that as the understanding of breast cancer increased the indication for more extensive surgical intervention decreased. Nowadays, mastectomy has evolved so that skin-sparing (SSM) or nipple-sparing mastectomy (NSM) is performed for majority of women who undergo mastectomy. About 40% of all women undergo mastectomy for breast cancer today.

When it comes to the types of breast cancer surgeries, Cil et al. (2018) reviewed the modern approaches for the management of breast malignancy. They stated that the main oncologic goal of breast cancer surgery is to remove all the clinical and radiologic evidence of the disease in the breast. The surgical technique that has been used to achieve the goal was the mastectomy surgery, in which all breast (mastectomy) or part (lumpectomy) is removed.

Currently, the surgical technique has dramatically changed and has expanded to different surgical approaches to extirpate the tumor and achieve optimal cosmesis. The surgical procedure will differ based on the type and stage of the cancer. A Description of the diverse types of mastectomies according to the surgical procedures used in the treatment

of breast cancer is found in (Table 2.2) (Cil et al., 2018).

Table 2.2 - Definition of diverse types of mastectomies, derived from Cil et., al (2018).

Breast surgery terminologies	
Term	Definition
Halsted\Radical mastectomy	Removal of the breast, including complete removal of pectoralis minor, extensive removal of pectoralis major and axillary lymph nodes up to the apex through a large oblique incision reaching the axillary fossa
Modified radical mastectomy (MRM)	Removal of the breast and ALND (level I and II) with preservation of pectorals muscles
Total (TM)/simple mastectomy (SM)	Removal of the breast with a large ellipse of skin, including the nipple and areola, without axillary dissection
Skin-sparing mastectomy (SSM)	Removal of all the breast, nipple, and areola With preservation of remaining breast' skin
Nipple-sparing mastectomy (NSM) or total skin-sparing mastectomy (TSSM)	Removal of all the breast with preservation of breast skin nipple, and areola
Quadrantectomy	Excision of a quadrant of breast tissue containing disease including skin and pectorals fascia
Lumpectomy	Excision of a segment of breast tissue with disease without skin, or muscle; also referred to as partial or segmental mastectomy and BCS
Oncoplastic surgery (OPS)	Excision of breast tissue with disease and use of techniques to reshape or rearrange remaining glandular tissue
Axillary node dissection (ALND)	Removal of level I (inferior and lateral to pectoralis minor) and level II (posterior to pectoralis minor) axillary lymph nodes
Sentinel lymph node biopsy (SLNA)	Removal of the first few axillary nodes that drain the breast: identified by dual mapping using technetium-99m sulfur colloid and blue dye

2.2.5 Anatomy of The Shoulder Complex

The shoulder joint is a complex joint with a wide range of motion and functions. An understanding of the shoulder joint anatomy is required to identify any alteration going around the common, properly diagnose any shoulder pathologies or morbidities, and better evaluate patients with shoulder compliant. The shoulder joint has many articulations, unique structural features, and anatomic relationships that play a role in shoulder function, as well as shoulder dysfunction and injury (Bakhsh and Nicandri, 2018).

According to Miniato et al. (2021), the shoulder joint is the junction between the chest and the upper extremity. There are two joints at the shoulder: The glenohumeral joint, formed by the intersection of the arm bone (humerus) and the shoulder blade socket (scapula), and the acromioclavicular joint, formed by the (clavicle bone) and the acromion bone. Also, the shoulder is considered one of the most complex joints in the body and one of the most freely movable joints due to the articulation at the glenohumeral joint. The shoulder girdle comprises the clavicle and the scapula and articulates with the humerus bone. There are four points in the shoulder girdle:

1. Sternoclavicular joint: a synovial saddle joint that connects the upper limb to the axial skeleton and connects the clavicle to the manubrium of the sternum.
2. Acromioclavicular joint: a plane synovial joint that connects the acromion of the scapula to the clavicle.
3. Scapulothoracic joints: It is not an actual joint but an articulation of the scapula that glides over the thoracic cage.
4. Glenohumeral joint: a highly movable ball and socket joint that is stabilized by the rotator cuff muscle and tendons of the biceps and triceps brachii. The humeral head articulates with the glenoid fossa of

the scapula and forms a shallow articulation. The labrum, a fibrocartilaginous ring, attaches to the glenoid fossa's outer rim, providing additional stability to the humeral head.

The shoulder joint also has several fluid-filled sacks known as bursae surrounding the capsule and aid mobility. The subacromial, subdeltoid, subscapular and subacromioclavicular bursae (Miniato et al., 2021).

The blood supply to the shoulder originates from the subclavian artery. The axillary artery is the major blood vessel in the shoulder that divides into several branches to supply the area, the superior thoracic artery, Thoracoacromial artery, lateral thoracic artery, subscapular artery, anterior humeral circumflex artery, and posterior humeral circumflex artery. On the other hand, the axillary lymph nodes passing through the shoulder joint contribute to efferent lymphatic vessels in the shoulder that passes proximally through the joint. Efferent lymphatic vessels also arise from the distal upper extremity and pass through the shoulder joint. At the same time, the deep lymphatic and superficial vessels drain lymph from the joint capsule, tendons, and nerves. Additionally, the lymphatics of the shoulder and axillary region are drained by the subclavian lymphatic trunk (McCausland et al., 2021).

There are around 17 muscles that work on the chest and shoulder joints. The intrinsic muscles of the shoulder connect the scapula, and the clavicle to the humerus include, deltoid, teres major, and rotator cuff muscles, which are the supraspinatus, infraspinatus, teres minor, and subscapularis. Other muscles that affect the movement of the shoulder joint including the Trapezius, Latissimus dorsi, levator scapulae, Rhomboid major, Rhomboid minor, serratus anterior, pectoralis major, pectoralis minor, subclavius, coracobrachialis, Biceps brachii and Triceps brachii (McCausland et al., 2021; Miniato et al., 2021).

2.2.6 Complications Following Mastectomy

Upper Limb Morbidity and Related Symptoms

According to a review by Hayes et al. (2012), upper limb morbidity after treatment of breast cancer is typical and is characterized by motor or sensory impairments, like pain, weakness, limitation of range of motion, altered movement pattern, numbness or swelling in the arm, shoulder, or breast of the affected side. The author claimed that upper body morbidity is highly associated with alteration of function of upper limb especially the shoulder joint. This affects the activities of daily living and the quality of life in women with breast cancer.

When it comes to the incidence of upper limb impairment after breast cancer treatment, the author evaluated more than 20 studies, including 7 cohort studies investigating the presence of upper body symptoms in a population-based samples. A wide range of prevalence was reported more in cohort studies than clinical trials. The presence of any one or more of the following symptoms such as: weakness, stiffness, pain, numbness, range of motion, swelling was assessed in these studies via self-report methods using validated or non-validated questions including items from quality-of-life questionnaire or invalidated items. Most of the studies reported a subset of the mentioned symptoms reported by women with breast cancer (Hayes et al., 2012).

The same above study reported that About 60% of women reported at least one of the upper limb symptoms at any point from 6 months to 3 years after breast cancer surgery. The results suggest that the presence of multiple symptoms is more common than having one symptom alone. Multiple symptoms of upper limb impairment usually appear in the period

from 6 up to 18 months post mastectomy surgery. The limitation of the study was in deriving a conclusion for the frequency of upper body symptoms, as the studies have varied in the length of follow up and only two based population have assessed the symptoms beyond 3 years (Hayes et al., 2012).

Another 5-years longitudinal study by Boquiren et al. (2016) looked at the arm morbidity in breast cancer survivors. It aimed to explore the developmental time course in which upper body morbidity described as “restricted range of motion, pain, arm volume and perceived disability of shoulder joint in the immediate years post-breast surgery” develop. Four oncology clinics were included in the study (n= 431) in which subjects had to complete five clinical assessments. The profile of mood, the disability of arm shoulder and hand, McGill pain questionnaire were completed. The results showed that arm morbidity and perceived disability were greatest at the first-year post- surgery and were significantly lower at 5 years. The arm volume changes and restriction in shoulder external rotation and abduction as well as pain were significant at most of the assessments.

Thomas-Maclean et al. (2008) also investigated the incidence of arm morbidity in women with breast cancer 6-12 months after surgery and had also investigated the relationship between arm morbidity and disability. The samples were 347 patients from four different sites across the area, and the incidence rate was calculated for the presence of arm, shoulder hand disability, lymphedema, and pain. The findings indicated about half of the subjects had range of motion restrictions, 39% reported pain, while 12% had lymphedema. The study concluded that pain and range of motion restriction are prevalent 6-12 months after the surgery, but lymphedema was not. The study finally implicated that pain and range of motion

restriction should be part of breast cancer follow up care and that arm morbidity could have long term effect in quality of life if left untreated.

In a recent study, Verbelen et al. (2019) explored the arm and shoulder complaints after sentinel lymph node biopsy (SLNB), which is a less invasive mastectomy surgery. Patients with SLNB (n=126) were followed up for at least 2 years. Self-reported arm and shoulder morbidities were assessed in the study for a mean follow up of 55.5 months. The highest prevalence of self-reported arm and shoulder morbidities from 2 to 7 years were as follows: 26.2 % for loss of strength, 19.5% for limitation of shoulder range of motion, 12% for pain, 8% for axillary web syndrome, 7.1% for lymphedema and 6.4% for paraesthesia. Figure (2.2) indicates the most prevalent symptom of shoulder is loss of strength, range of motion and pain respectively. The author also stated that, although the prevalence rate of arm and shoulder movements were high only 38.1% of patients were treated for their complaint (Verbelen et al., 2019).

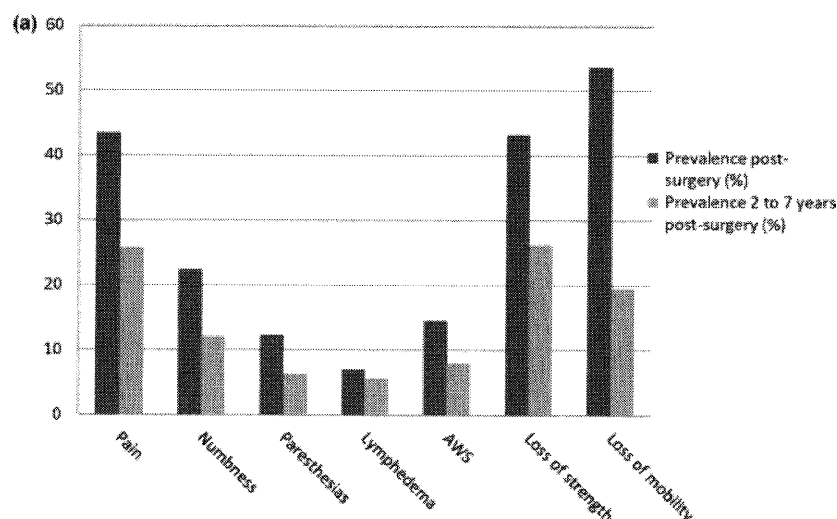


Figure (2.2) - The prevalence of arm and shoulder complaints in sentinel node-negative patients (Verbelen et al., 2019).

Risk Factors

Exploring the factors that increases the risk of upper body morbidity after breast cancer surgery is important for better understanding of the plausible causes. In a recent prospective cohort study by Carlos-Iriarte et al., (2019), a total of 653 patients were enrolled in a rehabilitation program shortly after breast cancer surgery. They were followed for 10 years to identify long-term predictive factors for upper limb morbidity. The study comprised of clinical assessment to evaluate the affected and contralateral limb including passive shoulder range of motion measurements, circumferential measurements, lymphedema, pain using VAS, sensory loss by pinprick. The follow up continued for 72 months, and 306 patients reported upper body symptoms at some point during the follow up period. The results of the objective assessment done in this study suggest that previous shoulder pathology, obesity, post-surgical complication, and site of radiotherapy were significant factors for developing shoulder and arm morbidity following mastectomy (Carlos-Iriarte et al., 2019).

It is also claimed that upper limb morbidity is high among patients who undergo more invasive surgical procedures like axillary dissection. In a randomized controlled trial that compared upper limb morbidity such as swelling, symptoms, and dysfunction of upper limb, patients who had routine axillary clearance (RAC) were compared to those who had the less invasive procedure like the sentinel lymph-node biopsy management (SNBM) over three years. Results showed that upper limb movement were significantly reduced in the RAC group especially at 6 months (Figure. 2.3) but has improved from 12 months to three years. Symptoms, swelling, disability and dysfunction were worse in the RAC group than in SNBM group especially at the first 6 months ($P < 0.001$) (Wetzig et al., 2014).

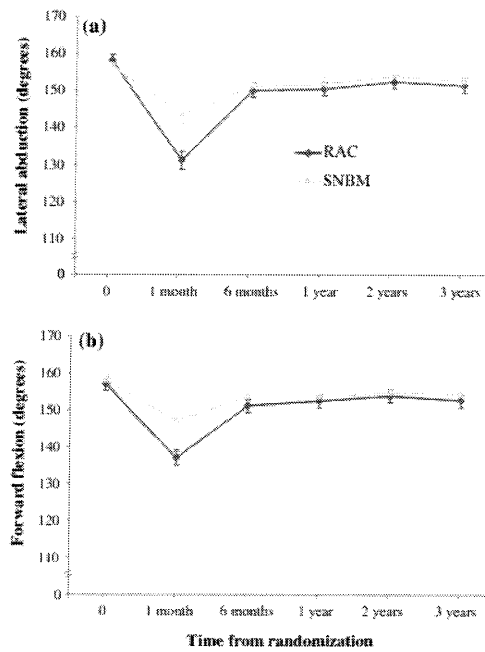


Figure (2.3) - changes in degrees in upper limb movement (Wetzig et al., 2014).

Based on these reviews of several studies including cohort, clinical trials or longitudinal studies, Upper limb morbidity is common in women after breast cancer treatment. Overall upper body symptoms and impairments that affect function and quality of life are quite common post-surgery. The impairments like swelling, stiffness, sensory or motor loss, range of motion limitation or movement alteration of shoulder are widely found in post mastectomy patients especially 12 months after the breast surgery. The most common impairment involves the shoulder joint restriction of range of motion and pain.

The factors that contribute to exaggerating upper limb morbidity in women after the breast surgery are obesity, radiation therapy, the type of surgery, the complication after surgery previous shoulder pathology and delaying of rehabilitation after surgery. Taking these factors into account and adding them to the assessment and evaluation of patients that undergo any type of breast mastectomy, there will be better control and prevention

of upper limb morbidity following the surgery, which is aligned with the goals of this study.

2.2.7 Assessment of Shoulder Dysfunction

The Pain Disability Questionnaire

When deciding the best self-reported instrumentation to be used, several points must be considered like the sensitivity and specificity of the outcome measure. The pain disability questionnaire (PDQ) is a well-known and validated instrument that is used in the measurements of chronic musculoskeletal disorders like shoulder dysfunction and arm morbidity. In a study by Anagnostis et al. (2004) to evaluate the validity of the PDQ and compare it with the responsiveness of other validated instruments like the Oswestry, million (MVAS) and SF-36 instrument. Multiple groups of patients were recruited including normative population (NP, n=50), an acute musculoskeletal disorder population (AMD, n= 52), a chronic disabled musculoskeletal disorder population (CDMP, n= 230) and a heterogeneous pain population (HP, n= 114). Results showed that the PDQ was found to have an excellent test-retest reliability coefficient ranging from 0.94 to 0.98 and a Cronbach's alpha coefficient of 0.96 indicating excellent reliability of the PDQ. The construct-related validity of the PDQ for measuring musculoskeletal was also found to be of high quality, as it correlates well to both the Oswestry (0.55-0.80) and the MVAS (0.65-0.81). The study suggested that the PDQ is valid and reliable for measurement of pain, functional disability in any type of musculoskeletal disorder whether acute or chronic.

The Visual Analogue Scale (VAS) For Disability

The visual analogue scale (VAS) is widely used in the clinics for objective assessment of pain. In a study by Boonstra et al. (2008) that aimed to determine the validity and reliability of the VAS as a single item for measurement of disability and pain in patients with musculoskeletal disorders. The main study outcome measure was the Spearman's correlation coefficient (q-value) test and retest data of the VAS for measuring disability. And for validity measures, the q-values of the VAS disability scores compared with other items like the short-form survey and VAS pain score. Results showed that the reliability q value ranged from 0.60 to 0.77, and the validity q value of VAS disability score with SF-36 0.16 to 0.5. However, the correlation between VAS for disability with other validated items was considerably weak and only strong with VAS for pain.

Measurement of Shoulder Range of Motion (ROM) After Mastectomy

Mullaney et al. (2010) conducted a study to compare between digital and standard goniometer for measurements of active and passive range of motion (ROM) of the shoulder. The intra- and inter-test reliability were assessed. Two experienced physiotherapists measured the shoulder flexion, internal and external rotation for both shoulders in two occasions for 20 patients with unilateral shoulder pathology the reliability was assessed using intraclass correlation coefficient (ICC). The intratester ICC ranged from 0.91 to 0.99 while inter-tester ICC ranged from 0.31 to 0.95 for both standard and digital goniometer. This indicates that the goniometer has high intratester reliability in measurements of shoulder range of motion limitation.

Based on the above, the best outcome measures for assessing the shoulder morbidity are the PDQ, which is considered a highly validated method for measurements of functional disability in women after breast cancer surgery, the VAS that has good test-retest reliability and fair concurrent validity for measuring pain in patients with musculoskeletal disorders. Finally, the goniometer which has excellent intratester reliability for measuring movements of the upper limbs joint and can be used as reliable instrument for measuring changes in the movement of shoulder joint after breast cancer surgeries (Mullaney et al., 2010).

2.2.8 Physiotherapy Interventions After Mastectomy

Beurskens et al. (2007) conducted a randomized controlled trial (RCT) that concluded that physiotherapy improves shoulder pain and quality of life in patients following axillary dissection after breast cancer. Patients (n = 30) who met the inclusion criteria were included in the study. The study had two groups, the treatment group that received the standardized physiotherapy of advice and exercises of arm for three months and the control group who had received a leaflet with advice and exercise for shoulder for the first weeks after surgery. The measurements were taken at baseline and after three months. Main outcome measure was pain measured with VAS and shoulder mobility, measured with inclinometer as well as the Disability of Arm Shoulder and Hand (DASH) index for measurement of disability and hand grip strength as a secondary outcome measures. Results showed significant reduction in functional shoulder impairments and pain after physiotherapy treatment ($P < 0.001$) at three months compared to the control group. Also, pain was significantly decreased by 3.4 on VAS in the treatment group, in contrast, only 0.5 points were decrease on VAS for the control group. For the

shoulder range of motion, both flexion and abduction have increased in the intervention group by 45 and 70 degrees respectively versus 11 and 13 degrees respectively in the control group. However, there was no significant improvement in the handgrip strength and arm volume in both groups ($P = 0.08$).

A systematic review by Tatham et al. (2013) included six studies looking at the benefits of reducing shoulder pain related to breast cancer treatment by doing exercises. Each study analyzed the effect of different type of exercises for shoulder, arm, and scapula, strengthening, stabilization, postural exercises, range of motion and conditioning with respect to their efficacy in reducing shoulder pain related to breast cancer treatment. The results suggest that exercises might be effective in treating shoulder pain related to breast cancer. However, it is not a definite conclusion due to lack of methodological quality and homogeneity of the included studies.

Giacalone et al. (2019) conducted a recent systematic review to describe the most recent and effective physiotherapy intervention in the treatment of shoulder pain following breast cancer treatment. The study suggested that active exercises joint tissue mobilization accessory mobilization, aerobic and strengthening exercises, education are the most used treatments in the last 10 years for treating shoulder symptoms caused by mastectomy.

Early Vs. Immediate Treatment

Prevention and treatment of shoulder dysfunction is essential for reducing the impairments that follows breast cancer mastectomy. Physical therapy has been introduced as a non-invasive conventional intervention

after mastectomy surgeries that include different modalities and approaches to manage the possible impairments that follow the treatment of breast cancer. The evidence-based practice for physical therapy role is presented below reviewing before recent studies.

In a systematic review comparing early versus delayed exercises following breast cancer surgery, Shamley et al. (2005) claimed that controlled delayed program (7- 12 days) of arm exercise helps in reducing seroma formation, one of the surgical complications that arise after breast cancer surgeries.

In contrast, Cinar et al. (2008) favors the early treatment (after the removal of the drains). The authors investigated the effect of early onset rehabilitation program on shoulder mobility, functional status, lymphedema, and incidence of prospective complication in patients who had modified radical mastectomy in a randomized controlled trial (n=57). Patients were randomly assigned to either treatment group (n=27) or home exercise group (n=30). The results suggest that early onset rehabilitation program after modified radical mastectomy improves the shoulder mobility and functional capacity without causing adverse effect ($P < 0.01$, $P < 0.001$, $P < 0.005$, in flexion, abduction and adduction, respectively). However, there was no statistically significant difference in the development of lymphedema and postoperative complication on both the control and intervention groups.

Targeted Muscles in the Treatment Plan

Crosbie et al. (2010) conducted an observational study that performed a 3-dimensional kinematic analysis of arm movement in sagittal scapular and coronal planes for women who had unilateral

mastectomy on the dominant side (n=29) or non-dominant side (n=24) compared to healthy women from age matched group (n=22) without any upper limb, shoulder or spinal problems. Results revealed that the pattern of scapular rotation is altered in women following mastectomy compared to the controls in all planes of movement. The scapula in the mastectomy side was markedly rotated upward to a greater extent than the non-mastectomy side. On the other hand, the average of lumbar spinal motions was neither significant nor clinically important. Thus, the authors suggested that the scapular movement patterns are altered at the same side of mastectomy.

Another study by Shamley et al. (2013) aimed to explore the impact of mastectomy on the shoulder by correlating altered muscle activity with the observed deviation and compared the movement and muscle deviation with a healthy group. It was noticed that the upper trapezius activity during the arm movement was markedly reduced accompanied with drop of rhomboid and lower pectoralis major activity. On the other hand, the serratus anterior muscle was relatively of normal activity at the mastectomy side. Moreover, the differences between the affected and non-affected side were significantly found associated with pain and disability and serratus anterior activity.

These two studies address the muscles that are mostly affected by mastectomy and should be targeted in the interventional exercise protocol like the scapulae muscles, the upper trapezius, and the rhomboids muscle. However, more extensive, and prolonged reviews of literature must be done on this regard.

Early physiotherapy intervention has a good impact on shoulder outcomes of pain, functional level, and quality of life especially at the first few months following mastectomy surgery. Exercises are the most used

intervention in this field for the treatment of any shoulder impairment following mastectomy. The suggested exercises include, strengthening, ROM, mobilization, aerobic strengthening, and education. However, limitations like some studies were lacking methodological quality, including small population size or using of improper instrumentation and lacking homogeneity in some database systematic reviews make driving a summative conclusion regarding the treatment indefinite.

2.2.9 Summary

In summary, the results of this literature review indicate that breast cancer is a common and serious health problem worldwide and has a high incidence rate in GCC. The review suggest that breast cancer usually requires surgical removal of the breasts via mastectomy procedures as a direct intervention for reducing mortality rate and increasing the life expectancy in diagnosed patients. The types of mastectomy surgeries differ as the type and site of cancer differs. The more invasive the mastectomy surgery was, the more morbidity and impairment of upper limb shoulder, arm appears following the surgery. Moreover, the review has also shown that the shoulder joint is the most joint affected after mastectomy surgery. The most common impairment found after the surgery involves marked reduction in shoulder range of motion and pain which usually leads to disability. Early intervention was suggested by many studies to control and prevent the symptoms. In the last review about the treatment, almost all the studies discussed in this review recommended exercise therapies as a preventive and therapeutic method for management of shoulder dysfunction following mastectomy. Recent studies suggest the use of aerobic, strengthening, mobilization, ROM, and education to the rehabilitation program to treat shoulder dysfunction following

mastectomy.

Nevertheless, the literature suggested treatments are still inconclusive. Interventions to date have been moderately successful in reducing shoulder dysfunction following mastectomy. Many variations were there regarding the studies quality of conduction, design and the methodologies used. Most of the studies were having small sample size, some of them were lacking the methodological quality, some studies data collections were done retrospectively, and others were lacking the use of valid instrumentations.

Chapter Three

Methodology

3.1 Study Design and Setting

A descriptive, cross-sectional study design that was carried out to investigate the perception of GCC physiotherapists towards their role in the management of shoulder dysfunction following mastectomy. The study was conducted as an online survey for GCC physiotherapists using a self-completed questionnaire. This design has been selected to suit with the current situation of COVID-19 most importantly to ensure the safety of participants, due to simplicity of conduction, its time saving, less expensive and useful for descriptive and evaluative purposes.

The study was conducted online using an online web-based survey questionnaire. A hyperlink of the survey was distributed among physiotherapists from different GCC countries on social media, social applications and via email. A reminder was sent every two weeks to maximize the responding rate.

Main steps of the study:

The study consisted of three main steps:

- I. Survey designs to measure the physiotherapist perception towards mastectomy related shoulder dysfunction based on the comprehensive literature review conducted by the researcher.
- II. Validating the survey by a panel of experts.
- III. Data collection and analysis.

3.2 Ethical Considerations

Ethical approval to conduct the study was obtained from the Research and Scientific Publication Committee of the College of Health and Sport Sciences at University of Bahrain (Recommendation No: 8/2020-21, dated 23 Feb 2021) (Appendix-1). The consent to participate in the study was obtained before filling the survey questionnaire. The privacy and confidentiality of the participants were strictly maintained. No personal information was included in the collected data or study results.

3.3 Recruitment and Study Population

Random invitations to participate in the survey was distributed through social media, social communication applications and emails amongst physiotherapists from different GCC countries. Participants were also recruited via official communication with the physiotherapy societies in the GCC. A hyper-link to the survey was distributed with the invitation.

The participants were requested to complete an online survey with an invitation that briefly introduces the study and explains its purposes and significance. They had to give their consent after reading the information sheet provided prior to their participation. All responses were collected anonymously. A reminder was sent every two weeks after the initial distribution to maximize the recruitment of participants and responding rate.

The study targeted any physiotherapist located in one of the six GCC countries: Bahrain, KSA, UAE, Oman, Kuwait, or Qatar regardless of their original nationality. The total number of physiotherapists were

around 600 physiotherapists, who were accessible by the researcher and had received the invitation to participate from different GCC countries. The total number of responses collected in two months from 26th August 2021 to the 30th of October 2021 were 114 responses. Only 108 were eligible and included in the study.

3.4 Eligibility Criteria

Participants were eligible to participate in the study if they were qualified practitioners of the profession with no upper limits to their years of experience, they are residents in the Arabian Gulf and have consented to participate electronically by approving the consent form (Appendix-2). To finally enroll in the study, the participants had to meet the following criteria:

Inclusion criteria:

- Being a physiotherapist
- A minimum of one year of experience
- Age more than or equal to 21
- Both genders
- Living in one of GCC countries (Bahrain, KSA, UAE, Oman, Kuwait, or Qatar)

Exclusion criteria:

- Resident country other than GCC countries
- Less than 1 year of experience
- Working in a facility not located within the GCC countries
- Did not consent to participate

3.5 Sampling and Sample Size

The official number of registered physiotherapists in GCC according to World Physio, the official organization representing physiotherapists worldwide is 10,670 (World Physio, 2022). Using a sample size calculator, (calculator.net) assuming a 95% confidence interval, a 5% margin of error, and 10% of the physiotherapists who may be interested in participating in the survey, the estimated sample size was 137. Given the challenges encountered in communicating with the potential participants, in addition to time constraints, only 108 out of 114 participants were included in the study.

The study has followed the convenient sampling method for targeting the sample. Physiotherapist from each of the six GCC countries with similar sociodemographic profile were randomly targeted to participate in the study.

3.6 Study Questionnaire

3.6.1 Questionnaire Development

According to the researcher's knowledge, there are no existing surveys related to measuring the perception of physiotherapist about mastectomy related shoulder dysfunction in females. Thus, the instrument that is being used in the current study is developed by the author based on the researcher's review of recent literature and consulting experts who were known to be specialized in the same topic of the study at Bahrain region. All the information that could aid in formulating the study questions were collected, reviewed, and phrased to be suitable for the survey study by the researcher.

The survey went under many stages of experts reviewing, consulting, and amending, then reviewing were executed by the researcher and the supervisor. The questionnaire (Appendix-3) was designed in English language with an information sheet provided to explain the aim of the study to encourage responses. The questionnaire involved information on respondent's demographics and experience that included age, gender, country of residence, educational qualifications, years of experience and working facility (Appendix-3). Questions to measure physiotherapists knowledge about mastectomy in knowledge section, questions that measure the perception of respondents about mastectomy related shoulder dysfunction, assessment, preventive procedures, treatment goals and treatment plan in perception section. Also, questions to measure the working environment and learning needs in two sections with two different Likert scale measures.

During the construction of the survey, leading questions were avoided, and the questions were modified to be simple and short. The survey was designed and divided into different sections with a brief explanation on how to complete the questions provided in each section.

The questionnaire is composed of seven sections design to accomplish the aim of the research (Appendix-3):

1. The first section contained information sheet to give a brief explanation about the study aim and significance.
2. The second section contained the socio-demographic information.
3. The third section contained information about clinical practice.
4. The fourth section contained perception about mastectomy information.

5. The fifth section contained perception about treatment of shoulder dysfunction after mastectomy.
6. The sixth and seventh sections contained information about working environment and learning needs.

3.6.2 Questionnaire Face Validation

The questionnaire was submitted to a panel of eight local experts in Bahrain to be judged for face and construct validity. The panel consisted of specialized physiotherapists, senior physiotherapists, research assistants, university professors. They were asked to rate each item of the questionnaire for its clarity, appropriateness and structure using five points scale according to their clarity, appropriateness, and structure (1= poor, 2= fair, 3= satisfactory, 4= good, 5= excellent).

3.6.3 Questionnaire Construct Validation

Construct validity was assessed using exploratory factor analysis (EFA) along with Principal component analysis (PCA) with varimax rotation to explore the three components of the questions clarity, appropriateness, and structure (Table (B), Table (C), Appendix 4).

3.6.4 Questionnaire Internal Consistency

To measure the internal consistency of questionnaire and inter-correlation of the questions, Cronbach's alpha (α) test was used. Data of the participant's responses was used for this test.

3.6.5 Pilot Testing

Before launching the study, a pilot study was conducted by asking a group of physiotherapists from diverse backgrounds to complete the questionnaire. They were also asked to provide their comments about the clarity of the questions, their appropriateness and structure (Table A, Appendix 3).

3.7 Data Collection

An advertisement containing a link and QR code to the online survey were sent through social, media and social applications, emails and professional physiotherapy associations networks or communication channels to encourage the participation in the survey. A reminder advert was sent later to the same channels of communications every two weeks to facilitate the recruitment.

The data collection was held for two months. All responses were being collected electronically in the period from end of August 2021 until end of October 2021.

3.8 Statistical Analysis

All collected data were entered and analyzed electronically using the Statistical packages of Social Sciences (SPSS) version 26 (IBM SPSS Inc., California, USA) and Google Forms (Alphabet, Inc., California, USA). The following statistical tests were used:

1. Descriptive statistics will be used for the participants' characteristics and knowledge perceptions and will be displayed as frequencies, means and Standard deviation (SD).

2. Independent sample t-test will be used to test for the differences between two factors or two variables.
3. One-way Analysis of variance (ANOVA) will be used to test for the differences between multiple factors and multiple variables.
4. Exploratory factor analysis (EFA) was used to measure the construct validity of the questionnaire.
5. Cronbach's alpha (α) test to measure internal consistency of the questionnaire.
6. Normality tests for the data by obtaining histogram skewness and kurtosis plots in SPSS.

Chapter Four

Results

4.1 Questionnaire Validation and Pilot Study Results

4.1.1 Questionnaire Face Validity Results

All eight reviewers who participated in the pilot study agreed that the questions were clear, appropriate, and well structured. Nearly all questions received an average score above 4.00 which was considered good. Therefore, they were included in the study. There were a few exceptions for the questions related to knowledge No 1, 3 and 6 and third question of the learning needs section that received average scores of 3.75, 3.875, 3.875, 3.875 respectively for one of the three tested components: clarity, structure, and appropriateness (Appendix-3, Table (A)). However, they were included after minor amendments and were supported with instructional directions and images to clear any doubts.

4.1.2 Questionnaire Construct Validity Results

To further strengthen the validity of the questionnaire, the EFA analysis identified that the second component of knowledge questions explained a total variance of 97.219 of the variances in the data as shown in (Appendix 3-Table (B)). In testing the communalities, all items had a high extraction value ranging from 0.93 to 0.99 (Appendix -3, Table (C)), which indicates a good construct validity of the questionnaire.

4.1.3 Questionnaire Internal Consistency and ICC Results

Results of the Cronbach's alpha test for internal consistency was equal to 0.74 and the Intraclass correlation coefficient (ICC) was equal to 0.74. According to Tsang et al. (2017), the minimally accepted Cronbach's value is 0.70, while according to Koo & Li (2016), the ICC ranging between 0.5 to 0.75 is an indicative of a moderate to good reliability. Thus, the results indicate adequate reliability of the questionnaire (Table 4.1).

Table (4.1) - Reliability statistics using the Cronbach's Alpha and ICC.

Reliability Statistics				
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items		
0.74	0.81	43		
Intraclass Correlation Coefficient				
	Intraclass Correlation	F Test with True Value		
		Value		
Single Measures	0.06	0.04	0.089	3.9
Average Measures	0.74	0.67	0.81	3.9

4.1.4 Normality of The Data

The data were assessed for normality using histogram skewness and kurtosis in SPSS, most of the data were normally or near normally distributed ranging between -1.5 to 0.4 for skewness values and from -1.3 to 3.4 for kurtosis. According to Kim (2013), for medium sized samples $50 < N < 300$ the values of skewness and kurtosis for a normal distributed data are increased to be between -3.29 to + 3.2, therefore the data were

considered approximately normal and parametric test were used as a more powerful test (Appendix – 4, Table (D)).

4.1 Sociodemographic Results

Response Rate

Approximately 600 physiotherapists from different GCC countries were invited to participate in the study. Out of the invitations sent, 114 responses were received in two months period representing a 19% response rate. The first three questions of the survey were screening questions. Consequently, six physiotherapists were excluded because they did not meet with the inclusion criteria for not being a resident physiotherapist in one of the GCC countries.

Participants and Demographics

The data of 108 physiotherapist from all GCC countries were analyzed. The demographical characteristics of the participants are presented in Table 4.2. Female physiotherapists were more than male participants representing 80.6 % of the responses. Most of the participants (46.3%) were aged between (31-40) years.

The highest number of participants were from Bahrain (33.3%) and the United Arab Emirates (20.4%). While Saudi Arabia (11.1%) and Qatar (2.8%) showed the lowest response rates. Majority of participants were licensed physiotherapist (96.3%) (Table 4.2).

The highest academic qualification degree obtained among the physiotherapists was the bachelors (BSc) degree (65.7%). Most of the

participants had more than 10 years of clinical experience (48.1%), and most of them were working in general hospitals (43.5%). Also, most of physiotherapists work in the governmental sector (69.4%) and are seeing outpatients (79%).

Table (4.2) - Sociodemographic characteristics of the participants.

Demographic data	Categories	N (%)
Gender	Male	21 (19.4)
	Female	87 (80.6)
Age group (years)	21-30	32 (29.6)
	31-40	50 (46.3)
	41-50	16(14.8)
	51-60	10(9.3)
Country of residence	Bahrain	36 (33.3)
	UAE	22 (20.4)
	KSA	12 (11.1)
	Oman	21 (19.4)
	Kuwait	14 (13)
	Qatar	3 (2.8)
Academic qualifications	B.Sc.	71 (65.7)
	M.Sc.	19 (17.6)
	D.PT	5 (4.6)
	Dip.	5 (5.6)
	Ph.D.	1 (0.9)
	Other qualifications	7 (5.6)
Experience (years)	More than 10 years	52 (48.1)
	2-4 years	15 (13.9)
	Less than one year	4 (3.7)
	5-10 years	37 (34.3)
Current area of practice	General hospitals	47 (43.5)
	Specialized hospitals	17 (15.7)

	Elderly care Centers	2 (1.9)
	Public health	8 (7.4)
	Clinics	28 (25.9)
	Home care	1 (0.9)
	Others (teaching, administrative)	5 (4.5)
Sector of practice	Private sector	33 (33.6)
	Governmental sector	75 (69.4)
Type of patients	Inpatient	23 (21)
	Outpatient	84 (79)

Notes: UAE: United Arab of Emirates, KSA: Kingdome of Saudi Arabia, B.Sc.: Bachelor's degree, M.Sc.: Master's degree, D.PT: Doctor of physical Therapy, Dip.: Diploma in physical therapy, Ph.D.: Doctor of Philosophy degree.

4.2 Questionnaire Results

4.2.1 Perceptions About Mastectomy General Knowledge

Perception of Mastectomy Definition

Around 74.1% of physiotherapist perceived that mastectomy is defined by the removal of the whole breast tissue. Moreover, about 23.1% perceived that it's defined by the removal of the tumor cell only, while 3.7% perceived that it's the removal of the lumps, and 3.7% perceived that they do not know the right answer as shown in Figure (4.1)

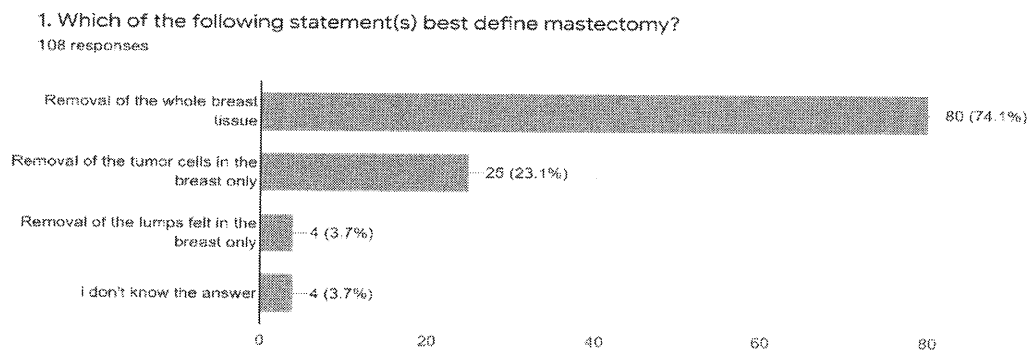


Figure (4.1) - Perceptions of the definition of mastectomy.

Perceptions of Mastectomy Surgery Decision

As shown in Figure (4.2), most physiotherapists perceived that mastectomy surgery is not indicated for every woman diagnosed with cancer (63.9%).

2. In my opinion, most women diagnosed with cancer undergo mastectomy.
108 responses

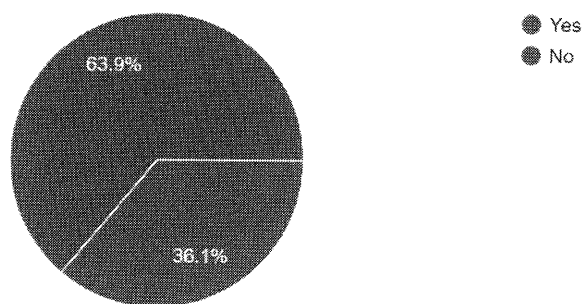


Figure (4.2) - Perception of participants about mastectomy surgery for women diagnosed with cancer.

Perceptions About the Indication of Mastectomy

Most physiotherapists perceived that mastectomy surgery is indicated for removing the malignant breast tumors (54.6%), while 1.9% of the participants perceived that it's indicated for the removal of benign breast tumors. About third (38%) of the participants perceived that it's indicated for both malignant and benign breast tumors, while 8.3% of them sees that it's indicated for breast calcifications and 8.3% do not have a certain perception regarding the indications of mastectomy surgery (Figure 4.3).

3. In my opinion, mastectomy is indicated for women diagnosed with breast cancer for :
108 responses

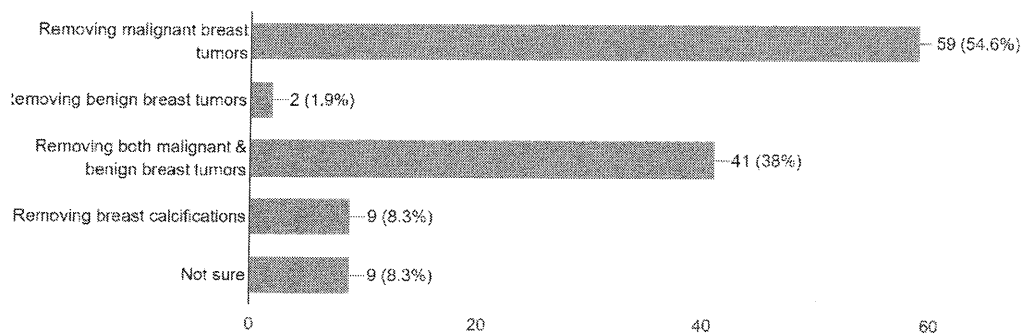


Figure (4.3) - Perceptions about the indication of mastectomy surgery.

Perceptions About Types of Mastectomy Surgery

Most physiotherapists perceived answer among the therapist for the types of mastectomy surgery is that it differs as the stage of the disease differs (67.6%), 23.1% of therapists perceived that the type depends on the type of cancer, 5.6% perceived that there is one type only, while 17.6% of the participants don't not sure about their knowledge perception (Figure 4.4).

4. In my opinion, the types of mastectomy :
108 responses

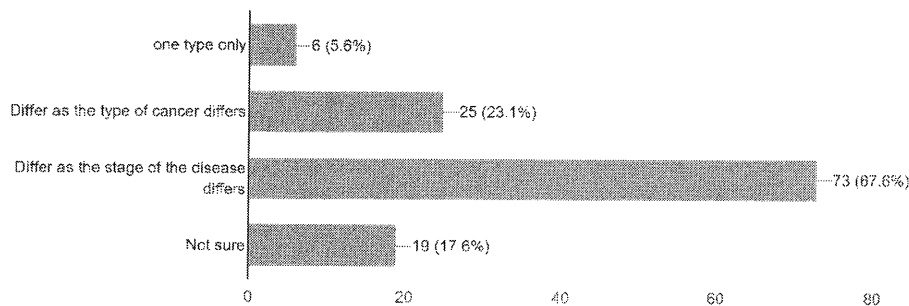


Figure (4.4) - Perceptions regarding the types of mastectomy surgery.

Perceptions About Goal of Mastectomy

About 88% of physiotherapists perceived that the goal of mastectomy surgery is to remove the tumor and extend the life expectancy

of the patients representing the majority. A percentage of 8.3% of participants perceived that the goal is to remove the tumor, while 2.8% of them don't have a certain knowledge perception about the goal of mastectomy surgery (Figure 4.5).

5. In my opinion, the goal of mastectomy is to:

108 responses

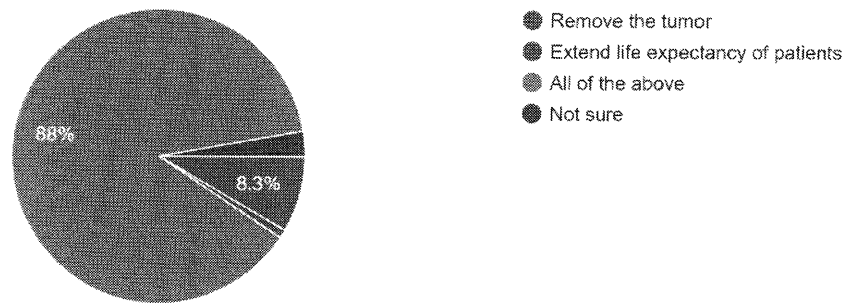


Figure (4.5) - Perception of participants about knowledge of the goal of mastectomy.

Perception About the Most Affected Joint Following Mastectomy

Majority of physiotherapists perceived that the shoulder joint is the most affected joint following the mastectomy surgery 67.6%, while 19.4% of the participants perceived that mastectomy affects the whole upper limb joints including wrist, elbow, shoulder, cervical and thoracic joints, while 8.3% of physiotherapist do not have a certain knowledge perception regarding the joint that is commonly affected after mastectomy (Figure 4.6).

In my opinion, the joint that is more commonly affected following a mastectomy procedure is :
108 responses

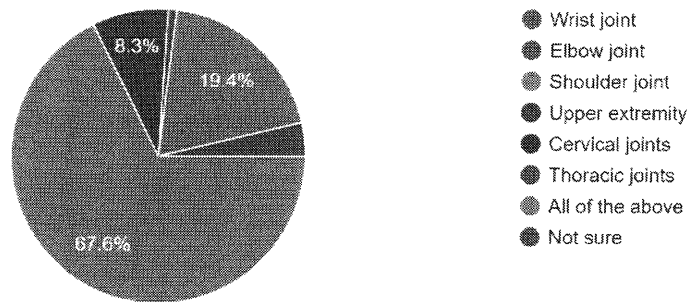


Figure (4.6) - The perception of participants regarding the most affected joint following mastectomy

Perceptions About Symptoms That Follows Mastectomy

Majority of physiotherapists (50.9%) perceived that pain, swelling, limited ROM, lymphedema, Axillary Web Syndrome (AWS), paraesthesia, sensory impairments, motor impairments and seroma formation are the most common symptoms that follows mastectomy. In the second-place limited range of motion, pain and lymphedema were the most common perceived answers by the participants (48.1%, 47.2%, 46.3%, respectively) as a common symptom that follows mastectomy surgery, while 3.7% of physiotherapist do not have a certain knowledge perception regarding the symptoms that follows mastectomy (Figure 4.7).

7. In my opinion, the most common symptoms that follow mastectomy are (select all that apply):
108 responses

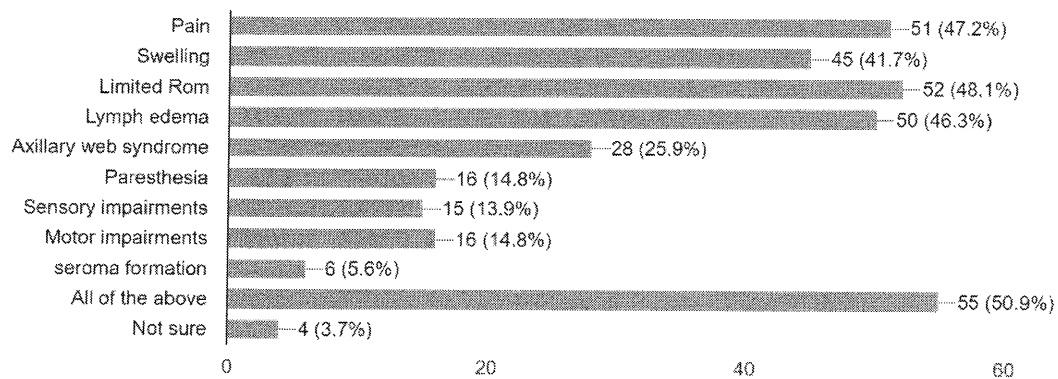


Figure (4.7) - perceptions of physiotherapist regarding the common symptoms that follows mastectomy.

Perceptions About Factors Exacerbating Upper Limb Morbidity Following Mastectomy

Figure (4.8) shows that most physiotherapists (60.2%) perceived that radiation therapy, type of surgery, complications that follows surgery, previous shoulder pathology, and delayed rehabilitations are all factors that exacerbate the upper limb morbidity after mastectomy. Complications after surgery and delayed rehabilitation alone was the second most common perceived answer by the participants (31.5%, 25% respectively.), while 10.2% of physiotherapist do not have a certain knowledge perception regarding the factors that exacerbate the morbidity of upper limbs following mastectomy (Figure 4.8).

8. Factors that exacerbate the upper limb morbidity after mastectomy (select all that apply)
108 responses

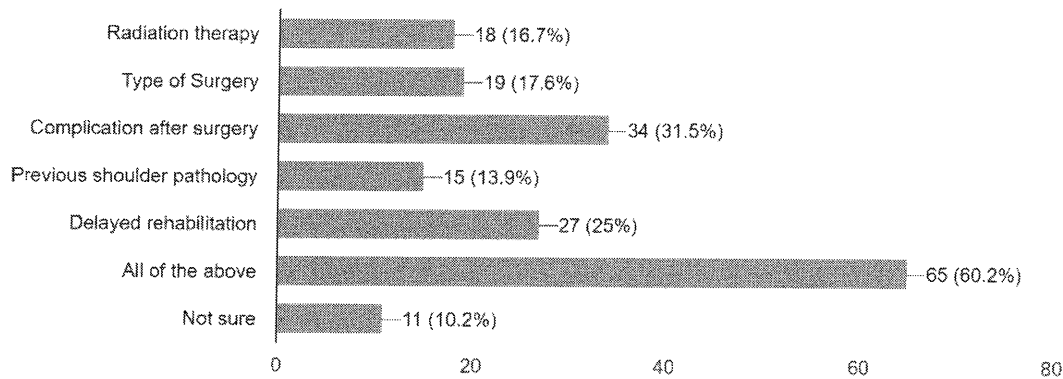


Figure (4.8) - Perceptions about factors that exacerbate upper limb morbidity following mastectomy.

Perceptions About the Indication of Physiotherapy Treatment

Figure (4.9) illustrates the most perceived answers by the therapist for indication of physiotherapy treatment. The lymphedema came in the first place, followed by shoulder dysfunction, restricted range of motion, treatment of pain, promote healing and axillary web syndrome (84.3%, 80.6%, 77.8%, 63%, 56.5%, respectively).

9. The indications for physiotherapy treatment for females after mastectomy are (select all that apply):
108 responses

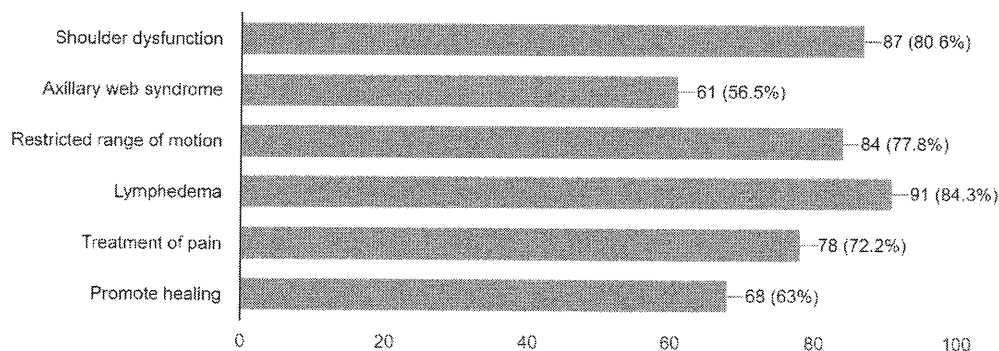


Figure (4.9) - Perceptions about the indication of physiotherapy treatment after mastectomy.

Perceptions About the Treatment of Shoulder Dysfunction

Most physiotherapists perceived that treatment of shoulder dysfunction should include isometric exercises, strengthening exercises, electrotherapy, lymphatic drainage, mobilization, and education all together. Half of the participants perceives that education is important in the treatment of shoulder dysfunction, followed by lymphatic drainage and mobilization (45.4, 45.4%, respectively), while electrotherapy came in the last place in favoring the treatments of shoulder dysfunction (13%) and a percentage of 3.7% participants responded that they do not have a certain knowledge perception in this regard (Figure 4.10).

10. The treatment for shoulder dysfunction after mastectomy should include (select all that apply):
108 responses

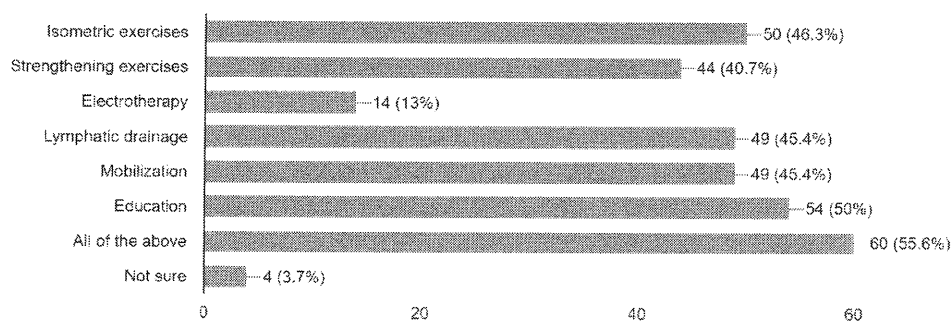


Figure (4.10) - Perception about the treatments of shoulder dysfunction following mastectomy.

Perceptions About the Muscles Targeted in The Treatment of Shoulder Dysfunction

Figure (4.11) illustrates the most perceived answers by the therapist the muscle that should be targeted in the treatment of shoulder dysfunction in females after mastectomy. Pectoralis muscles came in the first rank, followed by scapular muscles, serratus anterior trapezius muscle, deltoid,

rhomboids, and biceps (87%, 59.3%, 57.4%, 56.5%, 52.8% 46.3% and 37%, respectively).

11. The muscles that should be targeted in the treatment of shoulder dysfunction following mastectomy are (select all that apply):

108 responses

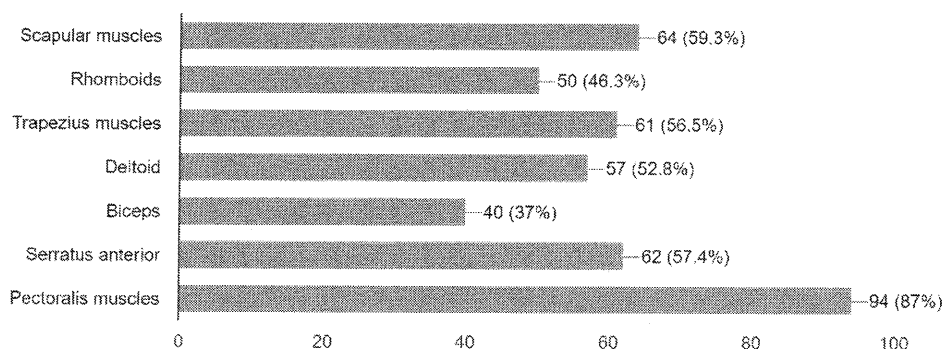


Figure (4.11) - Perceptions about the muscles targeted in the treatment of shoulder dysfunction

Perceptions About Preventive Techniques

For the knowledge about preventive techniques that should be taken to prevent shoulder dysfunction following mastectomy, the most perceived answers were as follows; patient education in the first place (86.1%,) followed by lymphatic drainage (76.9%), applying shoulder mobilization (75.9%), strengthening exercises (66.7%), improving circulation (63.9%), aerobic exercises (32.4%) and the use of electrotherapy modalities (23.1%) (Figure 4.12).

12. In my opinion, the following technique(s) is important for preventing shoulder dysfunction following mastectomy (select all that apply)

108 responses

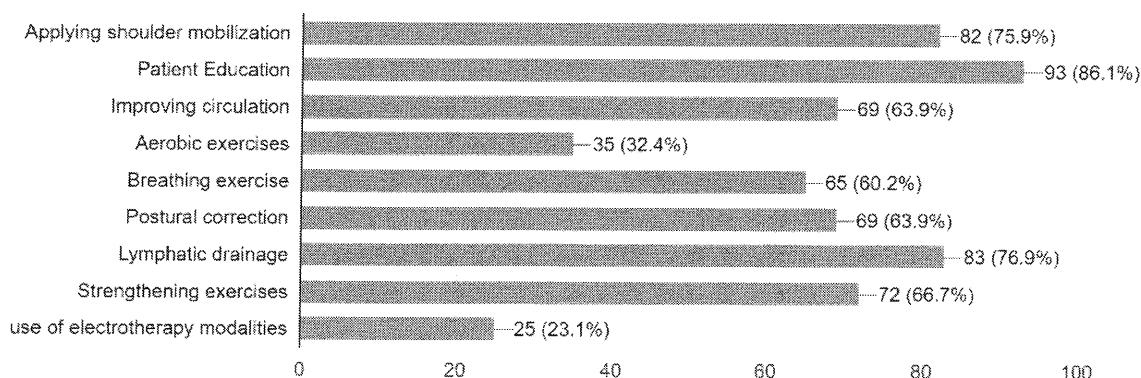


Figure (4.12) - Perceptions about preventive technique.

4.2.2 Perceptions Towards the Treatment of Shoulder Dysfunction After Mastectomy

Most of physiotherapist strongly agreed that physiotherapy is important in the treatment of breast cancer (76.8%), improves shoulder pain and function after mastectomy (79.6 %), can be implemented in early stages following mastectomy (60.2%) physiotherapist are essential caregivers for shoulder dysfunction following mastectomy (80.5%), physiotherapy prevents complications and motor impairments following mastectomy (66.6%), improves the quality of life for females (81.5%). (Figure 4.13).

4.2.3 Perceptions Toward the Working Environment

Majority of physiotherapist strongly agreed that physiotherapist needs to get necessary training to be able to treat shoulder dysfunction following mastectomy 64.8% ,while 45.8% physiotherapist strongly agreed that work places should be specially equipped for treating females

with mastectomy shoulder dysfunction , around 70.2% of physiotherapist strongly agreed that that the working facilities should increase the awareness about breast cancer and mastectomy diagnosis, assessment and treatments, while 50.9% of physiotherapist strongly agreed that there should be special rehabilitation centers for treating shoulder dysfunction following mastectomy, around 65.7%of physiotherapists responded that they strongly agreed that a protocol or guideline should be implemented for physiotherapists for the treatment of shoulder dysfunction following mastectomy. A percentage of 53.7% of respondents strongly agreed that all physiotherapists must be able to manage and tret shoulder dysfunction following mastectomy and 33.3% of physiotherapists strongly agreed that without sufficient knowledge physiotherapist will not be able to implement effective treatment of shoulder dysfunction following mastectomy in females diagnosed with cancer (Figure 4.14).

Please identify your level of agreement with the following statements regarding the treatment of Shoulder dysfunction after mastectomy. Specify your level of agreement on the following five points Likert scale. (1) Strongly agree, (2) Agree, (3) neutral, (4) Disagree, (5) strongly disagree.

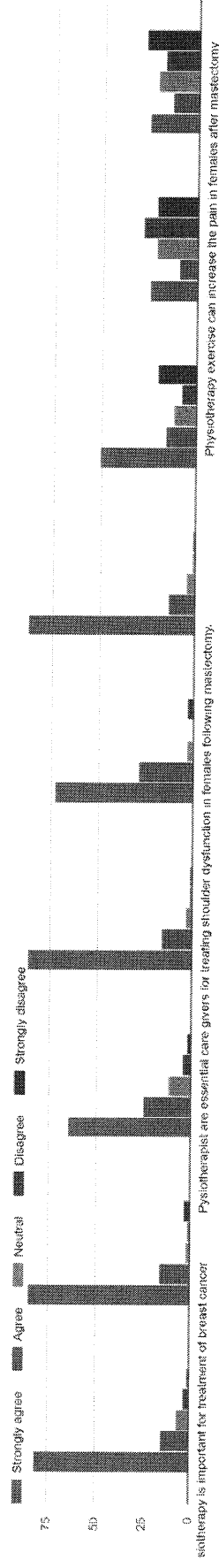


Figure (4.13) - perceptions towards the treatment of shoulder dysfunction after mastectomy on Likert scale

Please identify your level of agreement with the following statements regarding the physiotherapists learning needs for the treatment of shoulder dysfunction after mastectomy. Specify your level of agreement on the following five.... (1) Strongly agree, (2) Agree, (3) neutral, (4) Disagree, (5) strongly disagree.

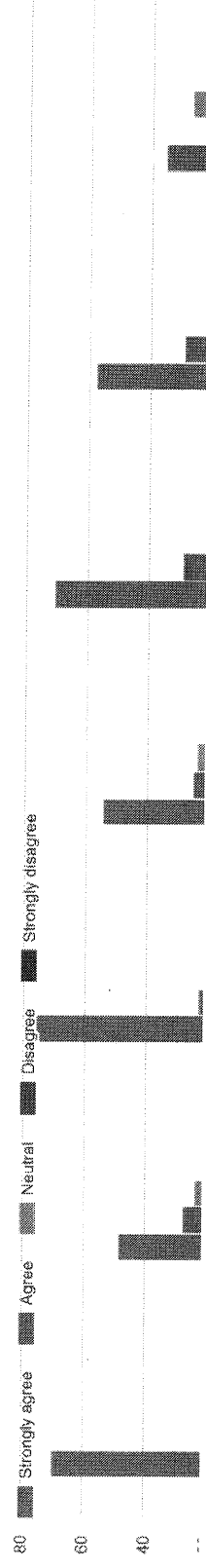


Figure (4.14) - perceptions toward learning needs on Likert scale.

4.2.4 Perceptions of the Learning needs

The results section below presents the likelihood of physiotherapists in improving their knowledge in various areas related to mastectomy (1= extremely unlikely, 5= extremely likely).

Improving The General Knowledge About Mastectomy

Majority of physiotherapists (51.47%) are extremely likely to increase their knowledge about mastectomy, while 3.7% of participant are unlikely to increase their knowledge regarding mastectomy (Figure 4.15).

1. How likely are you going to increase your knowledge about mastectomy?

108 responses

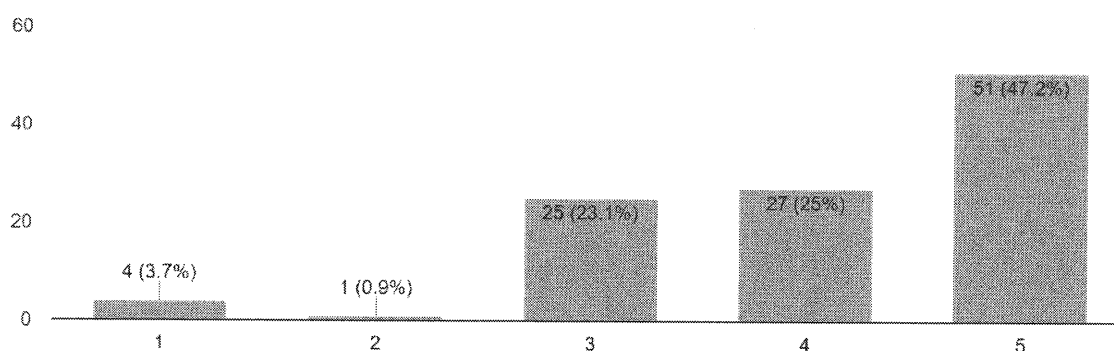


Figure (4.15) - Perception of physiotherapist to improve their knowledge about mastectomy

Improving The Knowledge About Shoulder Dysfunction After Mastectomy

Majority of physiotherapists (50%) are extremely likely to increase their knowledge about shoulder dysfunction following mastectomy, while 2.8% of participant are unlikely to increase their knowledge regarding shoulder dysfunction following mastectomy (Figure 4.16).

2. How likely are you going to increase your knowledge about shoulder dysfunction following a mastectomy?

108 responses

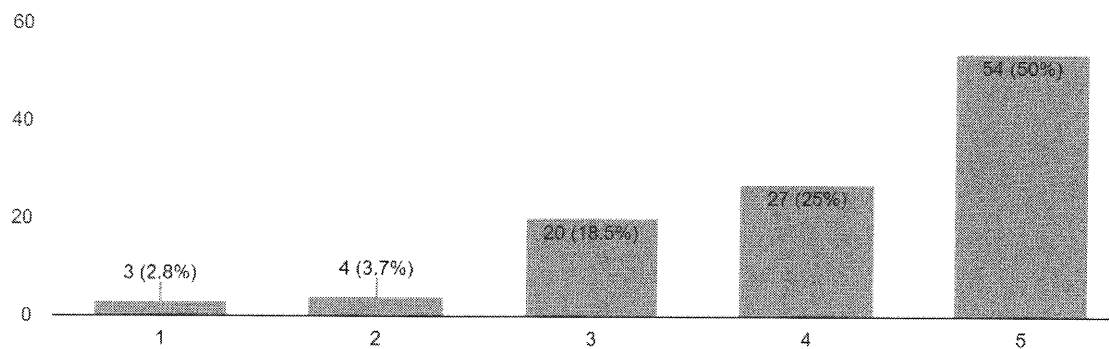


Figure (4.16) - Physiotherapist perception of increasing their knowledge about shoulder dysfunction following mastectomy.

The Need of Improving Knowledge About Shoulder Dysfunction Management

Majority of physiotherapists (48.1%) are extremely likely to increase their knowledge about shoulder dysfunction management following mastectomy, while 2.8% of participants are unlikely to increase their knowledge regarding shoulder dysfunction management following mastectomy (Figure 4.17).

3. in the near future, how likely are you to improve your knowledge about managing shoulder dysfunction after a breast surgery (Mastectomy)?

108 responses

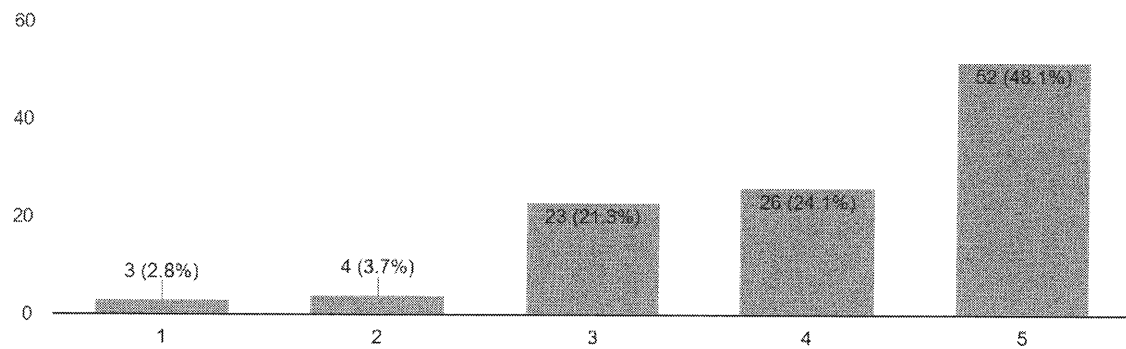


Figure (4.17) - Physiotherapists needs of improving knowledge about shoulder dysfunction management.

The Likelihood of Becoming a Lymphedema Therapist

Majority of physiotherapists (31.5%) are neutral regards having lymphedema training, while 13.9% are unlikely to train for becoming a lymphedema therapist (Figure 4.18).

4. How likely are you going to train to become a lymphedema therapist?

108 responses

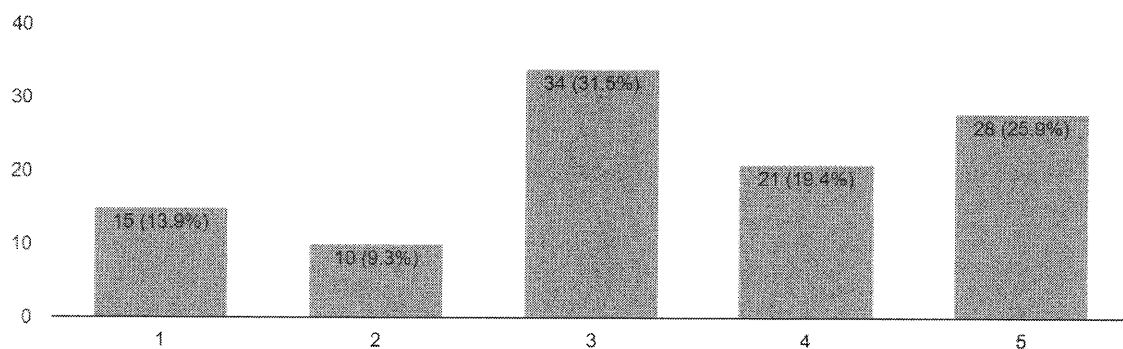


Figure (4.18) - Physiotherapists perception about becoming a lymphedema therapist.

The Likelihood of Attending Specialized Courses

Majority of participants are extremely likely to attend specialized courses and training programs about the management of shoulder dysfunction following mastectomy, while 7.4% are not likely (Figure 4.19).

5. How likely are you going to attend courses and training programs about the management of shoulder dysfunction following a mastectomy?

108 responses

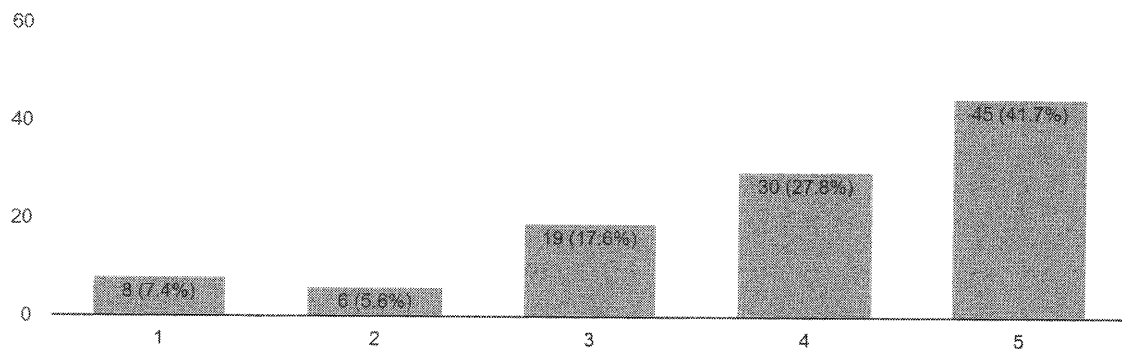


Figure (4.19) - Physiotherapist's perceptions towards attending special courses for the management of shoulder dysfunction.

Learning of Novel Approaches

Most of respondents (46.3%) are extremely likely to learn novel approaches for treating of shoulder dysfunction following mastectomy, while 4.6% are unlikely (Figure 4.20).

6. How likely are you going to learn new approaches for the treatment of shoulder dysfunction following a mastectomy?

108 responses

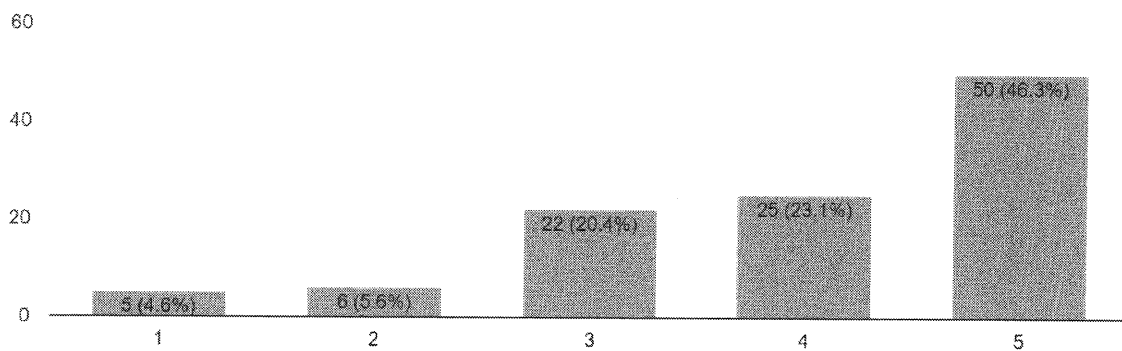


Figure (4.20) - Perceptions of physiotherapist towards learning new approaches for treatment of shoulder dysfunction following mastectomy.

4.2.5 Knowledge Level of The Physiotherapists

After reviewing the frequency of each question earlier in this chapter. This section further analysis is going to be obtained for the second part of the survey, concerning the perception of physiotherapist toward the knowledge about mastectomy to explore the level of knowledge that the participants in this survey have with respect to their different countries of residence and different qualifications.

The section contained several questions that are related to general knowledges related to mastectomy diagnosis, assessment of symptoms, and treatment. The questions were based on the literature review of this study then were categorized into three categories (1= adequate knowledge, 2= Inadequate knowledge, 3= Poor\No knowledge).

The “Adequate knowledge” represents the answers that match with the knowledge obtained from literature and are evidence based, “The inadequate knowledges” represent the answers that do not match with the

literature or not based on evidence and finally, “Poor or \ no knowledge” represents the lack of knowledge stated as “I don’t know the answer”, or “Not sure” as a response to knowledge questions. Data then were classified based on the three mentioned categories to determine the level of Knowledge the physiotherapist have regarding mastectomy by frequency analysis in SPSS. And the results were as follows:

Mastectomy Definition

After classifying the data according to categories to determine the level of knowledge, it was found that majority of the participants had an adequate level of knowledges (69.7%, n= 76), while (2.8%, n= 3) were classified as having no knowledge regarding the definition of mastectomy as shown in (Table 4.3).

Mastectomy Surgery Target Patients

Results shows that the level of physiotherapists knowledge regarding the mastectomy surgery revealed that (62.4%, n= 68) physiotherapist have adequate knowledge, while on other hand (35.8%, n=39) had inadequate level of knowledge regarding the mastectomy surgical decisions (Table 4.3).

Reason For Indication of Mastectomy

Results shows that (48.1%, n=52) of physiotherapists had adequate knowledge on the reason for mastectomy indication, while (5.6%, n=6) had no knowledge on the reason for mastectomy indications (Table 4.3).

Type of Mastectomies

Results shows that (63.9%, n= 68) physiotherapist had adequate knowledge about the types of mastectomies and (16.7%, n= 18) had no knowledge about mastectomy Types (Table 4.3).

The Goal of Mastectomy

Results shows that 87.9%, n= 95 physiotherapist had adequate knowledge about the goal of mastectomy while 2.8%, n= 3 had no knowledge about mastectomy goal (Table 4.3).

The Most Affected Joint Following Mastectomy

Results shows that (65.7%, n= 71) physiotherapist had adequate knowledge about the most affected joint by mastectomy surgery, while on the other hand (3.7%, n= 4) had no knowledge about the most affected joint after mastectomy (Table 4.3).

The Most Common Symptoms That Follows Mastectomy

Results shows that 39.8%, n= 43 physiotherapist had adequate knowledge about the most common symptoms following mastectomy surgery and (2.8%, n= 3|) had no knowledge about the most common symptoms after mastectomy (Table 4.3).

The Factors That Increase Upper Limb Morbidity Following Mastectomy

Results shows that (50.9%, n= 55) physiotherapist had adequate knowledge about the factors that exacerbate upper limb morbidity following mastectomy surgery while 9.3%, n= 10 had no knowledge about the factors that increase the upper limbs morbidity after mastectomy (Table 4.3).

The Treatment of Shoulder Dysfunction

It was shown that (40.7%, n= 44) physiotherapist had adequate knowledge about the factors that exacerbate upper limb morbidity following mastectomy surgery, 55.6% while (2.8%, n= 3) had no knowledge about the factors that increase the upper limbs morbidity after mastectomy (Table 4.3).

Table (4.3) - The knowledge level of physiotherapists according to their perceived perceptions.

Knowledge Variables	Level of knowledge	n (%)
Definition of mastectomy	Adequate	76 (6.7)
	Inadequate	28 (25.7)
	No knowledge	3 (2.8)
Mastectomy surgery	Adequate	68 (63.9)
	Inadequate	39 (36.1)
Mastectomy Indication	Adequate	52 (48.1)
	Inadequate	49 (45.4)
	No knowledge	6 (5.6)
Mastectomies type	Adequate	68 (63.9)
	Inadequate	21 (19.4)
	No knowledge	18 (16.7)
Mastectomies Goal	Adequate	95 (87.9)
	Inadequate	10 (9.3)
	No knowledge	3 (2.8)
Most affected joint	Adequate	71 (65.7)
	Inadequate	32 (29.6)
	No knowledge	4 (3.7)
Most common symptoms after mastectomy	Adequate knowledge	43 (39.8)
	Inadequate knowledge	61 (56.5)
	No knowledge	3 (2.8)
Factors that increase upper limb morbidity after mastectomy	Adequate knowledge	55 (50.9)
	Inadequate knowledge	42 (38.9)
	No knowledge	10 (9.3)
Treatment of shoulder dysfunction	Adequate knowledge	44 (40.7)
	Inadequate knowledge	60 (55.6)
	No knowledge	3 (2.8)

4.2.6 Levels of Agreements in Perceptions

In this section, the level of agreement between participants is going to be explored and measured for each agreement questions via the compare of each questions' mean and standard deviation in treatment, work environment and learning needs perceptions in each survey section.

Level Of Agreements Toward Treatment Perceptions

Table (4.4) Indicates a strong level of agreements among physiotherapists towards the statement that support the implementing of physiotherapy treatment to females following mastectomy, with a mean ranging between 4.61 to 4.73 for the positive statements and a weaker level of agreement with the statements that are unsporting the implementation of physiotherapy with a mean ranging between 2.88 to 3.6. The highest score was 4.61 supporting the importance of physiotherapy management for shoulder dysfunction, whilst the lowest score was 2.8 for the statement that is against the implementation of physiotherapy treatment stating that it increases the pain after the surgery. The statement with the highest agreement means was that physiotherapy improves the shoulder pain and function after mastectomy.

Table (4.4) - Descriptive statistics of treatment perceptions expressed by Mean and standard deviation.

Statement	Mean	SD
Physiotherapy is important for treatment of breast cancer	4.61	0.81
Physiotherapy improves shoulder pain and function after mastectomy	4.68	0.801
Physiotherapy can be implemented for mastectomy patients in early stages	4.36	0.95

Physiotherapists are essential care givers for treating shoulder dysfunction in females following mastectomy	4.73	0.65
Physiotherapy can prevent the shoulder joint complications that follows the mastectomy like sensory (pain and paraesthesia) and motor impairments (Limited ROM)	4.56	0.80
Physiotherapy can improve the quality of life for females after having mastectomy	4.73	0.66
Physiotherapy can increase the prevalence of upper limb morbidity after mastectomy (like lymphedema, seroma formation)	3.63	1.58
Physiotherapy exercise can increase the pain in females after mastectomy	2.88	1.45
Physiotherapists can come up with limited outcomes in management of shoulder dysfunction in females following mastectomy.	2.93	1.52

Notes: SD, standard deviation.

Level Of Agreements Towards Working Environment and Settings

Table (4.5) Indicates a strong level of agreements among physiotherapists towards the statement that support the need for having a prepared working environment, special protocols of treatments of shoulder dysfunction in females after mastectomy in working environments and a specific equipped facilitations with a mean ranging between 4.07 to 4.59 for the positive statements and a weaker level of agreement with the statements that are not sporting the need for having a prepared working environment with a mean ranging between 3.52 to 4.25. The statement that got the highest mean of agreement is that Workplaces should work on increasing the awareness about breast cancer and mastectomy diagnosis, assessment, and treatment 4.59, while the lowest score was 3.52 to the statement that physiotherapist can't treat shoulder dysfunction related to mastectomy in females without previous knowledge.

Table (4.5) - Descriptive statistics of working environment and settings perceptions expressed by Mean and standard deviation.

Statements	Mean	SD
Physiotherapists need to get the necessary training and attend special courses to be able to treat shoulder dysfunction following mastectomy.	4.45	0.85
Workplaces should have special equipment / facilities for treatment of shoulder dysfunction in females following mastectomy.	4.07	1.04
Workplaces should increase the awareness about breast cancer and mastectomy diagnosis, assessment, and treatment.	4.59	0.74
There should be specialized physiotherapy rehabilitation centers for the treatment of shoulder dysfunction in females following mastectomy	4.20	0.94
There should be a guideline or information protocol for the treatment of shoulder dysfunction following mastectomy.	4.56	0.73
All physiotherapists must be able to treat and manage shoulder dysfunction in females following mastectomy	4.25	1.01
Physiotherapists can't treat shoulder dysfunction in females following mastectomy without having previous knowledge	3.52	1.32

Notes: SD, standard deviation.

Learning Needs Perceptions Level of Agreements

Table (4.6) Indicates a strong level of agreements among physiotherapists towards the statement that support the intention of physiotherapists towards improving their knowledge regarding the treatment of mastectomy, learning new approaches attending specialized courses with a mean ranging between 3.34 to 4.16 for the positive statements. The statement with the highest agreement means was about the likelihoods of physiotherapists regarding increasing their knowledge about mastectomy and shoulder dysfunction. (4.16).

Table (4.6) - Descriptive statistics of learning needs perceptions expressed by Mean and standard deviation

Statements	Mean	SD
How likely are you going to increase your knowledge about mastectomy	4.11	1.03
How likely are you going to increase your knowledge about shoulder dysfunction following a mastectomy	4.16	1.03
In the near future, how likely are you to improve your knowledge about managing shoulder dysfunction after a breast surgery (Mastectomy)?	4.11	1.04
How likely are you going to train to become a lymphedema therapist	3.34	1.33
How likely are you going to train to become specialized in the treatment of shoulder dysfunction in females after mastectomy	3.58	1.27
How likely are you going to attend courses and training programs about the management of shoulder dysfunction following a mastectomy?	3.91	1.22
How likely are you going to learn new approaches for the treatment of shoulder dysfunction following a mastectomy?	4.01	1.15

Notes: SD, standard deviation.

4.8 Comparisons Between Various Categories

4.8.1 Differences Between Genders

Gender Vs Treatment Perception

The independent t-test results comparing between genders and treatment perceptions showed a statistically significant difference between males (Mean $\pm$ SD) (n= 21, 4.32 $\pm$ 0.73) and females (n= 87, 4.68 $\pm$ 0.63) regarding their treatment perception (P = 0.034) (Table 4.7).

Gender Vs Work Environment

The independent t-test results comparing between genders showed no statistical difference between males (Mean $\pm$ SD) (n= 21, 4.13 $\pm$ 0.58) and females (n= 87, 4.26 $\pm$ 0.70) regarding their work environment perception (P = 0.53) (Table 4.7).

Gender Vs Learning Needs Perception

The independent t-test to comparing between genders illustrated that there is a statistical significance between males (Mean $\pm$ SD) (n= 21, 3.89 $\pm$ 1.34) and females (n=87, 4.62 $\pm$ 1.03) regarding their learning need perceptions since the P-value was equal to (0.028) (Table 4.7).

Table (4.7) - The difference between gender and physiotherapists perceptions.

	Gender	N	Mean	SD	P
Treatment perceptions	Male	21	4.32	0.73	0.03

	Female	87	4.68	0.63	
Work perceptions	Male	21	4.13	0.58	0.53
	Female	87	4.26	0.70	
Learning need perceptions	Male	21	3.89	1.34	0.02
	Female	87	4.62	1.03	

Notes: SD, standard deviation.

4.8.2 Differences Between GCC Countries

The One-way Analysis of Variance (ANOVA) test results showed no statistical significance difference between the GCC countries in treatment perception ($P = 0.657$), work perceptions ($P = 0.66$), and learning perceptions ($P = 0.39$) (Table 4.8).

Table (4.8) - Analysis of Variance (ANOVA) results of the difference between country of resident and physiotherapists perceptions.

Treatment perception				95% Confidence Interval for Mean		
Country	N	Mean	SD	Lower Bound	Upper Bound	P
Bahrain	36	4.72	0.41	4.57	4.85	0.66
Kuwait	14	4.58	1.06	3.97	5.19	
Oman	21	4.63	0.75	4.28	4.96	
Qatar	3	4.66	0.57	3.23	6.10	
KSA	12	4.32	0.7	3.86	4.76	
UAE	22	4.60	0.58	4.34	4.85	
Work perceptions				95% Confidence Interval for Mean		
Country	N	Mean	SD	Lower Bound	Upper Bound	P
Bahrain	36	4.22	0.60	4.02	4.43	0.66
Kuwait	14	4.29	1.03	3.69	4.89	

Oman	21	4.34	0.65	4.05	4.64	
Qatar	3	4.71	0.49	3.48	5.94	
KSA	12	4.11	0.54	3.77	4.46	
UAE	22	4.10	0.66	3.80	4.39	
Learning Perceptions				95% Confidence Interval for Mean		
Country	N	Mean	SD	Lower Bound	Upper Bound	
Bahrain	36	4.67	0.89	4.37	4.98	0.39
Kuwait	14	4.18	1.20	3.48	4.87	
Oman	21	4.70	0.92	4.28	5.12	
Qatar	3	3.61	2.16	-1.75	8.99	
KSA	12	4.38	1.38	3.49	5.26	
UAE	22	4.31	1.31	3.72	4.89	

Notes: SD, standard deviation; KSA, Kingdom of Saudi Arabia; UAE, United Arab of Emirates.

4.8.3 Differences Between Qualifications.

The independent simple t-test to comparing between BSc holders (Mean $\pm$ SD) (n= 71, 4.5 $\pm$ 0.72) and holders of higher degrees (n=37, 4.6 $\pm$ 0.52) qualification level showed no statistical significance difference in treatment perception (P = 0.31), work perceptions (P = 0.89), and learning perceptions (P = 0.12) (Table 4.9).

Table (4.9) - The Difference between Qualification degree and physiotherapists perceptions

Qualification degree Vs Treatment perceptions					
	Qualification	N	Mean	SD	P
Treatment perception	BSc	71	4.58	0.72	0.31
	Higher education	37	4.65	0.52	

Qualification degree Vs Work environment settings perceptions					
	Qualification	N	Mean	SD	P
Work perception	BSc	71	4.23	0.70	0.89
	Higher education	37	4.23	0.65	
Qualification degree Vs Learning needs perceptions					
	Qualification	N	Mean	SD	P
Learning perceptions	BSc	71	4.58	1.13	0.19
	Higher education	37	4.28	1.10	

Notes: SD, standard deviation

4.8.4 Differences Between Years of Experience and Physiotherapists Perceptions

The One-way Analysis of Variance (ANOVA) test results showed no statistical significance difference between therapist with different years of experience in learning perception ($P = 0.40$), treatment perceptions ($P = 0.12$), and work perceptions ($P = 0.19$) (Table 4.10).

Table (4.10) - The difference between years of experience and physiotherapists perceptions

Years of Experience Vs Learning needs perceptions						
Learning perceptions						
	N	Mean	SD	95% Confidence Interval for Mean		
Years of Experience				Lower Bound	Upper Bound	P
10+	52	4.29	1.18	3.96	4.62	0.40

5 to 10	37	4.69	1.06	4.34	5.05	
2 to 4	15	4.60	1.09	4.00	5.21	
less than 1	4	4.42	1.18	2.54	6.31	
Total	108	4.48	1.13	4.26	4.69	
Years of Experience Vs treatment perceptions						
Treatment perception						
	N	Mean	SD	95% Confidence Interval for Mean		P
Years of Experience				Lower Bound	Upper Bound	
10+	52	4.50	0.83	4.27	4.73	0.128
5 to 10	37	4.80	0.32	4.69	4.91	
2 to 4	15	4.62	0.45	4.37	4.87	
less than 1	4	4.25	0.86	2.87	5.62	
Total	108	4.61	0.66	4.48	4.73	
years of experience Vs working environment						
Work Perception						
	N	Mean	SD	95% Confidence Interval for Mean		P
Years of Experience				Lower Bound	Upper Bound	
10+	52	4.11	0.77	3.89	4.32	0.199
5 to 10	37	4.36	0.625	4.15	4.57	
2 to 4	15	4.40	0.451	4.15	4.65	
	4	3.96	0.31	3.46	4.46	
Total	108	4.23	0.682	4.10	4.36	

Notes: SD, standard deviation

4.8.5 Differences Between Sector of Practice and Physiotherapists Perceptions

The independent simple t-test to comparing between governmental (Mean $\pm$ SD) (n= 71, 4.10 $\pm$ 0.70) and private sectors of practice (n=33, 4.17 $\pm$ 0.50) showed no statistical significance difference in treatment perception (P = 0.14), work perceptions (P = 0.98), and learning perceptions (P = 0.08) (Table 4.11).

Table (4.11) - Difference between sector of clinical practice and physiotherapists perceptions

Sector Vs treatment perceptions					
	Sector of practice	N	Mean	SD	P
Treatment Perception	Government	75	4.10	0.70	0.14
	Private	33	4.17	0.50	
Sector Vs work environment perceptions					
	Sector of practice	N	Mean	SD	P
Work perception	Government	75	4.26	0.70	0.98
	Private	33	4.16	0.63	
Sector Vs learning needs perceptions					
	Sector of practice	N	Mean	SD	P
Learning perceptions	Government	75	4.39	1.21	0.08
	Private	33	4.67	0.90	

Notes: SD, standard deviation

4.8.6 Differences Between the Type of Patients Seen and Physiotherapists Perceptions

The independent simple t-test to comparing between Type of patients seen by physiotherapists in In-patient (Mean $\pm$ SD) (n= 23, 4.28 $\pm$ 1.12) and out-patient (n=84, 4.69 $\pm$ 0.43) showed a statistical significance difference in treatment perception (P = 0.00), work perceptions (P = 0.03), and learning perceptions (P = 0.01) (Table 4.12).

Table (4.12) - Difference between type of patients seen and physiotherapist perceptions

Type of patients seen Vs treatment perceptions					
	Type of patients seen	N	Mean	SD	P
Treatment perception	In-patient	23	4.28	1.12	0.00
	out-patients	85	4.7	0.43	
Type of patients seen Vs Work environment perceptions					
	Type of patients seen	N	Mean	SD	P
Work Perception	In-patient	23	4.11	0.95	0.03
	out-patients	85	4.27	0.59	
Type of patients seen Vs learning needs perception					
	Type of patients seen	N	Mean	SD	P
Learning needs perceptions	In-patient	23	3.86	1.38	0.01
	out-patients	85	4.65	1.00	

Notes: SD, standard deviation

Chapter Five

Discussion

To the best of the researcher's knowledge, this is the first study exploring the perception of physiotherapists about the importance of managing shoulder dysfunction in females following mastectomy. The aim was to identify the level of knowledge of GCC physiotherapists about mastectomy and shoulder dysfunction after the surgery in female patients. It also aimed to investigate their perception of the working environment and learning needs.

In the present study, most respondents were females. It may indicate that female therapists are more interested in rehabilitating females following mastectomy than males. Such finding was expected in the GCC region due to cultural barriers and norms, as female patients will be more comfortable with therapists of the same gender. This finding agrees with Landes et al., (2013) who examined the women's preference for the sex of the therapist and concluded that women significantly prefer the female therapist ($P < 0.05$).

Moreover, gender and learning need perceptions differed statistically. This may indicate a difference in perception among the two genders as most of the participants were females; this can be explained by the intuition of female therapists to improve their knowledges in management of mastectomy shoulder dysfunction as they manage more female patients and come across female disorders more than males.

Most participants were holders of BSc degree in physiotherapy. Even though there were no significant differences based on the level of qualification and perception or level of mastectomy knowledge, this goes

in agreement with the physiotherapist's beliefs that there is a need for courses and training programs for the physiotherapist to improve their knowledge and clinical practice with mastectomy patients regardless of the level of qualifications. our finding is consistent with previous study by Belen et al., (2016) who studied the influence of type of patients in the perspectives of nurses and nurse student, he has also tested whether the academic qualifications affect the nurse's perspective. Results showed that the academic year did not influence the nurses' perspectives ($p=0.08$).

Notably, most physiotherapists had more than ten years of work experience and worked in general hospitals in the governmental sector. Regardless, the industry of clinical practice was found to have no impact on the physiotherapist's perception as there was no statistical difference. It indicates that general experience gained by the therapist in different hospital specialties or sectors will not be enough to educate the physiotherapist regarding the management of shoulder dysfunction in post-mastectomy patients. It also emphasizes the importance of implementing specific training programs to increase physiotherapist awareness and knowledge levels.

The results of the present study showed a statistically significant difference in the perception of physiotherapists regarding perceptions and the type of patients seen by the physiotherapists. Such finding means that the nature of the patients seen by the physiotherapists is one of the factors that will affect their practice and attitude toward the management of mastectomy. In other words, it is anticipated that as the physiotherapists in GCC get more engaged in a clinical training program with patients after having a mastectomy, they will develop more knowledge and clinical experiences as well as improve the work facilities to be qualified for the treatment of shoulder dysfunction in females after surviving breast cancer

surgery. This again supports this study's findings regarding the need for special constructed courses, programs, or protocols for this professional category. Lopez-Perez et al., (2016) investigated the influence of type of the patient in the cognitive and emotional reacting responses of professional nurses and student nurses treating terminal patients or nonterminal patients, it was found that the post-hoc analyses revealed significant pattern ($p= 0.05$), such that when facing terminal patients, the professional nurses rated higher on objective perspectives compared to students, while the nurses students had a main effect role, such that they scored higher on self-oriented perspective ($p=0.02$).

Most physiotherapists had adequate general knowledge regarding mastectomy related to the definition, indication, types, goals, and complications. Mastectomy was defined by most of a physiotherapist as the surgical removal of the whole breast tissue, while the indication of the surgery, as reported by many of the physiotherapists, was to remove the malignant breast tumors.

Also, they believed that the types of mastectomies differ as the stage and type of tumor differ and that the joint that is more affected by the mastectomy is the shoulder joint.

These results in the current study show that majority of physiotherapists agree with other studies that mentioned that upper body morbidity is highly associated with alteration of upper limb function, especially the shoulder joint (Hayes et al., 2012). Also, the indication of the surgical intervention was to remove the tumor from the breast and extend the life expectancy of the patient, as stated by Jones et al. (2018). Another study by Cil et al. (2018) also noted that the main oncologic goal of breast cancer surgery is to remove all the clinical and radiologic evidence of the disease in the breast.

Cil et al. (2018) also claimed that the surgical technique has dramatically changed and has expanded to different surgical approaches to extirpate the tumor and achieve optimal cosmesis. The surgical procedure will differ based on the type and stage of cancer.

In this study, it was reported that approximately more than half of the physiotherapists had inadequate knowledge of the symptoms that follow mastectomy. The results showed that most of the physiotherapists failed to address the most common upper limb morbidities that follow mastectomy surgery like axillary web syndrome, seroma formation and sensory impairment that usually are associated with the other symptoms like pain, paraesthesia, lymphedema and restricted range of motion as were reported in several studies by Hayes et al. (2012), Boquiren et al. (2016), and Thomas et al. (2008).

It was also found that almost half of the physiotherapists had inadequate knowledge of treatment of the shoulder dysfunction after cancer surgery. It was noticeable that the majority could not point all aspects of treatment methods that should be used to overcome the morbidities of shoulder dysfunction. Most choose a single intervention such as isometric and strengthening exercises, mobilization, education, and lymphatic drainage.

Giacalone et al. (2019) conducted a recent systematic review to describe the most current and effective physiotherapy intervention in treating shoulder pain following breast cancer treatment. The study suggested that active exercises, joint tissue mobilization accessory mobilization, aerobic and strengthening exercises, and education are the most used treatments for treating shoulder symptoms caused by mastectomy in the last ten years.

Crosbie et al. (2010) and Shamley et al. (2013) concluded that the muscles

most affected by mastectomy and should be targeted in the interventional exercise protocol are the scapulae muscles, the upper trapezius, and the rhomboids muscle. However, more extensive and prolonged literature reviews must be done in this regard.

This current study highlights a gap in the knowledge of GCC physiotherapists regarding the assessment and treatment of shoulder dysfunction. There is limited data regarding the knowledge of the physiotherapists in GCC regarding shoulder dysfunction following mastectomy. In addition, the studies found in the above literature do not individualize this professional category and, therefore, cannot be generalized

In this current study, all physiotherapists consider their profession an essential and promising discipline in treating females after mastectomy and reducing upper limb morbidity like shoulder dysfunction. This belief will likely influence their clinical practice in the same professional category.

Most surveyed physiotherapists strongly believe that physiotherapy is essential in treating breast cancer and improves shoulder pain and function after mastectomy surgery in females. They mostly thought that physiotherapists should be a necessary caregiver for all patients after mastectomy and that it should be implemented in the initial stages. It agrees with McNeely (2010) who demonstrated that early physiotherapy intervention involving lymphatic drainage, massage, exercise and education can reduce the incidence of some upper limb morbidities that follow mastectomy, such as lymphedema.

Singh et al. (2013) also reported that early integration of a surveillance physiotherapy approach for breast cancer patients is very promising and may decrease the incidence of upper limb morbidity.

Similarly, Koehler et al. (2018) reported that physiotherapy improves the shoulder range of motion and pain and is recommended to treat axillary web syndrome.

It was found that physiotherapists strongly agreed that the workplaces should be specially equipped for treating shoulder dysfunction in females with mastectomy surgery. It's also believed by most of the participants that the workplaces should increase the awareness of this health category. In addition, the vast majority also believed that there should be a standardized protocol to cover all the aspects of mastectomy that the physiotherapists will need to provide adequate preventative and therapeutical interventions to the concerned group. It was also perceived by approximately half of the participants that there should be a specialized physiotherapy rehabilitation center for the treatment of upper limb morbidities described by shoulder dysfunction that affects the females after surviving breast cancer mastectomy. These believes are anticipated to create an optimal practice environment in which the physiotherapists can implement their potential experiences for the good of the treatment of female breast cancer survivors. It would improve the patient outcomes and prevent or reduce the onset and prevalence of shoulder dysfunction following mastectomy surgery in females, as well as reduce the cost of physiotherapy treatment if the therapist directed the treatment to the concerned group. These finding are consistent with a study by Kitajima et al., (2020), who investigated the factors that affect the nursing and nursing specialist job satisfaction in cancer care in Japan to promote cancer care program in a cross-sectional study, the finding showed that factors related to activities, facilities, and cancer care team are highly associated with job satisfaction ($p=0.001$), which positively affect the nurse's commitment

increases work engagement and promote the cancer control and patient outcomes.

In exploring the learning needs of the physiotherapists, it was found that most physiotherapists are having extreme tendency to increase their knowledge about mastectomy and shoulder dysfunction management. Despite that a small percentage of physiotherapist 2.8% did not seek to improve their knowledge in the concerned field as they probably perceive that it is similar to their practice. A revolutionary trend of physiotherapists toward having lymphedema training and attending specialized courses or training programs about managing shoulder dysfunction was also found. Additionally, 46.3% of the respondents rated that they are incredibly likely to learn novel approaches to treating shoulder dysfunction following mastectomy in female cancer survivors. These findings can guide the facilitation programs that the physiotherapists will need in the future to improve their bits of knowledge, skills, and clinical practice with the concerned group.

Chapter Six

Conclusion and Limitations

6.1 Conclusion

This study was conducted to explore the perceptions of GCC physiotherapists about their role in the management of shoulder dysfunction in terms of knowledge, treatment perceptions, work environment and learning needs. To assess their level of expertise and find out the interrelations or differences in physiotherapists' perceptions impacted by factors like gender, country, level of qualification, sector of practice and the type of patients seen.

Significant relation between gender and treatment and learning needs perception were found, but no association was found between perception and country of residence or level of qualifications. In addition, most participants were seeing out patients, and a significant relationship was found between perception and type of patients the therapists treated.

Based on the results found, a significant gap in the knowledge regarding the assessment of symptoms and identification of mastectomy following morbidities and professional management of shoulder dysfunction were addressed among respondents, reaffirming the absence of standardization of knowledge and lack of systemization in working facilities and practices among GCC physiotherapists.

Further studies are needed to broaden such findings with larger sample size, propose rehabilitation protocols for treating shoulder dysfunction in female cancer survivors, and establish a specialized profession of physiotherapy practice in the concerned group. The results

should be used in conjunction with cost-benefit analysis, risk analysis as well as assessment of health requirements of both patients and physiotherapists.

6.2 Limitation of The Study

Like any other study, there must be some limitations. The limitation. Of this study was that the researcher was obliged to take a convenient sample to maximize the response rate. Above that, the COVID-19 pandemic restricted the study's design only online surveys instead of face-to-face interviews for direct contact. In addition, there were difficulties in maximizing the response rate in countries other than the researcher's country of origin.

6.3 Implication of Physiotherapy Practice

The results of this survey provide new evidence about the current views of GCC physiotherapists regarding the importance of post-mastectomy shoulder dysfunction management in females surviving breast cancer. Evidence will serve physiotherapy associations, health departments, oncology centers & oncology rehabilitation units and health ministries to redefine the role of physiotherapists and physiotherapy implementation in GCC for the breast cancer survivors. The results of this study should be used in conjunction with cost-benefit, risk, and preventive analysis before integrative changes in the physiotherapy field.

6.4 Recommendations

Implementing continuous awareness programs for the physiotherapists regarding breast cancer management from basic to specialized level is highly recommended. As well as the importance of building a consistent, standardized physiotherapy protocol in treating shoulder dysfunction. Moreover, conducting similar studies on physiotherapy and different professions and occupations like doctors, nursing, and occupational therapists will help create an overall view of this health category to be used as a reference for the future.

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Appendices

Appendix-1 - Ethical approval to conduct study



University of Bahrain
College of Health and Sports Sciences
Scientific Research and Publication Committee



February 23, 2021

To: The Chairperson of the Research and Ethics Committee
Ministry of Health / National Health Regulatory Authority (NHRA)
Kingdom of Bahrain

Dear Madam/Sir,

Greetings from the College of Health and Sport Sciences, University of Bahrain!

RE: Research study on "Perception of Arab Gulf Physiotherapists About Their Role in the Management of Females Shoulder Dysfunction Following Mastectomy"- CHSS SRPC Recommendation No: 8/2020-21 dt.Feb 23,2021.

The Scientific Research and Publication Committee, College of Health and Sport Sciences (CHSS), University of Bahrain (UOB), has reviewed and recommended the research proposal (CHSS SRPC Recommendation No: 8/2020-21 dt. Feb 23, 2021) entitled "Perception of Arab Gulf Physiotherapists About Their Role in the Management of Females Shoulder Dysfunction Following Mastectomy" to the MoH / NHRA RTST. Ms. Fatima Mohammed Jaffer Hazeem, a student enrolled in M.Sc Physiotherapy Program of CHSS, UoB would be carrying out the study under the supervision of Dr. Mohamed Abdulla Mohamed, Assistant Professor, Physiotherapy Program, CHSS, UoB as Master's Thesis. Notably, the outcome of the research is expected to benefit the physiotherapy profession in the Arab World. Therefore, I request to do the needful considering the paucity of time to complete the Master's Thesis.

Thank you for supporting scientific research at the CHSS, UOB.

Kind Regards,

Prof. Adnan Bekhit, PhD
Chairperson, Scientific Research and Publication Committee
College of Health and Sport Sciences
University of Bahrain

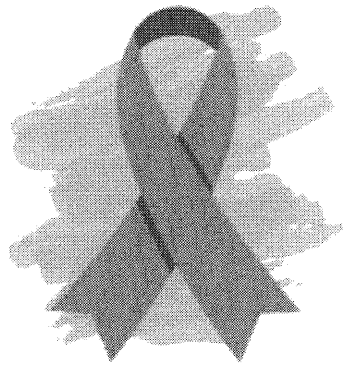
Appendix-2 - Consent and information sheet

Exploring The Perception of Arab Gulf Physiotherapists About Their Role in the Management of Shoulder Dysfunction in Females Following Mastectomy

 fatimahazeem27@gmail.com (not shared) [Switch accounts](#)



*Required



Informed consent

[Dear reader

Informed consent

Dear reader,

You are invited to participate in this study to explore the knowledge, perception and learning needs of GCC physiotherapist about their role in the management of shoulder dysfunction following mastectomy. Please take time to read the following information and ask us if there is anything that is not clear or for more information.

Title of the study

Perception of Arab Gulf Physiotherapists About Their Role in the Management of Females Shoulder Dysfunction Following Mastectomy

Purpose

The purpose of the study is to explore the perception of the physiotherapists in GCC about their potential role in the rehabilitation management of shoulder dysfunction in females after mastectomy.

Significance

The result of this study would highlight the professional practice of Arab-Gulf physiotherapists and give some insight about their learning needs which may play an important role in creating more optimal environment that they practice in. This would improve the patient outcomes and prevent or reduces shoulder dysfunction in females following mastectomy surgery. It will also reduce the cost of health care delivery if the treatment was well directed by the therapist to the concerned group.

Risks

This research is associated with no risks. The participation in this study is preformed online by answering the survey questions. It does not include any invasive procedures nor actual attendance.

Benefits

The study has no potential conflict of interest or any affiliation. There will be no direct benefits to you from participation in this study, however the researcher hope that the information obtained from this study my help in assessing the knowledge and awareness among physiotherapist in Bahrain and GCC about their role in the management of shoulder dysfunction in females following mastectomy.

Confidentiality

The privacy and confidentiality of the participants will strictly be maintained. No personal information will be included in the collected data or study results. The information obtained from the study will remain confidential and will only be used by the researcher.

Right to withdraw

There will be no enforcements for participation from any party. If you do not wish to take part in this study, you have the complete right to refuse or withdraw from the study at any time without any consequences.

Contact information

If you have any questions regarding the study or the questionnaire, you may contact the researcher at anytime via email on 20112684@stu.uob.edu.bh / Fatima_hazeem@hotmail.com.

The research is supervised by Dr. Mohamed Abdulla Mohamed, University of Bahrain [Email: moabdulla@uob.edu.bh]

I have read the forgoing information. I have had the opportunity to ask *
questions about it and any questions I have asked have been answered to my
satisfaction. I consent to voluntary participate in this research.

☐ Agree

☐ Disagree

Appendix-3 - Questionnaire

Exploring The Perception of Arab Gulf Physiotherapists About Their Role in the Management of Shoulder Dysfunction in Females Following Mastectomy

 fatimahazeem27@gmail.com (not shared) Switch accounts 

*Required

Demographic information

1. What is your gender? *

☐ Male

☐ Female

2. What is your age (in years)? *

☐ 21-30

☐ 31-40

☐ 41-50

☐ 51-60

☐ 61 and above

3. Are you a resident in GCC? *

☐ Yes

☐ No

4. What is your country of residence? *

☐ Bahrain

☐ Saudi Arabia

☐ United Arab Emirates

☐ Kuwait

☐ Oman

☐ Qatar

☐ Other:

Exploring The Perception of Arab Gulf Physiotherapists About Their Role in the Management of Shoulder Dysfunction in Females Following Mastectomy

 fatimahazeem27@gmail.com (not shared) Switch accounts 

*Required

Clinical practice

1. Are you a licensed physiotherapist? *

☐ Yes

☐ No

2. What is your highest academic qualifications? *

☐ Diploma of Physiotherapy (Dip)

☐ Bachelor of physiotherapy (BSc)

☐ Master of physiotherapy (MSc)

☐ Doctor of physiotherapy (DPT) (including DPT)

☐ Philosophy degree (PhD)

☐ Other:

3. How many years of clinical experience do you have? *

☐ less than 1 year

☐ 2-4 years

☐ 5-10 years

☐ 10+ years

4. What is your current practice setting? *

☐ General hospital

☐ Specialized hospital

Knowledge about mastectomy

Choose all that are applicable or answer with Yes / No or select the most appropriate answer

4. What is your current practice setting? *

- ☐ General hospital
- ☐ Specialized hospital
- ☐ Elderly care center
- ☐ Public health center
- ☐ Clinic / center
- ☐ Home care
- ☐ Other

5. Sector of clinical practice: *

- ☐ Government (public) sector
- ☐ Private sector

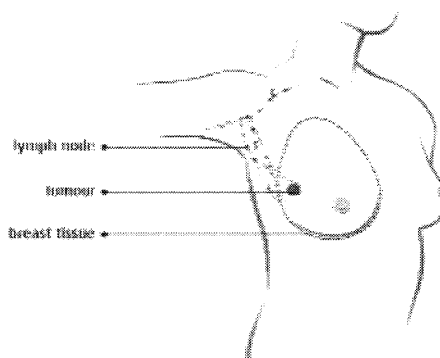
6. Type of physiotherapy patients seen currently

- ☐ Inpatient
- ☐ Outpatient

7. Current specialty area of physiotherapy practice: *

- ☐ Intensive Care Unit (ICU)
- ☐ Medical
- ☐ Neurology
- ☐ Women health
- ☐ Cardiopulmonary
- ☐ Orthopedic
- ☐ Geriatrics
- ☐ Sport
- ☐ Oncology
- ☐ Pediatrics
- ☐ Amputation
- ☐ Other

1. Which of the following statement(s) best define mastectomy? *



- ☐ Removal of the whole breast tissue
- ☐ Removal of the tumor cells in the breast only
- ☐ Removal of the lumps felt in the breast only
- ☐ I don't know the answer

2. In my opinion, most women diagnosed with cancer undergo mastectomy. *

- ☐ Yes
- ☐ No

3. In my opinion, mastectomy is indicated for women diagnosed with breast cancer for:



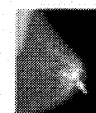
Normal
mammogram



Benign cyst
(not cancer)



Breast
calcifications



Breast
cancer

- ☐ Removing malignant breast tumors
- ☐ Removing benign breast tumors
- ☐ Removing both malignant & benign breast tumors
- ☐ Removing breast calcifications
- ☐ Not sure

4. In my opinion, the types of mastectomy : *

- ☐ one type only
- ☐ Differ as the type of cancer differs
- ☐ Differ as the stage of the disease differs
- ☐ Not sure

5. In my opinion, the goal of mastectomy is to: *

- ☐ Remove the tumor
- ☐ Extend life expectancy of patients
- ☐ All of the above
- ☐ Not sure

In my opinion, the joint that is more commonly affected following a mastectomy procedure is : *

- ☐ Wrist joint
- ☐ Elbow joint
- ☐ Shoulder joint
- ☐ Upper extremity
- ☐ Cervical joints
- ☐ Thoracic joints
- ☐ All of the above
- ☐ Not sure

7. In my opinion, the most common symptoms that follow mastectomy are (select all that apply): *

- ☐ Pain

4. In my opinion, the most common symptoms that follow mastectomy are (select all that apply): *

- ☐ Pain
- ☐ Swelling
- ☐ Limited ROM
- ☐ Lymph edema
- ☐ Axillary web syndrome
- ☐ paresthesia
- ☐ Sensory impairments
- ☐ Motor impairments
- ☐ seroma formation
- ☐ All of the above
- ☐ Not sure

8. Factors that exacerbate the upper limb morbidity after mastectomy (select all that apply): *

- ☐ Radiation therapy
- ☐ Type of Surgery
- ☐ Complication after surgery
- ☐ Previous shoulder pathology
- ☐ Delayed rehabilitation
- ☐ All of the above
- ☐ Not sure

9. The indications for physiotherapy treatment for females after mastectomy are (select all that apply): *

- ☐ Shoulder dysfunction
- ☐ Axillary web syndrome
- ☐ Restricted range of motion
- ☐ Lymphedema
- ☐ Treatment of pain
- ☐ Promote healing

Perception toward treatment of shoulder dysfunction after mastectomy

10. The treatment for shoulder dysfunction after mastectomy should include (select all that apply):

- ☐ Isometric exercises
- ☐ Strengthening exercises
- ☐ Electrotherapy
- ☐ Lymphatic drainage
- ☐ Mobilization
- ☐ Education
- ☐ All of the above
- ☐ Not sure

11. The muscles that should be targeted in the treatment of shoulder dysfunction following mastectomy are (select all that apply):

- ☐ Scapular muscles
- ☐ Rhomboids
- ☐ Trapezius muscles
- ☐ Deltoid
- ☐ Biceps
- ☐ Serratus anterior
- ☐ Pectoralis muscles

12. In my opinion, the following technique(s) is important for preventing shoulder dysfunction following mastectomy (select all that apply):

- ☐ Applying shoulder mobilization
- ☐ Patient Education
- ☐ Improving circulation
- ☐ Aerobic exercises
- ☐ Breathing exercise
- ☐ Postural correction
- ☐ Lymphatic drainage
- ☐ Strengthening exercises
- ☐ use of electrotherapy modalities

Please identify your level of agreement with the following statements regarding * the treatment of Shoulder dysfunction after mastectomy. Specify your level of agreement on the following five points Likert scale. (1) Strongly agree, (2) Agree, (3) neutral, (4) Disagree, (5) strongly disagree.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Physiotherapy is important for treatment of breast cancer	☐	☐	☐	☐	☐
Physiotherapy improves shoulder pain and function after mastectomy	☐	☐	☐	☐	☐
Physiotherapy can be implemented for mastectomy patients in early stages	☐	☐	☐	☐	☐
Physiotherapist are essential care givers for treating shoulder dysfunction in females following mastectomy.	☐	☐	☐	☐	☐
Physiotherapy can prevent the shoulder joint complications that follows the mastectomy like sensory (pain and paresthesia) and motor impairments (Limited ROM)	☐	☐	☐	☐	☐
Physiotherapy can improve the quality of life for females after having mastectomy.	☐	☐	☐	☐	☐
Physiotherapy can increase the prevalence of upper limb morbidity after mastectomy like	☐	☐	☐	☐	☐

Learning needs I

Please identify your level of agreement with the following statements regarding * the physiotherapists learning needs for the treatment of shoulder dysfunction after mastectomy. Specify your level of agreement on the following five points Likert scale. (1) Strongly agree, (2) Agree, (3) neutral, (4) Disagree, (5) strongly disagree.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Physiotherapists need to get the necessary training and attend special courses to be able to treat shoulder dysfunction following mastectomy.	☐	☐	☐	☐	☐
Work places should have special equipment / facilities for treatment of shoulder dysfunction in females following mastectomy.	☐	☐	☐	☐	☐
Work places should increase the awareness about breast cancer and mastectomy diagnosis, assessment and treatment.	☐	☐	☐	☐	☐
There should be specialised physiotherapy rehabilitation centers for the treatment of shoulder dysfunction in females following mastectomy	☐	☐	☐	☐	☐
There should be a guideline or information protocol for the treatment of shoulder	☐	☐	☐	☐	☐

Learning needs II

Please identify your likelihood level with the following statements regarding the physiotherapists learning needs for the treatment of shoulder dysfunction after mastectomy. Specify your answer on the following five points Likert scale. (1) = Extremely Unlikely (5) = Extremely likely.

1. How likely are you going to increase your knowledge about mastectomy? *

	1	2	3	4	5	
Extremely unlikely	☐	☐	☐	☐	☐	Extremely likely

2. How likely are you going to increase your knowledge about shoulder dysfunction following a mastectomy?

	1	2	3	4	5	
Extremely unlikely	☐	☐	☐	☐	☐	Extremely likely

3. In the near future, how likely are you to improve your knowledge about managing shoulder dysfunction after a breast surgery (Mastectomy)? *

	1	2	3	4	5	
Extremely unlikely	☐	☐	☐	☐	☐	Extremely likely

4. How likely are you going to train to become a lymphedema therapist? *

	1	2	3	4	5	
Extremely unlikely	☐	☐	☐	☐	☐	Extremely likely

4. How likely are you going to train to become specialized in the treatment of shoulder dysfunction in females after mastectomy?

	1	2	3	4	5	
Extremely unlikely	☐	☐	☐	☐	☐	Extremely likely

5. How likely are you going to attend courses and training programs about the management of shoulder dysfunction following a mastectomy? *

Appendix-4 - Supplementary material

Survey validation tables

Table A. descriptive statistics of the items included in the factorial analysis.

Descriptive Statistics	Mean	Std. Deviation	Analysis N
	3.75	1.38	8
Mean	4.00	1.41	8
Std. Deviation	3.87	1.35	8
Analysis N	4.12	1.24	8
clarity of knowledge question 1	4.12	1.24	8
3.75	4.12	1.24	8
1.38	3.87	1.55	8
8	4.00	1.41	8
appropriateness of knowledge question 1	4.00	1.41	8
4.00	4.00	1.41	8
1.41	4.00	1.41	8
8	4.12	1.24	8
structure of knowledge question1	4.00	1.19	8
3.87	4.00	1.19	8
1.35	4.00	1.19	8
8	4.00	1.19	8
clarity of knowledge question 2	4.00	1.19	8
4.12	3.87	1.24	8
1.24	4.25	1.16	8
8	4.25	1.16	8
appropriateness of knowledge question 2	4.25	1.16	8
4.12	4.12	0.99	8
1.24	4.12	0.99	8
8	4.12	0.99	8
structure of knowledge question2	4.12	1.35	8
4.12	4.12	1.35	8
1.24	4.12	1.35	8
8	4.37	0.91	8
clarity of knowledge question 3	4.37	0.91	8
3.87	4.37	0.91	8

1.55	4.25	1.16	8
8	4.12	1.24	8
Appropriateness of knowledge question 3	4.12	1.24	8
4.00	4.12	1.45	8
1.41	4.00	1.60	8
8	4.00	1.60	8
structure of knowledge question3	4.50	0.75	8
4.00	4.50	0.75	8
1.41	4.50	0.75	8
8	4.12	0.99	8
clarity of knowledge question 4	4.12	0.99	8
4.00	4.12	0.99	8
1.41	4.00	1.19	8
8	4.37	0.91	8
Appropriateness of knowledge question 4	4.12	0.99	8
4.00	4.00	1.19	8
1.41	4.37	0.91	8
8	4.12	0.99	8
structure of knowledge question 4	4.00	1.19	8
4.12	4.12	1.24	8
1.24	3.87	1.24	8
8	4.00	1.19	8
clarity of knowledge question 5	4.37	0.916	8
4.00	4.12	0.99	8
1.19	4.00	1.19	8
8	4.37	0.91	8
Appropriateness of knowledge question 5	4.12	0.99	8
4.00	4.00	1.19	8
1.19	4.37	0.91	8
8	4.12	0.99	8
structure of knowledge question 5	4.00	1.19	8
4.00	4.37	0.91	8
1.19	4.12	0.991	8

Table (B). Total variance of the components in factorial analysis for Knowledge, perception, learning needs questions.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% Of Variance	Cumulative %	Total	% Of Variance	Cumulative %	Total	% Of Variance	Cumulative %
1	58.213	92.401	92.401	58.213	92.401	92.401	33.562	53.273	53.273
2	3.035	4.818	97.219	3.035	4.818	97.219	27.686	43.946	97.219
3	.953	1.512	98.731						
4	.799	1.269	100.000						
5	2.102E-14	3.337E-14	100.000						
6	1.356E-15	2.153E-15	100.000						
7	1.035E-15	1.643E-15	100.000						
8	5.100E-16	8.096E-16	100.000						
9	2.738E-16	4.346E-16	100.000						
10	2.328E-16	3.696E-16	100.000						
11	2.221E-16	3.525E-16	100.000						
12	2.221E-16	3.525E-16	100.000						
13	2.220E-16	3.525E-16	100.000						
14	2.220E-16	3.525E-16	100.000						
15	2.220E-16	3.525E-16	100.000						
16	2.220E-16	3.525E-16	100.000						
17	2.220E-16	3.525E-16	100.000						
18	2.220E-16	3.525E-16	100.000						
19	1.917E-16	3.043E-16	100.000						
20	1.576E-16	2.502E-16	100.000						

21	1.322E-16	2.098E-16	100.000				
22	1.183E-16	1.878E-16	100.000				
23	5.688E-17	9.028E-17	100.000				
24	2.080E-17	3.302E-17	100.000				
25	1.579E-17	2.506E-17	100.000				
26	3.381E-18	5.366E-18	100.000				
27	1.388E-31	2.203E-31	100.000				
28	1.019E-31	1.618E-31	100.000				
29	3.120E-32	4.952E-32	100.000				
30	2.285E-32	3.628E-32	100.000				
31	9.543E-33	1.515E-32	100.000				
32	2.619E-33	4.156E-33	100.000				
33	4.543E-48	7.211E-48	100.000				
34	6.480E-49	1.029E-48	100.000				
35	-	-					
	1.926E-64	3.057E-64	100.000				
36	-	-					
	5.394E-50	8.562E-50	100.000				
37	-	-					
	5.690E-48	9.032E-48	100.000				
38	-	-					
	6.706E-33	1.065E-32	100.000				

39	-	-							
	1.056E	1.676E-	100.000						
	-32	32							
40	-	-							
	1.881E	2.986E-	100.000						
	-32	32							
41	-	-							
	3.244E	5.150E-	100.000						
	-32	32							
42	-	-							
	4.435E	7.039E-	100.000						
	-32	32							
43	-	-							
	5.410E	8.588E-	100.000						
	-32	32							
44	-	-							
	5.702E	9.051E-	100.000						
	-32	32							
45	-	-							
	9.744E	1.547E-	100.000						
	-32	31							
46	-	-							
	9.368E	1.487E-	100.000						
	-31	30							
47	-	-							
	2.524E	4.007E-	100.000						
	-20	20							
48	-	-							
	1.972E	3.131E-	100.000						
	-18	18							
49	-	-							
	3.571E	5.669E-	100.000						
	-17	17							
50	-	-							
	4.447E	7.059E-	100.000						
	-17	17							
51	-	-							
	7.078E	1.123E-	100.000						
	-17	16							

52	-	-							
	1.283E	2.037E-	100.000						
	-16	16							
53	-	-							
	2.220E	3.525E-	100.000						
	-16	16							
54	-	-							
	2.220E	3.525E-	100.000						
	-16	16							
55	-	-							
	2.220E	3.525E-	100.000						
	-16	16							
56	-	-							
	2.282E	3.622E-	100.000						
	-16	16							
57	-	-							
	3.260E	5.175E-	100.000						
	-16	16							
58	-	-							
	3.674E	5.832E-	100.000						
	-16	16							
59	-	-							
	4.446E	7.057E-	100.000						
	-16	16							
60	-	-							
	5.221E	8.287E-	100.000						
	-16	16							
61	-	-							
	1.175E	1.864E-	100.000						
	-15	15							
62	-	-							
	1.680E	2.667E-	100.000						
	-14	14							
63	-	-							
	1.882E	2.987E-	100.000						
	-14	14							

Extraction Method: Principal Component Analysis.

Table (C). Communalities of the items included in factorial analysis.

Communalities		
	Initial	Extraction
clarity of knowledge question 1	1.000	.934
appropriateness of knowledge question 1	1.000	.979
structure of knowledge question1	1.000	.981
clarity of knowledge question 2	1.000	.970
appropriateness of knowledge question 2	1.000	.970
structure of knowledge question2	1.000	.970
clarity of knowledge question 3	1.000	.926
Appropriateness of knowledge question 3	1.000	.979
structure of knowledge question3	1.000	.979
clarity of knowledge question 4	1.000	.979
Appropriateness of knowledge question 4	1.000	.979
structure of knowledge question 4	1.000	.970
clarity of knowledge question 5	1.000	.983
Appropriateness of knowledge question 5	1.000	.983
structure of knowledge question 5	1.000	.983
clarity of knowledge question 6	1.000	.983
Appropriateness of knowledge question 6	1.000	.983
structure of knowledge question 6	1.000	.935
clarity of knowledge question 7	1.000	.983
Appropriateness of knowledge question 7	1.000	.983
structure of knowledge question 7	1.000	.983
clarity of knowledge question 8	1.000	.992
Appropriateness of knowledge question 8	1.000	.992
structure of knowledge question 8	1.000	.992
clarity of knowledge question 9	1.000	.964
Appropriateness of knowledge question 9	1.000	.964
structure of knowledge question 9	1.000	.964
clarity of knowledge question 10	1.000	.982
Appropriateness of knowledge question 10	1.000	.982
structure of knowledge question 10	1.000	.982
clarity of knowledge question 11	1.000	.983
Appropriateness of knowledge question 11	1.000	.970
structure of knowledge question 11	1.000	.970
clarity of knowledge question 12	1.000	.929
Appropriateness of knowledge question 12	1.000	.974

structure of knowledge question 12	1.000	.974
clarity of perception question 1	1.000	.941
appropriateness of perception questions 1	1.000	.941
structure of perception question 1	1.000	.941
clarity of learning need question 1	1.000	.992
appropriateness of learning needs questions 1	1.000	.992
structure of learning need questions 1	1.000	.992
clarity of learning need-2 question 1	1.000	.983
appropriateness of learning needs-2question 1	1.000	.982
structure of learning needs-2 question 1	1.000	.992
clarity of learning need-2 question 2	1.000	.983
appropriateness of learning needs-2question 2	1.000	.982
structure of learning needs-2 question 2	1.000	.992
clarity of learning need-2 question 3	1.000	.983
appropriateness of learning needs-2 question 3	1.000	.804
structure of learning needs-2 question 3	1.000	.894
clarity of learning needs-2 question 4	1.000	.983
appropriateness of learning needs-2question 4	1.000	.982
structure of learning needs-2 question 4	1.000	.992
clarity of learning needs-2 question 5	1.000	.983
appropriateness of learning needs-2question 5	1.000	.982
structure of learning needs-2 question 5	1.000	.992
clarity of learning needs-2 question 6	1.000	.983
appropriateness of learning needs-2question 6	1.000	.982
structure of learning needs-2question 6	1.000	.992
clarity of learning needs-2question 7	1.000	.983
appropriateness of learning needs-2question 7	1.000	.982
structure of learning needs-2question 7	1.000	.992

Extraction Method: Principal Component Analysis.

المخلص

مقدمة: خلل الكتف هو أحد المضاعفات الشائعة بين الإناث بعد استئصال الثدي. يلعب أخصائيو العلاج الطبيعي دوراً أساسياً في معالجة اختلال وظائف الكتف، لكن مستوى معرفتهم وخبرتهم وبروتوكولات إعادة التأهيل المطبقة لا تزال غير واضحة وبحاجة للدراسة. يهدف هذا البحث إلى استكشاف معرفة أخصائيي العلاج الطبيعي ورأيهم المتعلق بإدارة خلل الكتف لدى الإناث بعد استئصال الثدي. كما تهدف إلى تقييم بيئة عملهم واحتياجات التعلم. الأساليب: تم إجراء مسح عبر الإنترنت في شهري أغسطس حتى أكتوبر من العام 2021. تم توظيف أخصائيي العلاج الطبيعي من خلال جمعيات العلاج الطبيعي في دول مجلس التعاون الخليجي (GCC) عبر المكالمات ورسائل البريد الإلكتروني وتطبيقات وسائل التواصل الاجتماعي. كان المشاركون مؤهلين إذا كانوا أخصائيي علاج طبيعي مرخصين ومقيمين في دول مجلس التعاون الخليجي. وتألفت الدراسة الاستقصائية من عدة أقسام تغطي التركيبة السكانية للمستجيب، ومعرفة استئصال الثدي، وتقييم الأعراض والإجراءات الوقائية، وتخطيط العلاج، وبيئة العمل، واحتياجات التعلم. تم استخدام برنامج الحزم الاجتماعية للعلوم الاجتماعية (V 26) (SPSS). لتحليل البيانات. النتائج: شارك في الاستطلاع 108 أخصائيين في العلاج الطبيعي، وكانت أعلى نسبة مشاركة من البحرين (33.3%) والإمارات العربية المتحدة (20.4%). لوحظت فجوة في المعرفة فيما يتعلق بتقييم أمراض استئصال الثدي وإدارة ضعف الكتف في 48.2% من المشاركين. يوجد فرق ذو دلالة إحصائية بين الجنس وتصورات العلاج، حيث أن الذكور (متوسط $\pm$ الانحراف المعياري) ($n = 21$, 4.32 ± 0.73) ينظرون إليها بشكل مختلف عن الإناث ($n = 87$, 4.68 ± 0.63) ($P = 0.03$). كما أن هناك دلالة إحصائية بين الذكور ($n = 21$, 1.34 ± 3.89) والإناث ($n = 87$, 1.03 ± 4.62) فيما يتعلق بتصورات احتياجات التعلم لديهم ($P = 0.02$). علاوة على ذلك، لوحظ اختلاف في الأهمية الإحصائية في إدراك العلاج بين المعالجين الذين يعالجون المرضى الذين يرقدون بداخل المشفى ($n = 23$, 1.12 ± 4.28) والذين يعالجون المرضى في العيادات الخارجية ($n = 84$, 4.69 ± 0.43) ($P = 0.01$). وأخيراً، لم يتم العثور على فروق ذات دلالة إحصائية في الإدراك استناداً إلى بلد الإقامة ($P = 0.066$) أو مستوى المؤهلات ($P = 0.891$). الاستنتاج: هناك حاجة إلى مزيد من الدراسات لتوسيع نطاق هذه النتائج مع حجم عينة أكبر، واقتراح بروتوكولات إعادة التأهيل المتعلقة بعلاج اختلال وظائف الكتف لدى الناجيات من السرطان من الإناث، وإنشاء ممارسة متخصصة للعلاج الطبيعي للمجموعة المعنية. يجب استخدام النتائج بالاقتران مع تحليل التكلفة والعائد، وتحليل المخاطر، وتقييم المتطلبات الصحية لكل من المرضى وأخصائيي العلاج الطبيعي.

الكلمات المفتاحية: الإدراك، المعرفة، العلاج الطبيعي، الثدي، السرطان، استئصال الثدي، العلاج، المسح

جامعة البحرين

قسم العلاج الطبيعي



كلية العلوم الصحية
والرياضية

دراسة تصور أخصائي العلاج الطبيعي في دول الخليج العربي حول دورهم في علاج اعتلال الكتف الوظيفي لدى النساء بعد عمليات استئصال الثدي

أطروحة مقدمة كجزء من متطلبات الحصول على درجة الماجستير في العلاج الطبيعي

إعداد

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يناير 2023