Impact of breast hypertrophy on musculoskeletal pain, sexual function and physical activity

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Abstract

Background: Breast hypertrophy affects personal relationships, attracts unwanted attention, especially from men, and is likely to cause muscular discomfort and overstretching of the skin envelop, which can lead to ulceration.

Objectives: To determine the difference in musculoskeletal pain, sexual function and physical activity levels between women with and without breast hypertrophy as well as to analyse the relationship between breast sizes versus musculoskeletal pain, sexual function and physical activity.

Methodology: A cross sectional study design was used. One hundred and fifty married women with and without breast hypertrophy attending the gymnasium of the Physiotherapy Department, Aminu Kano Teaching Hospital, Afficent gymnasium and Sharada gymnasium were included in the study using a purposive sampling technique. Breast cup sizes, musculoskeletal pain, female sexual function and physical activity levels of participants were measured using a measuring tape, Visual Analogue Scale (VAS), Female Sexual Function Index (FSFI) and General Practice Physical Activity Questionnaire (GPPAQ), respectively.

Results: Results demonstrated no significant ($p>0.05$) differences in musculoskeletal pain, sexual function and physical activity levels between women with and without breast hypertrophy. Moreover, there was no significant relationship between breast sizes versus musculoskeletal pain, sexual function and physical activity levels of participants.

Conclusion: There is no difference between women with and without breast hypertrophy with respect to musculoskeletal pain, sexual function and physical activity levels. A large proportion of participants are sexually dysfunctional with a marked percentage being physically inactive. Women with breast hypertrophy should be encouraged to engage in physical activities.

Key words: breast hypertrophy; musculoskeletal pain; sexual function

Introduction

Large breast sizes, a common medical condition, whose morbidity has increased over recent decades, affects personal relationships attracts unwanted attention, especially from men, and has been a major concern. Intimate relationships have often been compromised due to excessive self-consciousness and physical difficulties associated with large breasts. In some cases, relationships with co-workers have been strained, as some women are concerned about being misperceived or stereotyped because of the appearance of their breasts [1].

Schnur, Petty and Hanson [2] have stated that the anatomic mechanisms of postural aberrations are heavy breasts and related pain symptoms. The common clinical symptoms associated with breast hypertrophy include neck, thoracic spine and

shoulder pain, breast pain, headache, grooving and the resultant pain caused by bra straps, intertrigo, and ulnar nerve paraesthesia [3,4]. The most common physical problems are pain and dysfunction that come with large breasts, which can be improved by physical therapy. Back pain caused by back packs may be short term and possibly be alleviated following removal of the back pack. The use of back packs has been reported to increase back pain and distort the spinal curves [5]. Large breasts are the forms of permanent front packs which have been demonstrated to have an impact of physical [4], social [1], and psychological [6] well-being of females. To date, the sexual function has not yet been explored among women having large breast sizes. The present study attempted to determine the relationship between the breast size and sexual function.

The exercise-induced breast motion and the resultant breast pain in larger- breasted women can be severe enough to discourage some of them from participating in sports and exercise [7]. To ensure all females have the opportunity to comfortably participate in, and therefore reap the health benefits associated with regular exercises, it is imperative to assess the physical activity level of women with large breasts. Large breasts can impede physical activities such as exercise, sports and strenuous work, with growing concerns over increasing obesity in modern society; therefore, encouraging participation in physical activity is of paramount importance. Physical activity not only lowers the obesity levels through changes in the metabolic rate, but also positively affects cardiovascular fitness and well-being [8]. Evidence suggests that some females refrain from physical activity due to embarrassment associated with excessive breast motions [7]. Despite an increasing amount of literature highlighting the importance of physical activity for health [9.10], only limited attention has been given to determination of the physical activity levels of women with large breast sizes.

Wood, Cameron and Fitzgerald [11] evaluated the effect of large breasts on spinal, neck or back pain. The aim of the present study was to determine the effect of breast hypertrophy on pain at different sites and the impact of large breast sizes on the sexual function and physical activity level. Women with increased levels of physical activity and fitness are characterised by a reduced relative risk of death [12]. Regular physical activity is clearly effective in the secondary prevention of cardiovascular diseases and in attenuating the relative risk of premature death [13].

Material and methods

Research Design: A cross-sectional correlational research design was used..

Population of the Study: The study population comprised all women attending the gymnasium at the Physiotherapy Department of Aminu Kano Teaching Hospital (AKTH), Afficent Gymnasium, Sharada Gymnasium, Kano.

Sample Size and Sampling Technique: A purposive sampling technique was used; the sample size was calculated using the following formula:

$N=z^2 p (1-p) /e^2$ [14]

The minimum sample size was 150 women with and without large breast sizes.

Inclusion Criteria

a) Married women

Exclusion Criteria

a) History of thoracic spine surgery
b) History of any pathology involving the breast, lung and thoracic spine
c) History of any form of cancer
d) Use of steroids
e) History of breast surgery/implants
f) History of systemic or vertebral diseases
g) Use of medications for musculoskeletal or on-musculoskeletal pain

h) Breastfeeding mothers as their breasts are only temporarily enlarged.

Data Collection Instruments

The study employed the following instruments:

a) **Butterfly Measuring Tapes (China)** to measure the breast sizes of participants.

b) **Stadiometer** (SECA gmbh/Germany) to assess the height and weight of participants.

c) **Visual Analogue Scale (VAS)** to assess the severity of pain. Its reliability and validity was found to be 0.60-0.77 and 0.76-0.84, respectively [15].

d) **Female Sexual Function Index (FSFI)** to assess sexual function. FSFI is a 19-item questionnaire, a multidimensional self-report instrument for evaluating the key dimensions of sexual function in women [16].

Validity and Reliability of FSFI. It has been validated on a clinically diagnosed sample of women with female sexual arousal disorder, female orgasmic disorder and hypoactive sexual desire disorder. The internal reliability for the total FSFI and six domain scores is found to be good – excellent for combined sexually and non-sexually dysfunctional samples (Cronbach`s alpha>0.9) and good for sexually and nonsexually dysfunctional samples, independently (Cronbach`s alpha =0.8). Its sensitivity is found to be 0.707 – 0.772 and specificity - 0.88 – 0.854 [17].

e) **General Practice Physical Activity Questionnaire (**GPPAQ): The General Practice Physical Activity Questionnaire was developed by the London School of Hygiene and Tropical Medicine as a validated short measure of physical activity. It collects information on physical activity participation of individuals. Its reliability and validity are found to be 0.83-0.96 and 0.53-0.83, respectively [18].

Data Collection

Ethical approval was sought before commencing the study. The researchers introduced themselves to all the volunteers from the Physiotherapy Department, Aminu Kano Teaching Hospital, Afficent Gymasium and Sharada Gymasium. All the participants gave their written informed consent for participation and were screened for eligibility. The research protocol used in this study was compatible with the Declaration of Helsinki. The following were assessed and recorded:

1. **Body weight:** The weight of participants was measured using a standard calibrated measuring scale. Participants were asked to wear light clothing, to remove all heavy objects prior to measurements and to step on the weighing scale bare footed and standing erect with the face looking straight forward and their hands by their sides. The reading was taken and recorded to the nearest 0.5kg [19].
2. **Stature:** Participants were asked to relax, barefoot or wearing socks or stockings. The stadiometer was mounted on a straight wall, i.e.at a 90˚ angle to the floor. The heel plate was mounted on the floor in the same vertical plane as the backboard of the stadiometer. Participants stood with their back against the wall-mounted stadiometer, heels together. The horizontal bar down firmly onto the top of the head and a weight of about 0.5kg was placed on the headboard and the measurement was recorded on the counter [20].
3. **Body Mass Index:** The body mass index (BMI) was computed by dividing the participant's weight in kilograms by the square of their height in meters. BMI is an index used for assessing body fat [21].

   BMI = weight (kg)/ height (m)] ^{2}
4. **Breast Size:** Breast sizes were measured using a measuring tape by subtracting the band size from the cup size. Participants were instructed

on the details for self-assessment. Assistance was provided, whenever required.

a) **Measurement of band size:** The band size is the thoracic circumference under the bust at the level of the infra-mammary fold that is converted to a categorical classification ranging from 10-22 inches. A tape measure was placed horizontally and fairly snug all the way around the participant's body just underneath the breast; the arms - kept down. Measurements were taken in inches [22].

b) **Measurement of Cup Size:** The cup size is the thoracic circumference across the fullest part of the breast converted to a categorical classification which ranges from A-F cup. The tape was placed around the fullest part of the breasts and measurements were taken in inches [23]. Cup sizes were recorded and coded as follows:

A-C (Normal cup size =coded as 1)

D-F (Large cup size =coded as 2)

5. **Musculoskeletal Pain**: The VAS score was used for pain assessment. Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The subject marks the point on the line that they feel represents their perception of their current state. It is scored 0-10 with 0 indicating no pain and 10 indicating maximum pain. The VAS score <5 was defined as "mild pain" and ≥5 as "severe pain" [15]. The following were assessed:
   a) Neck pain
   b) Shoulder pain
   c) Low back pain
   d) Bra strap discomfort: Furthermore, the presence of a bra strap furrow was recorded as 1 and its absence as 0.
6. **Sexual Function:** The sexual function of participants was assessed using the Female Sexual Function Index (FSFI) [16]. The questionnaire was administered to individual participants and was collected on the same day. The questionnaire consists of six domains including libido, sexual arousal, vaginal lubrication, female orgasm, sexual satisfaction, and dyspareunia, with 19 items.
   a) Libido -the sum of scores for questions 1 and 2; scores <8 were considered as diminished libido.
   b) Lubrication - the sum of scores for questions 7-10; scores <8 were considered as dryness.
   c) Sexual arousal - the sum of the scores for questions 11-12; scores <8 were considered as female orgasm disorder.
   d) Sexual satisfaction- the sum of scores for questions 13-16; scores < 16 indicated sexual dissatisfaction.
   e) Pain - the sum of scores for question 17-19; scores < 12 were considered as dyspareunia

   Scoring: scores were summarized and categorized, the minimum score being 2 and the maximum score being 95. the score of 2 indicates no sexual activity; 3-19 - severe sexual dysfunction; 20-57 - moderate dysfunction; 58-76 - mild dysfunction; 77-96 - no sexual dysfunction. The higher the score, the lesser the severity of sexual dysfunction and vice versa- the lower the score, the more severe the sexual dysfunction. The sexual function was assessed before and after intervention.
7. **Physical Activity Level:** The GPPAQ was administered to participants and collected on the same day. The questionnaire consists of four levels physical activity, i.e. active, moderately active, moderately inactive and inactive.

Categorization:

Inactive – recorded as '0'; moderately inactive – as '1'; moderately active – as '2'; Active – as '3' [18].

Data Analysis

Descriptive and inferential statistics were used to analyze data. Descriptive statistics of means, percentage (%) and standard deviation (SD) were used to summarize data. Inferential statistics of independent t-test were computed to determine the difference in musculoskeletal pain between women with and without large breast sizes. The Mann Whitney-U test was applied to determine the difference in sexual function and physical activity levels between women with and without large breast sizes. The Pearson's Correlation was used to analyse the relationship between the breast size and musculoskeletal pain. The Spearman's Correlation was computed to determine the relationship between the breast size versus sexual function and physical activity. All statistical analyses were carried out using the Statistical Packages for the Social Sciences (SPSS – Version 16). Statistical significance was determined at $P<0.05$.

Results

A total of 150 married women participated and completed the study. The age of the participants ranged between 15 and 35 years. The descriptive characteristics of participants are presented in table 1.

Table 1 shows that on average, the participants were within the young adult age category and were overweight. There was no significant difference in height, BW, BMI and pain between women with and without large breast sizes.

The proportion of women having sexual dysfunction and physical inactivity is presented in Table 2.

Table 2: Proportion of women having sexual dysfunction and physical inactivity

Variables	Women with Large Breast Size (n=85) (%)
Sexual dysfunction	56.7
Physical activity	
Inactive	24.7
Moderately inactive	25.9
Moderately active	29.4
Active	20

Table 2 shows that over half of women with large breast sizes had sexual dysfunction. Moreover,, very few participants with large breasts were active.

The difference in sexual function and physical activity levels between women with and without large breast is displayed in table 3.

Table 1: Baseline characteristics of participants (N=150)

Variables	Women with Large Breast Size (n=85) M±SD	Women without Large Breast Size (n=65) M±SD	t-value	p-value
Height(m)	1.66±0.086	1.66±0.104	0.057	0.955
BW (Kg)	74.54±14.404	72.42±13.359	-0.924	0.352
BMI (Kg/m^2)	27.05±14.404	26.21±6.479	-0.748	0.456
Age (yrs)	26.74±4.451	25.22±4.364	0.736	0.666
Pain				
Neck pain	2.71±1.132	2.51±1.127	0.170	0.280
Low back pain	7.56±1.117	6.83±0.961	0.843	0.785
Shoulder pain	1.18±0.915	1.03±0.790	0.573	0.125

Table 3: The Mann-Whitney U results showing the difference in sexual function and physical activity between women with and without large breasts (N=150).

Variables	Mean Rank	Sum of Ranks	U	P-value
Sexual function	75.79	6442.50	2737.500	0.901
Desire	81.04	6888.00	2292.000	0.069
Arousal	76.16	6474.00	2706.000	0.830
Lubrication	77.67	6602.00	2578.000	0.480
Orgasm	78.15	6643.00	2537.000	0.390
Satisfaction	74.08	6296.50	2641.500	0.644
Pain	75.72	6436.50	2743.500	0.942
Physical activity	77.69	6603.50	2576.500	0.466

Table 3 shows that there was no significant difference (p>0.05) in sexual function and physical activity levels between women with and without large breast sizes.

The relationships between the breast size versus musculoskeletal pain (Pearson's correlation), sexual function and physical activity (Spearman's correlation) were shown in table 4.

Table 4: Relationship between breast size versus musculoskeletal pain, sexual function and physical activity (N=150).

Variables	r	p-value
Musculoskeletal pain Low back pain	-0.125	0.127
Shoulder pain	0.084	0.307
Neck pain	0.087	0.293
Bra strap pain	-0.083	0.311
Sexual function	0.010	0.902
Desire	0.149	0.069
Arousal	0.018	0.830
Lubrication	0.058	0.482
Orgasm	0.070	0.392
Satisfaction	-0.038	0.646
Pain	0.006	0.942
Physical activity	0.060	0.468

Table 4 reveals no significant relationship (p>0.05) between the breast size versus low back pain, neck pain, shoulder pain and bra strap pain using the Pearson's correlation). Likewise, there was no significant relationship (p>0.05) between breast size versus sexual function and physical activity using the Spearman's correlation.

Discussion

This study was conducted to determine the impact of large breast sizes on musculoskeletal pain, sexual function and physical activity levels. All subjects participated throughout the study and were interested in the assessment of breast sizes; most of them used incorrectly sized bras. There was no difference in the characteristics between the 2 groups (women with and without breast hypertrophy). The lack of inclusion of postmenopausal women in the study is considered a strength, since the hormonal and psychological factors affecting sexual function caused by menopause could have been a confounding factor.

In women with large breast sizes, the altered position of the scapula due to the weight of breasts may lead to swelling and stiffness of the rotator cuff and induce painful limited motion of the shoulder girdle [4]. Therefore, women with large breast sizes may suffer from functional disabilities in the upper body and may be limited in their ability to perform everyday tasks due to decreased ranges of motion of the shoulder girdle. Our results revealed that women with large breast sizes were capable of performing everyday tasks and had no limited range of motion, which is inconsistent with the findings reported by Blomqvist, Erikson and Brandberg [4].

Evidence suggests that some females refrain from physical activity due to embarrassment associated with excessive breast motion [7]. However, the present study showed that our participants were willing to engage in exercises to stay fit and not merely to lose weight. Our findings demonstrated that large breast sizes were not related to musculoskeletal pain, which is consistent

with the results presented by Wood, Cameron and Fitzgerald [11].

Women with large breasts experience less frequent breast caressing and more loss of pleasure and tended to be less likely to achieve orgasm with non-coital sexual stimulation [24]. Sexual problems related to body image among large breast women are associated with vaginal dryness, poor mental health, partner`s difficulties in understanding their feelings and more body image-related problems [25]. "The failure of a woman to engage in the healthful activity of nipple stimulation during sex, specifically to aid sexual arousal and in achieving orgasm, is counter to a unique species typical practice and such failure puts a woman's sexual satisfaction, emotional health and physical health into jeopardy" [26]. However, the studies mentioned above are not consistent with our findings, which could possibly be linked to the perception of pleasure as regards breast sizes in the given population.

Exercise has been considered to be the most challenging physical activity with emphasis placed on performance limitations and embarrassment caused by excessive breast motion. Promoting physical activity in women with large breasts is particularly important as breast volumes and BMI are positively correlated [23]. It is essential that all women, irrespective of their breast sizes, are able to enjoy the health benefits associated with an active life style. Our results are similar to those reported by Spencer and Briffa [23]. Clothing issues were declared important as most participants had issues with proper bra fitting and were rarely able to wear matching undergarment. In addition, the ability of women to accurately assess their bra sizes has been questioned and wearing of a wrong-sized bra has been associated with serious medical consequences, contributing to the development of musculoskeletal problems [27]. Thoracic kyphosis and lumbar lordosis were more severe in women with macromastia. According to Findikcioglu et al. [5[, the small inclination angles may be a combination of a large lordosis angle countered by a large kyphosis angle. Our observations do not confirm the above data.

Conclusion

Breast hypertrophy does not have any impact on musculoskeletal pain, sexual function and physical activity. Moreover, breast sizes are not related to musculoskeletal pain, sexual function and physical activity levels. Further studies carried out in other countries and across different races are required to explain the disparities between our results and the literature data. To assess a possible causal link between breast hypertrophy and sexual dysfunction/physical activity, an intervention study is recommended to investigate the impact of breast size reduction on sexual dysfunction/physical activity.. Women with large breasts attending gymnasiums and physiotherapy clinics should be assessed and advised on correct bra sizes as the majority of study participants did not wear correct fitting bras. Women with breast hypertrophy should be engaged in physical fitness exercises as a high proportion of them were not physically active.

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