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The Influence of Women's Positioning in Breast Measurements for Subsequent Breast Plastic Surgery

Bassam Ahmed ALmutlaq[1], Mohammad M. Al-Qattan[2], Bisher Alshanawani[3], Abdullah Dakheel Alotaibi[1], Mona alkhotani[3], Majid Zannon Aturkstani[4], Hussain Gadelkarim Ahmed[1,*]

[1]College of Medicine, University of Hail, Kingdom of Saudi Arabia, KSA
[2]Plastic Surgery, Head of Research Centre, College of Medicine, King Saud University, KSA
[3]Consultant Plastic Surgery, Head, Plastic Club Meetings, Division of Plastic Surgery KKUH
[4]Batterjee medical college, Jeddah, KSA
*Corresponding author: hussaingad5@gmail.com

Abstract **Background:** The confidently growing outcomes following breast plastic surgery has revealed several advantages to breast reconstructive approach, comprising precise preoperative assessment. The objective of the present study was to assess the influence of women's positioning (standing or sitting) on breast measurements. **Methodology:** A total of 250 women who were undergoing breast screening or breast cosmetic amendment were included. Breast measurements were performed in two positions (standing and setting). **Results**: All variables were significantly correlated and only left sternal notch Inframammary Fold (IMF), showed lower significant than others. **Conclusion**: A proper measurements can give the patients excellent cosmetic and surgery. Accurate measurement can be achieved by calculating the mean of both positioning (standing and sitting).

Keywords: *breast plastic surgery, breast measurement, breast reconstruction*

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1. Introduction

Breast plastic surgery involves whole tumor extirpation, fractional reconstruction of extensive local excisions, and symmetrizing surgery for the contralateral breast [1]. The procedure used for reconstruction depends on several factors, utmost tumor location and size, tumor to breast size ratio, and patient choices [2].

For patient intending to do breast plastic surgery, it is important to have a multidisciplinary preoperative assessment with the breast oncologic surgeon and plastic surgeon. The breast oncologic surgeon will evaluate the volume and location of breast to be resected thus bringing data as to the expected imperfection that will be reconstructed. Preoperative preparation gives surgeons better flexibility in regard to incision strategy and pedicle selection [3,4,5,6,7]. The choice of massive tissue rearrangement through surgical procedures can simplify the elimination of greater tumors, which can possibly extend the choice of breast conservation to patients who would have conventionally needed mastectomy [8].

The preoperative assessment should comprise check-up for degree of ptosis, overall skin quality, evidence of prior radiation, and overall breast size. The reconstructive preferences accessible are mainly determined by the size of the breast and the tumor to breast ratio. In the smaller breasted woman, there is a smaller amount of glandular tissue accessible to make local tissue rearrangement, and thus these patients are more likely to require regionally-based flaps. Mastectomy with reconstruction may deliver a more aesthetically fair outcome than breast conservation surgery in the small to moderate-breasted woman with a huge tumor. Larger breasted women have more alternatives obtainable for reconstruction, whether it is local tissue rearrangement, local or regional flaps, or reduction mammoplasty/mastopexy. In the oncoplastic breast reduction, tumor location will dictate the reduction procedure applied and the design of the nipple/areolar pedicle [9,10,11].

Breast reconstruction at the time of partial mastectomy, either via local tissue rearrangement or mastopexy/reduction mammoplasty procedure, is a tremendously valued mean in inclusive oncologic treatment. These procedures render patients with the least breast deformities after appropriate treatment, without including oncologic care. These are techniques that all reconstructive breast surgeons should be aware of and give their patients at the time of breast conserving surgery for breast cancer [2]. Consequently accurate measurement of breast before the breast reconstruction is an essential step towards better outcome. Therefore, the aim of the present study was to assess the influence of patient's positioning (standing or sitting) on breast measurements.

2. Materials and Methods

In this prospective study, data were obtained from 250 females living in the city of Riyadh, the Kingdom of Saudi Arabia (KSA). Participants were selected from women intending to do breast plastic surgery by simple random regardless to age, and other demographical factors.

Purposeful questionnaire was designed and used for collection of the required data. The following information were obtained from each participant: age, nationality, marital status, smoking, previous pregnancies, breast feeding, previous abortions, co-morbidity, previous surgery and physical activity. Data regarding breast measurements (standing and sitting) included, Skin fold, Sternal notch – nipple, Sternal notch – IMF (straight line from sternal notch to the level of IMF which is between two IMFs), Mid-clavicular – nipple= , Inter-mammary distance, Nipple – IMF, Breast base (at the upper pole = measurement of base – skin fold).

3. Data Analysis

Statistical Package for Social Sciences (version 16) was used for analysis and to perform Pearson Chi-square test for statistical significance (P value). The 95% confidence level and confidence intervals were used. P value less than 0.05 was considered statistically significant. Pearson's and Spearman correlations were obtained using 2x2 cross-tabulation.

4. Results

This study evaluated the measurements of two positions (standing and sitting) for 250 females intending to undergo surgery, their ages ranging from 25 to 60 years with a mean age of 40 years. Out of the 250 women 232/250 (92.8%) were Saudi and the remaining 18/250 (7.2%) were non-Saudi.

Different demographical characteristic have been assessed in relation to the presence of breast lumps. The great majority of patients were found in age group 31-40 years representing 90 patients followed by < 25 years, 41-50 and 51+ years constituting 74, 55, and 31 patients, respectively. With regard to the marital status, most of the study subjects were married constituting 138 followed by single, divorced and widow representing 101, 8 and 3 in this order, as shown in Figure 1.

With regard reproduction characteristics, 41% of the participants have previous pregnancy, 34% used to do breast feeding, 15% have histories of previous abortion and 10% have current habit of tobacco smoking, as indicated in Figure 2.

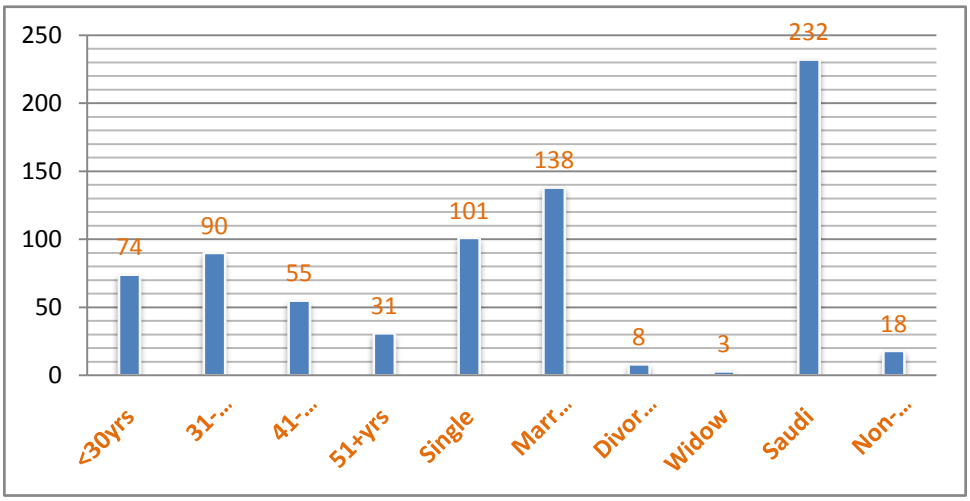

Figure 1. Description of the study population by age, marital status and nationality

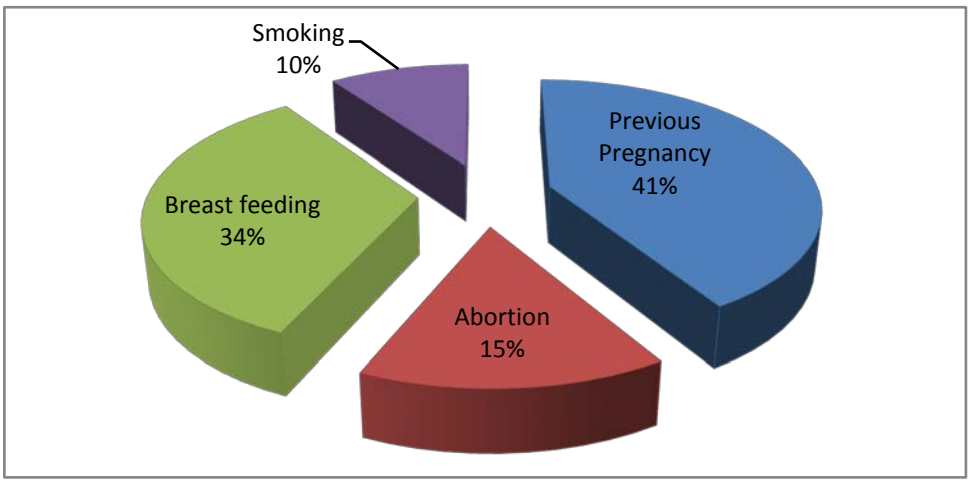

Figure 2. Description of the study population by reproduction characteristics and smoking habit

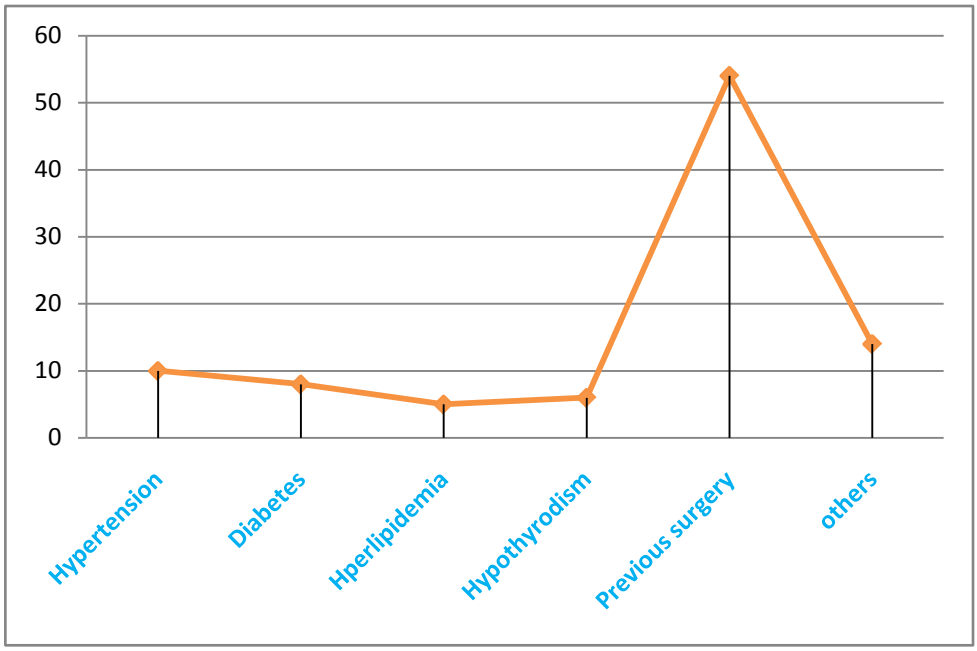

Figure 3. Description of the study population by comorbidity

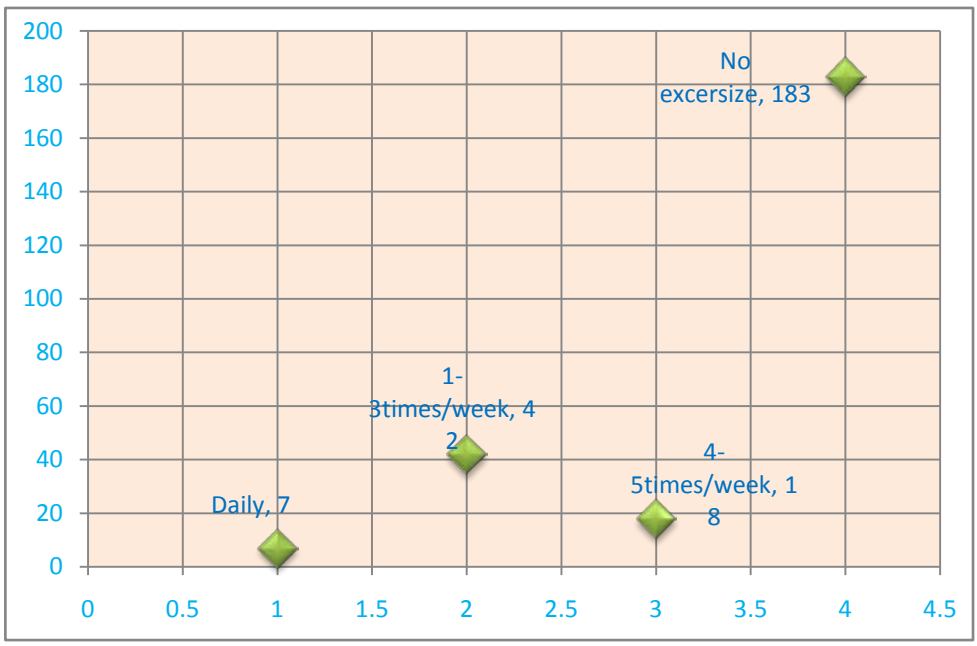

Figure 4. Description of the study population by physical activity

As shown in Figure 3, 54 of the patients have experienced previous surgery, 10 were hypertensive, 8 were diabetic, 6 were with hypothyroidism, 5 were with hyperlipidemia and 14 were with other scattered conditions.

With regard to the physical activity the great majority of the study subject inert (no physical activity) representing 183/250(73.2%). A bout 42/250(16.8%) used to do physical activity for 1-3 times per week, 18/250 (7.2%) used to do for 4-5 times per week and only 7/250(2.8%) used to do physical activity daily, as shown in Figure 4.

Table 1, showed the distribution of the study population by grade of breast ptosis. Most patients were found without breast ptosis constituted 27.2% followed by grade I, grade II, seudo-ptosis and grade III, representing 24.4%, 19.6%, 16% and 12.8% respectively.

Table 1. Distribution of the study population by grade of breast ptosis

Grade of ptosis	Number	Percentage
No breast ptosis	68	27.2
I	61	24.4
II	49	19.6
III	32	12.8
Pseudo-ptosis	40	16
Total	250	100

Table 2 summarized the distribution of the study population by positioning (standing and sitting) breast measurements. The correlations were calculated for each measurement in standing and sitting positions. As it is shown in Table 2, all variables were significantly correlated.

However, only left sternal notch Inframammary Fold (IMF), showed lower significant than others.

Table 2. Distribution of the study population by positioning (standing and sitting) breast measurements

Breast measurements	Pearson's correlation ±STD error	Spearman correlation ±STD error	Approx. sig.
Skin fold right (R)	0.496±0.18	0.96±0.011	0.000
Skin fold left (L)	0.65±0.23	0.96±0.014	0.000
Sternal notch (R)	0.97±0.017	0.98±0.012	0.000
Sternal notch (L)	0.97±0.015	0.97±0.01	0.000
Sternal notch IMF(R)	0.35±0.17	0.98±0.014	0.000
Sternal notch IMF(L)	0.19±0.15	0.97±0.02	0.006
Clavicular distance(R)	0.93±0.04	0.98±0.009	0.000
Clavicular distance(L)	0.99±0.005	0.98±0.009	0.000
Inter-mammary distance	0.94±0.03	0.96±0.011	0.000
Nipple IMF(R)	0.97±0.005	0.97±0.004	0.000
Nipple IMF(L)	0.92±0.04	0.94±0.03	0.000
Breast base(R)	0.96±0.02	0.96±0.02	0.000
Breast base(L)	0.46±0.12	0.96±0.06	0.000

5. Discussion

In the present study our prior hypothesis was that, a women positioning (Standing or sitting) measurement may influence the subsequent plastic surgery. Therefore, we tried to assess the influence of patient's positioning (standing or sitting) on breast measurements.

Although, measurements of a number of breast variables have been done, but no reverse significant correlation was encountered. Though there are numerous means of breast tools to locate and measure a breast mass, but in the present study we compared the measurements during sitting and standing position. The measurement of tumor size should be accurate as even small discrepancies can affect staging and treatment. The various techniques to assess tumor size are clinical examination (CE), mammography (MG), ultrasonography (USG), magnetic resonance imaging and pathologic examination (PE). The last is still considered the blueprint for pathological/final staging and for formulation of the treatment plan. However, all have their compensations and shortcomings, with varying degrees of accuracy [12]. Since tumor size is an important part of staging breast cancer, treatment decisions, and subsequent surgery, it is important to know the actual size of breast tumor [13].

Among all the obtainable pre-surgical imaging modalities for breast cancer, magnetic resonance imaging (MRI) is considered to be more accurate than ultrasound and mammography. Pathological measurement, however, is regarded as the gold standard of tumor size measurement [12].

Although there have already been several studies investigated the correlations between pre- and post-surgical tumor size measurements in breast cancer [14,15,16] applying various measuring tools, but and to the best of our knowledge no study has compared the measurements during patient's position (standing or sitting), particularly with breast surgical settings.

Furthermore, we assessed some risk factors that related to breast cancer in order to evaluate the levels of knowledge and awareness among studied population.

Furthermore, we assessed some risk factors that related to breast cancer in order to evaluate the levels of knowledge and awareness among studied population. About 41% of the participants have previous pregnancy, 34% used to do breast feeding. It was well established that recurrent pregnancy [17,18]and breast feeding reduce the risk of breast cancer in many population settings [19,20].

About 10% have current habit of tobacco smoking. Tobacco smoking is inconsistently associated with breast cancer. Although some studies suggest that breast cancer risk is related to passive smoking, little is known about the association with breast cancer by tumor hormone receptor status [21]. Smoking, particularly if initiated before first birth, was modestly associated with ER+ breast cancer risk that was not confounded by amount of adult alcohol intake. Possible links with breast cancer provide additional motivation for young women to not initiate smoking [22].

With regard to the physical activity the great majority of the study subject inert (no physical activity) representing 183/250(73.2%). Strong evidence shows that physical inactivity increases the risk of many adverse health conditions, including major non-communicable diseases such as coronary heart disease, type 2 diabetes, and breast and colon cancers, and shortens life expectancy [23,24]. Since much of the world's population is inactive, this relationship presents a major public health issue. Moreover, several co-morbidities were encountered in the studied population which requires further assessment.

Most patients were found without breast ptosis constituted 27.2% followed by grade I, grade II, seudo-ptosis and grade III, representing 24.4%, 19.6%, 16% and 12.8% respectively. Breast ptosis is encountered in several types of defects to be made: pseudoptosis, partial ptosis, and true ptosis. In case of true ptosis, three degrees are described according to the nipple relation to the submammary fold and skin brassiere. An association with hypoplasia is described. The corrective techniques chosen are different according to the various types of ptosis and their possible association with various types of hypoplasia. The subpectoralis augmentation is used to insert the prosthesis in all cases [25,26].

6. Conclusion

A proper measurements can give the patients excellent cosmetic and accurate surgery. Accurate measurement can be achieved by calculating the mean of both positions (standing and sitting).

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Disclosure of Potential Conflicts of Interest

The authors declare that, they have no conflict of interest.

Informed Consent

Each participant was asked to sign a written ethical consent during the questionnaire's interview.

Ethical Approval

The informed ethical consent form was designed and approved by the ethical committee of the College of Medicine (University of Hail, KSA) Research Board.

Competing Interests

The authors declare that they have no competing interests.

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