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Significance of Evaluation of Breast Size Measurements Among Lactating Indian Women

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Abstract

Background: Breastfeeding is one of the important aspects of a woman's life. Asymmetry/small size of the breast(s) has important psychological consequences on the mother about her capacity of milk production and ability to breastfeed her baby.

Objectives: To find out the size of the breasts among lactating Indian women in the first postpartum week.

Method: The study was conducted over 6 months in tertiary care hospital in Delhi involving 451 consecutive consenting mothers (18–40 years) within the first postpartum week. The breast and nipple size were estimated by anthropometry (Capraro and Dewhurst technique).

Results: Mean breast unit was 565.22 cm^2 and mean areolar unit was 43.18 ± 21.88 cm^2. Mean breast unit and mean areolar units were similar on both sides. These were neither significantly different among various maternal age groups nor according to parity. Both breast and areolar units did not differ significantly with frequency of breastfeeding. The mean nipple length had significant positive correlation with the parity but there was no significant difference between the length of the right and left nipple.

Conclusion: The size of right and left sides of breasts (as estimated by measurement of Breast Unit) was not significantly different in mothers of different ages, parity and frequency of breastfeeding in the first postpartum week. However, nipple length was found to be longer in multiparous breastfeeding mothers. The mothers having lowest range of 'Breast Unit' 255 cm^2 also reported normal lactation output, a very encouraging finding implying that mothers with small breasts are also capable of producing enough milk for their infants.

Keywords: Breast; Breast size; Lactation; Breastfeeding counseling.

Introduction

Breastfeeding is a phase of the reproductive cycle and is fundamental to the growth, development and survival of the newborn infant as well as wellbeing and health of the mother. The macroanatomy of the female breast comprises nipple, areola and stroma. The lactating system of the breast consists of alveoli, lactiferous ducts, lactiferous sinuses and lactiferous ductules. It is the fat and connective tissue which gives the breast its shape and size.[1] The breast attains its hemispherical shape at puberty. Variations in size and position are affected by age of the woman and activity of the gland. During pregnancy and lactation, the breasts increase two to three times in size. Following cessation

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of lactation, breast size decreases and at times become more pendulous. Shape, size, position and asymmetry, and hypoplasia of the breast(s) has many psychological consequences on the mother doubting her capacity of milk production, and the ability to breastfeed the baby, and loss of self confidence due to the appearance (shape/size) of the breasts.[2]

Some women are highly distressed by the shape and size of their breasts and its impact on amount of milk produced in the postpartum period requiring adequate counseling and treatment. Adequate counseling regarding shape and size of breast may influence and improve initiation and duration of breastfeeding.[3]

Asymmetry between the size of the breasts is often seen during the normal stage of breast development and when breastfeeding is done predominantly from one breast. The breast bud frequently begins to develop on one side before it does on the other. During adolescence one of the breasts may respond better to the circulating hormone and grow bigger than the other breast. Adequate counseling in these cases helps allay anxiety of mothers regarding adequate milk production. Successful breastfeeding can be done even in deformed breast condition by proper education, counseling and empowerment of the mother and family.[4] Significant difference between the two sides or persistence of difference between the two sides in a growing adolescent, suggestive of asymmetry can be considered for cosmetic correction, after all other underlying pathologies are ruled out.

The technique of breast measurement used in this study was originally described by Capraro and Dewhurst in 1975.[2] This method was chosen as it is a simple technique which uses anthropometric measurements to evaluate the breast size and does not require expensive equipment for the measurements.

Most authors have studied breast size for esthetic purposes, small number of adolescents[2] and women aged 16 to 83 years.[5] Authors who have studied breast size for adolescents are one adolescent in Capraro and Dewhurst study[2], and 498 adolescents in Aygun et al.[6] Kalbhen et al. measured breast size on mastectomy samples only by mammography.[7] However, none of the studies has evaluated breast size among lactating women, which may be useful for breastfeeding counseling.[23]

Objectives

This study was conducted to measure breast size among lactating Indian women and correlate it with parity of women and frequency of breastfeeding in the first postpartum week from lactating Indian women.

Study design: Observational cross-sectional study.

Materials and Methods

The study was conducted over 3 months in University College of Medical Sciences, Guru Teg Bahadur Hospital, a tertiary care teaching hospital in Delhi after obtaining ethical approval. 451 consecutive mothers (18–40 years), who gave birth to apparently healthy term appropriate–for–gestational age infants, of either sex, by normal vaginal delivery, and initiated breastfeeding within one hour of delivery, were enrolled for the study after informed consent. The measurements were recorded within the first postpartum week by a single observer to preclude any observer bias. Women suffering from postpartum psychosis, depression and any other medical and surgical illnesses, and whose babies were admitted in NICU were excluded.

All women were given information on the advantages of breastfeeding, anatomy of breast and physiology of breast milk production in simple local language in the presence of their female family members. They were explained the procedure and need of the study and consent was obtained. The age and parity of the mother was recorded by taking obstetric history after enrollment. Mother was then given a paper sheet and pen to record breastfeeding frequency from 9 am to 9 am for two consecutive days and a mean of that determined breastfeeding frequency in a day. Babies were weighed daily in the morning an hour before breastfeeding on an electronic weighing scale which could record a minimum of 10 gm weight. All infants were 'roomed-in' with the mothers as a unit protocol and were given semi-demand feeding. Infants passed urine 6–9 times in 24 hours. The average daily loss in weight was 1.5 to 3% during the period of study.

Breast measurement was done between 2 and 6 days after delivery and time of the breast measurement was mutually decided preferably in the afternoon after mother has taken at least an hour rest after lunch. All measurements were taken in their allotted separate room with the infant roomed in on

the same bed. After making mothers comfortable they were asked to wear loose clothing and then breastfeed their babies. The breast measurements were taken 15–30 minutes after breastfeeding using the technique devised by Capraro and Dewhurst.[2] A non-stretchable centimeter tape having a least count of 1 mm was used. While maintaining adequate privacy mothers were asked to expose the area from the clavicles to the costal margins. They were asked to relax their upper limbs, shoulder and chest muscles and sit erect, as reclining position can lead to erroneous results. Both breasts were measured at the same sitting, right followed by the left. The entire breast hemi-circumference was measured in two planes. The breast was measured from 9 o'clock to 3 o'clock *(horizontal* plane) position starting from the breast margin (estimated by palpating the breast tissue), passing through the center of the nipple and measuring up to the other breast margin. The second measurement was taken from 12 o'clock to 6 o'clock (*vertical* plane) direction passing through the center of the nipple and measuring up to the other breast margin. These two measurements (vertical and horizontal) were *multiplied to yield a measure* – 'Breast Unit' (Fig. 1).

Areolar diameter was also measured in the similar manner from 9 o'clock to 3 o'clock (horizontal plane) passing through the center of the nipple and then from 12 o'clock to 6 o'clock (vertical plane) passing through the center of the nipple in the. These two measurements (horizontal and vertical) were *multiplied to yield*' Areolar Unit'.

Nipple projection length was measured from the base of the areola to the tip of the nipple in the vertical and horizontal planes, after making the nipple prominent by gentle rolling of the nipples between index finger and thumb for 60 seconds by the mother. The evaluation was completed and the mother was thanked for her cooperation in the study.

Statistics: The data was analyzed using SPSS software. Mean, standard deviation, standard error of mean and *p* - value and 95% confidence interval for mean was calculated. One-way ANOVA was applied. Significance was further determined using Tukey's test.

Results

451 consenting consecutive mothers were enrolled for the study. The size of the breast and nipple was measured in 450 lactating women (one mother was excluded due to bilateral inverted nipples). Their ages ranged from 18 to 40 years (mean age 24.14 ± 4.75 years) and parity ranged from 1 to 5. Mothers were divided in 18–22 years, 23–27 years and 28–40 years age group, Group-1 (18–22 years; *n* = 182), Group 2 (23–27 years; *n* = 188) and Group 3 (28–40 years; *n* = 80) (Table 1). The distribution was done as 5 years age group each in first 2 groups and the rest in Group 3 as there were few women in 33–40 years age. This was done for the ease of statistical analysis (and suggested by the statistician)

Table 1: Maternal age and group characteristics

Group	Age (years)	No. of mothers	Parity of mothers	Frequency of breastfeeding (in 24 hours)
1	18–22	182	1–3	7–15
2	23–27	188	1–3	8–14
3	28–40	80	1–5	7–12
Mean	24.14 ± 4.75			9.77 ± 2.88

Table 2: Measurements of breasts and nipple

SD = Standard Deviation

Breast Measurement	Left Breast (Range)	Left Breast (Mean ± SD)	Right Breast (Range)	Right Breast (Mean ± SD)	Mean ± SD of Left and Right Breast	*p* - value
Breast hemi-circumference (cm)					23.66 ± 3.29	
Vertical plane	14.5-31.5	22.34 ± 3.23	15.0-31.0	22.23 ± 3.3		0.358
Horizontal plane	15.0-34.0	25.16 ± 3.21	15.0-32.0	25.09 ± 3.3		0.557
Breast Unit (cm^2)	255-957	568.85 ± 136.55	255-896	561.60 ± 140.89	565.22 ± 138.72	0.445
Areolar Unit (cm^2)	4.0-143.7	42.94 ± 18.88	4.0-138.0	43.43 ± 24.88	43.18 ± 21.88	0.739
Areolar Diameter (cm)					6.36 ± 1.69	
Vertical plane	1.5-12.0	6.30 ± 1.70	2.0-12.0	6.39 ± 1.75		0.459
Horizontal plane	2.0-12.5	6.40 ± 1.64	2.0-12.0	6.35 ± 1.68		0.664
Nipple length (cm)					2.55 ± 0.59	
Vertical plane	1.3-4.0	2.55 ± 0.58	1.3-3.8	2.54 ± 0.61		0.680
Horizontal plane	1.3-4.0	2.55 ± 0.57	1.3-3.8	2.54 ± 0.60		0.706

as this distribution resulted in almost equal number of women in Groups 1, 2 & 3.

Mean breast hemi-circumference was 23.668 ± 3.29 cm. Mean breast unit (both breasts) was 565.22 ± 138.72 cm^2 (range 255–957 cm^2) (Table 2). Mean areolar diameter was 6.36 ± 1.69 cm (range 1.5–12.5 cm). Mean areolar unit of both breasts was 43.43 ± 24.88 cm^2. Nipple length of the right and left breasts was 2.55 ± 0.59 cm (range 1.3–3.8 cm). Mean nipple length was similar on both sides and was 2.55 ± 0.59 cm. Table 3 demonstrates the correlation between breast unit, areolar unit and nipple length with various maternal parameters. Mean frequency of the breastfeeding was 9.77 ± 2.88 times per 24 hours and was not significantly different ($p > 0.05$) among various age groups (Table 3).

Table 3: Correlation of breast unit, areolar unit and nipple length with maternal parameters

Breast Measurement	Maternal parameter/ second parameter	*p* - value	Significance (Tukey's test at 5%)
Mean Breast Unit	Mat. age groups (1,2,3) (1 = 18—22 years, 2 = 23—27 years, 3 = 28—40 years)	0.853	Mean breast unit is not significantly different in various maternal age groups.
Mean Breast Unit	Maternal Parity Groups (1,2,3,4,5)	0.237	None of the groups is statistically significantly different from the other
Rt. Breast Unit	Maternal Parity Groups (1,2,3,4,5)	0.429	None of the groups is statistically significantly different from the other
Left Breast Unit	Maternal Parity Groups (1,2,3,4,5)	0.242	None of the groups is statistically significantly different from the other
Mean Breast Unit	Frequency of Breastfeeding (No. of feeds/day)	0.027- Pearson correlation, 0.562- Sig. (2-tailed)	No significant relation
Mean Rt Breast Unit	Mean Lt. Breast Unit	0.445	No significant difference
Mean Areolar unit	Mat. age Groups (1,2,3), (1 = 18—22 years, 2 = 23—27 years, 3 = 28—40 years)	0.780	Mean areolar unit is not significantly different in various maternal age groups.
Mean Areolar Unit	Maternal Parity Groups (1,2,3,4,5)	0.104	None of the groups is statistically significantly different from the other
Rt. Areolar diameter (vertical plane)	Maternal Parity Groups (1,2,3,4,5)	0.368	None of the groups is statistically significantly different from the other
Breast Measurement	Maternal parameter/ second parameter	*p* - value	Significance (Tukey's test at 5%)
Rt. Areolar diameter (horizontal plane)	Maternal Parity Groups (1,2,3,4,5)	0.564	None of the groups is statistically significantly different from the other
Lt. Areolar diameter (vertical plane)	Maternal Parity Groups (1,2,3,4,5)	0.307	None of the groups is statistically significantly different from the other
Lt. Areolar diameter (horizontal plane)	Maternal Parity Groups (1,2,3,4,5)	0.573	None of the groups is statistically significantly different from the other
Mean Areolar Unit	Frequency of Breastfeeding (No. of feeds /day)	0.00- Pearson correlation, 0.978- Sig. (2-tailed)	No significant relation
Mean Rt Areolar Diameter (vertical plane)	Mean Lt. Areolar Diameter (vertical plane)	0.459	No significant difference
Mean Rt Areolar Diameter (horizontalplane)	Mean Lt. Areolar Diameter (horizontal plane)	0.664	No significant difference

Mean nipple length	Mat. age groups 3 vs Mat. age Groups 1 & 2, (1 = 18—22 years, 2 = 23—27 years, 3 = 28—40 years)	0.004	Mean nipple length of mat. age Group 3 is significantly different (longer) than mat. age Groups 1 and 2.
Mean nipple length	Maternal Parity Groups (1,2,3,4,5)	0.001	Group 1 was significantly different from Group 4
Breast measurement	Maternal parameter/ second parameter	*p* - value	Significance (Tukey's test at 5%)
Rt. Nipple length (vertical plane), Rt. Nipple length (horizontal plane), Left. Nipple length (vertical plane), Left. Nipple length (horizontal plane)	Maternal Parity Groups (1,2,3,4,5)	0.002	Group 1 was significantly different from Group 4
Mean Nipple Length	Frequency of Breastfeeding (No. of feeds /day)	0.061- Pearson correlation, 0.193- Sig. (2-tailed)	No significant relation
Mean Rt Nipple length (horizontal plane)	Mean Lt. Nipple length (horizontal plane)	0.706	No significant difference
Mean Rt Nipple length (vertical plane)	Mean Lt Nipple Length (vertical plane)	0.68	No significant difference

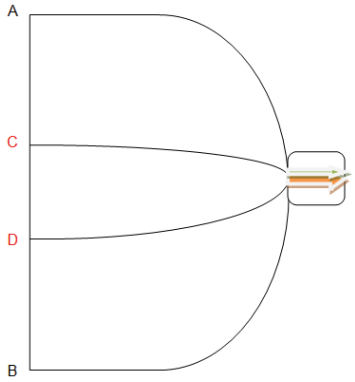

Fig. 1: Method of breast measurement

A to B = Vertical hemi-circumference of the breast

C to D = Horizontal hemi-circumference of the breast

E to F (distance from E to F in vertical plane) = Nipple projection length (vertical)

G to H = Nipple projection length (horizontal)

Discussion

Breastfeeding is one of the important aspects of a woman's life. Shape, size, position and asymmetry of the breast(s) have various important psychological consequences on the mother regarding her capacity of milk production and the ability to breastfeed her baby.[1] We measured size of the breasts, areola and nipples in the first week postpartum as it is the most crucial time for establishing successful breastfeeding especially when many mothers harbor misplaced ideas about quantity and quality of the breast milk related to the size and shape of their breasts and may feel less confident about breastfeeding their infants.[3]

The technique of breast measurement used in this study was originally described by Capraro and Dewhurst in 1975.[2] Anthropometric measurements are easier to perform and do not require too much material. Various other methods have also been used in literature using complex measurements.[8–10] A method using breast anthropometry measurements used for breast volume determination in women with breast hypertrophy is used for breasts with ptosis and may be used as an alternative method for breast volume determination for lactating women.[8] Various methods employed for breast measurements such as Grossman Disk,[11,12] casting techniques,[9] water displacement techniques, mammography,[7] 3-D imaging[13–17] and ultrasound imaging of the breast.[18]

The wide range of techniques available yield varied results and are sometimes difficult to interpret. The methods considered most accurate are the direct volume measurement techniques such as plaster casts, paraffin models and water displacement techniques.[19] However, these are time consuming and cumbersome. Casting methods are conducive to deformation of the breast and may alter the volume measurements. Patient stated cup-sizes have been found to be a poor proxy for the actual measurements of the breast. Surgical work requires accurate measurements. Hence, the constant need to develop accurate and simple measurement techniques.

Mean (maternal) age of the enrolled subjects was 24.14 ± 4.75 years with a range of 18–40 years. Mean Breast hemi-circumference was 23.668 ± 3.29 cm. For left breast, mean vertical hemi-circumference was 22.34 ± 3.23 cm and 25.16 ± 3.21 cm in horizontal plane. For the right breast, the corresponding values were 22.13 ± 3.36 cm (vertical) and 25.03 ± 3.37 cm (horizontal) respectively. Comparison between vertical and horizontal hemi-circumferences of right and left breast did not reveal any significant difference ($p > 0.05$). Average (both breasts) mean vertical (12 to 6 o'clock) breast hemi-circumference was 22.23 cm and average mean horizontal (9 to 3 o'clock) breast hemi-circumference was 25.09 cm. Mean breast hemi-circumference was related neither to parity status of the mother nor to frequency of breastfeeding. The fact that breast hemi-circumference(s) were neither significantly related to parity of the mother nor to frequency of breastfeeding may imply that these measurements do not depend on and do not increase with age/ parity of women and can help reassure would-be mothers that breastfeeding/increase in frequency of breastfeeding does not lead to enlargement of the breast.

Mean breast unit of the left and right breasts were 568.85 ± 136.55 cm^2 and 561.60 ± 140.89 cm^2 respectively ($p > 0.05$) and mean breast unit of both breasts was 565.22 ± 138.72 cm^2 (range 255–957 cm^2) (Table 2). The mean and individual breast units were neither significantly different among various maternal age groups nor parity of the mothers had any effect on them. Similarly, frequency of breastfeeding did not affect the breast unit (Table 3), indicating that it does not alter the breast size. The finding that even the mothers having lowest range of 'Breast Unit' i.e. 255 cm^2 also reported normal lactation, is a very encouraging finding as it implies that mothers with small breasts are also capable of producing enough milk for their infants irrespective of the size of the breasts.

Mean breast unit was 565.22 cm^2 (range 255–957 cm^2) and mean areolar unit was 43.18 ± 21.88 cm^2 in our study and these were not different in primipara mothers from multipara mothers and among different reproductive age groups. Mean areolar diameter was 6.36 ± 1.69 cm (1.5–12.5 cm), approximately one-fourth of mean breast hemi-circumference (calculated from both breasts and including the vertical and horizontal planes). Right areolar diameter in the vertical plane was 29% of the hemi-circumference and 25% of the hemi-circumference in the horizontal plane of the right breast in the vertical and horizontal planes, respectively. Corresponding values were 29% and 26% on the left side.

Areolar diameter and breast circumference (like breast and alveolar unit), were neither related to para status of mother nor to frequency of breastfeeding. This reinforces the fact that breast tissue enlargement during lactation is neither dependent on age and para status of the mother nor does the breast size increase/decrease with frequency of breastfeeding.

Mean areolar unit of both breasts was 43.43 ± 24.88 cm^2. The right areolar unit was 8% of the right breast unit and left areolar unit made 6% of the left breast unit. Maternal age ($p = 0.780$), parity ($p = 0.104$) and frequency of breastfeeding ($p = 0.978$) did not affect areolar unit of the breasts (Table 3).

Mean areolar unit and mean breast unit were significantly different neither among various maternal age groups nor among various parity groups. Both breast and areolar unit did not differ/increase significantly with frequency of breastfeeding. This indicates that areola and breast unit measurements do not increase with parity among breastfeeding women, these facts can be used for reassuring women that breastfeeding does not lead to enlargement of the breast.

The areola made up almost 25% of the breast, and nipple length was about 11% and 40% of the breast hemi-circumference and areolar diameter, respectively. The ratio between breast stroma, areola and nipple make up to 6:4:1. Unlike other studies, which show that nipple-areola-breast proportion are 1:3, the nipple-areola-breast proportion in lactating women was 1:4.

Symmetrical breast has been defined as < 5.6%[9] or < 50 cc difference in the breast volume between the right and left breasts.[8] We did not find any significant difference in the breast and areolar units on both sides. Some authors have reported asymmetry of the two sides.[14,17,21] However, none of these studies have been done on lactating women in the immediate post-partum period. Most authors have studied 'esthetically pleasing breast'. 'Esthetically pleasing breast' has been defined as size and fullness proportional to the body, have minimal ptosis and no axillary tail, be conical to teardrop in shape, and have the nipple at the anterior most position.[9] Esthetically perfect breast was defined as a non-ptotic breast in which no common esthetic procedure would be considered appropriate (excluding augmentation) to enhance the breast's form.[9] But the results from esthetically perfect breasts and breast size of the adolescent nulliparous women cannot be extrapolated to lactating women.

Breast volume is an indicator of whole organ change reflecting responses to the pathologic, physiologic, pharmacologic and environmental factors. Breast volume varies during the menstrual cycle and pregnancy. It has been reported that breast volume increases by 145 ± 19 ml during pregnancy to 211 ± 16 ml by 1 month of lactation.[22] In normal women the breast units for each breast at any given time are not exactly equal but relatively similar.

Most authors have expressed breast size in volume except Capraro and Dewhurst,[2] who introduced a measure named 'Breast Unit'– which is the multiplication of vertical and horizontal breast hemi-circumference. There is paucity of literature and no similar study is available to the best of our knowledge for comparison of breast size(s) using Capraro and Dewhurst method. We found that areola and breast unit measurements of lactating mothers in the immediate postpartum period were independent of age and parity.

In Capraro and Dewhurst study, the measure 'breast unit' shows an increase in value (indicating an increase in size of breasts) as the adolescent grows. Measurements of breast unit on a normal adolescent girl– Right breast unit at 11,12,14,15 and 16 years was 24.75, 180, 247, 357 and 396 and Left breast unit values at corresponding years were 13.5, 170.5,252,340 and 378 respectively, showing a progressive increase with age.[2] Breast size of mothers having lowest breast unit-255 cm^2 in the present study have measurements similar to those found in the adolescent age group and yet are able to breastfeed the babies well and have sufficient milk output.

Breast volumes have been found to be positively correlated to body weight, and chest, lumbar and buttock circumference, and negatively correlated to height.[10] However, these observations have not been verified on lactating women. We did not record mother's weight and other anthropometric measurements. It was, therefore, difficult to categorically state whether woman's physique had any bearing on the size of the breast from this study. Another limitation of the present study was that the breast margin was estimated by palpation of the breast tissue and this could have introduced an element of subjectivity in the measurements. However, single observer recordings were performed to diminish this bias. The breast and areolar units were equal on both sides. However, both breast and areolar units did not increase significantly with increase in frequency of breastfeeding. This observation could help reassure mothers that breastfeeding probably did not lead to enlargement of the breast, a frequent misconception. The areolar diameter made up about 25–30% of the breast hemi-circumference. Hauben et al.[20] have shown that nipple-areola-breast proportion was 1:3:3 in non-lactating women. In our study, the measurements were 1:4:6 signifying that breast stroma and areolar proportion is significantly larger (compared to the size of the nipple) among lactating women than in non-lactating women. The nipple was longer in older (28–40 years) and multiparous mothers. Mothers with smallest nipple projection length (1.3 cm) were also able to feed the babies well and small nipple did not pose any difficulty in breastfeeding.

Nipple length of the right and left breasts was 2.55 ± 0.59 cm (range 1.3–3.8 cm). Mean nipple length was similar on both sides and was 2.55 ± 0.59 cm (Table 1) maybe because the frequency of breastfeeding was almost equal from both the sides. In our subjects due to cultural practice of feeding from both the breasts and the influence of good breastfeeding counseling practices in the hospital.Mothers with smallest nipple projection length (1.3 cm) were also able to feed the babies well.

Mean nipple length of mothers of Group 3 (28–40 years) was significantly longer ($p = 0.004$) than women of Group 1 (18–22 years) and Group 2 (23–27 years), indicating that mean nipple length was longer in higher age and parity ($p = 0.001$), despite similar frequency of breastfeeding. Mean nipple length did not have significant positive correlation with number of feeds per day ($p = 0.193$) (Table 3). Lactation and IYCF (Infant and Young Child Feeding) clinics focus on the benefits of anatomy breastfeeding, and physiology of the breast, techniques of breastfeeding, care of the breast(s) and common problems likely to be encountered during lactation and their remedies in order to help resolve maternal apprehensions regarding breast size, and adequacy of breastfeeding. These antenatal/IYCF/lactation promotion clinics can help resolve maternal apprehensions regarding adequacy of breast size during lactation and breastfeeding of the baby.[23] This data would be of immense benefit to Lactation counceling clinics for counseling of breastfeeding mothers and such counceling is likely to decrease the likelihood of discontinuation of lactation and increase the rates of exclusive breastfeeding up to 6 months. Breast measurements can be used for pre-surgical counseling before esthetic and plastic surgery as well.

Conclusion

This study provides data of breast measurements of lactating women using non-invasive, rapid and inexpensive method. Mean breast unit in the breastfeeding mothers was 565.22 ± 138.72 cm^2 (range 255–957 cm^2) and mean areolar unit was 43.18 ± 21.88 cm^2 (range 4–143.7 cm^2) in the first postpartum week. Breast and alveolar units were not affected by age, parity or frequency of breastfeeding. The mean nipple length was 2.55 ± 0.59 cm and was significantly longer in mothers aged 28–40 years (as compared to < 28 year old mothers) and in multipara.

Implications: The nomograms of breast measurements and breast volume estimations can help to counsel lactating mothers regarding adequacy of breast volume. Studies may be conducted for various ethnic groups/populations for determining their own anthropometric parameters of the breast for comparisons.

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