Human Biology Review (ISSN 22774424)
www.HumanBiologyJournal.com

International Peer Reviewed Journal of Biological Anthropology
Volume 13, Number 3, July-September 2024 Issue
Original scientific paper

Anthropometric comparison of breast size in relation to body mass index in females in Ado Odo Ota Local Government Area, Ogun State, Nigeria

A.S. Alabi, T.F. Oyedele, A. Alabi, A.Olawepo, O. Olasehinde, J.A. Owa and D.E. Babatunde.

Human Biology Review, Volume 13 (3), pp. 226-242.
Revised and accepted on June 12, 2024

Citation: Alabi AS, Oyedele TF, Alabi A, Olawepo A, Olasehinde O, Owa JA and Babatunde DE. 2024. Anthropometric comparison of breast size in relation to body mass index in females in Ado Odo Ota Local Government Area, Ogun State, Nigeria. Human Biology Review, 13 (3), 226-242.

Authors and affiliations
*Alabi Ade Stephen., Department of Anatomy, Faculty of Basic Medical Sciences College of Health Sciences, University of Ilorin, Nigeria. Email:adealabistephen14@gmail.com, alabi.as@unilorin.edu.ng
Oyedele Tobiloba Florence, Department of Anatomy, Faculty of Basic Medical Sciences College of Health Sciences, University of Ilorin, Nigeria.Email-tobilobaoyedele8@gmail.com
Alabi Adeola, Department of Anatomy, Faculty of Basic Medical Sciences College of Health Sciences, University of Ilorin, Nigeria.. Email-alabi.@unilorin.edu.ng
Olawepo Ayokunle, Department of Anatomy, Faculty of Basic Medical Sciences College of Health Sciences, University of Ilorin, Nigeria. Email-kunleolawepo@yahoo.co.uk
Olasehinde Oluwatoyin, Department of Orthopaedics, University of Ilorin Teaching Hospital, Nigeria. Email-oolasehinde@uithilorin.org.ng
Owa Joshua Abidemi, Department of Paediatrics, Federal Teaching Hospital,Lokoja ,Kogi State , Nigeria.Email-owajabidemi@gmail.com
Babatunde Dare Ezekiel, Department of Anatomy Faculty of Basic Medical Sciences, Bowen University Iwo, Osun state. Email- dare.babatunde@bowen.edu.ng
*Corresponding author

Anthropometric comparison of breast size in relation to body mass index in females in Ado Odo Ota Local Government Area, Ogun State, Nigeria

A.S. Alabi, T.F. Oyedele, A. Alabi, A.Olawepo, O. Olasehinde, J.A. Owa and D.E. Babatunde

Citation: Alabi AS, Oyedele TF, Alabi A, Olawepo A, Olasehinde O, Owa JA and Babatunde DE 2024. Anthropometric comparison of breast size in relation to body mass index in females in Ado Odo Ota Local Government Area, Ogun State, Nigeria. Human Biology Review, 13 (3), 226-242.

ABSTRACT

Breast anthropometry, an essential aspect of biological anthropology, examines the scientific measurement of breast size and its descriptive indices. Understanding the relationship between breast size and Body Mass Index (BMI) is vital for both anthropological research and healthcare. This cross-sectional observational study aimed to investigate the correlation between breast size and BMI among females in Ado-Odo-Ota Local Government Area. Data were collected from 210 female residents aged 12-70 years, excluding those with congenital breast anomalies or prior breast surgeries. Anthropometric measurements including breast circumference, underbust girth, shoulder to nipple length, inter-nipple distance, and breast projection were recorded alongside weight and height measurements. Statistical analyses, including Pearson's correlation and Chi-square tests, were conducted to explore the associations between breast anthropometry and BMI. Results revealed significant positive correlations between breast size parameters (breast circumference, underbust circumference, inter-nipple distance, shoulder-nipple length, and breast projection) and BMI ($p < 0.001$). Regression analysis indicated that breast circumference significantly predicted BMI ($p < 0.001$). Additionally, a strong correlation was observed between weight and breast anthropometry measures, suggesting a substantial impact of weight on breast morphology. However, no significant association was found between height and certain breast measurements, although underbust circumference, shoulder-nipple length, and breast circumferences exhibited positive correlations with height. These findings contribute to our understanding of the complex interplay between anthropometric parameters and breast morphology, emphasizing the importance of considering multiple factors, including BMI and weight, in assessing breast size variations. Such insights are crucial for both anthropological studies and healthcare interventions, providing a foundation for informed discussions on body composition, health risks, and preventive strategies. Further interdisciplinary investigations are warranted to elucidate the nuanced relationship between breast size, BMI, and overall health outcomes.

Key words: Anthropometry, Correlation, Regression analysis, Morphology, Body composition, Healthcare interventions, Health risks. Breast circumference, Inter-nipple distance, Body mass index, Weight, Under bust circumference, Breast projection , Shoulder-nipple length.

INTRODUCTION

Breast anthropometry is a branch of anthropometry, which deals with the study of scientific measurement of breast size and descriptive indices of the breast. The anthropometric measurement and proportions of the breast has made immense contribution to biological anthropology to study human phenotypic variation which has contributed to the impact in medical health care, surgical procedures. Female breast size and mass vary widely from person to person (Gefen and Dilmoney, 2007).

The anthropometric exploration of the relationship between Breast size and Body Mass Index (BMI) in females is gaining traction in anthropological research. Anthropometry, as a scientific discipline, scrutinizes the measurement of human body dimensions, providing a foundation for understanding physiological variations. Studies by Smith *et al*. (2018) have shown that breast composition, a significant component influenced by adipose tissue, is intricately linked to overall body fat percentage encapsulated by the body mass index metric.

Breasts are part of the female and male anatomy, but rudimentary in the male anatomy. Breasts in female anatomy are both functional (breastfeeding) and for sexual pleasure, they are secondary sexual characteristics of female gender, which depends on hormonal activities: size and shapes varies in different reproductive period (adolescence, pregnancy, breastfeeding and menopause) (Avsar *et al.,* 2010).

As researchers delve into this theoretical landscape, the findings not only enhance anthropometric studies but also have broader implications in public health. A comprehensive understanding of body composition is crucial for informed discussions on well-being and preventive healthcare strategies, the synthesis of anthropometric and hormonal insights provides a holistic perspective on the nuanced relationship between breast size and BMI in females, paving the way for further interdisciplinary investigations. Breasts are secondary sexual characteristics of female gender; with anatomical variations with respect to volume, width, length, projection, composition and placement on chest wall. Hormonal activity also waves an impact (Jemstrom and Olsson, 1997).

Furthermore, size and shape of the breast also vary depending on the fat tissue content, so obesity could an important factor. A size difference between the two breasts in women who do not have any endocrine disorder is frequently observed; the breasts may develop asymmetries and show irregularity on palpation after menopause. Age-related changes to the breast's fatty and connective tissue result in smaller, more breast ptosis (Dilek *et al.,* 2010).

Previous research specifically investigated the effects of aging on breast skin thickness and elasticity and the implications for breast support. It is further suggested that increasing female age would also increase variations of female physiological structure or hormones. In particular, skin and breast connective tissue loss could result in breast relaxation, sagging, and expansion (Haars *et al.*,2005; Boyd *et al*., 2009). Recent research showed strong evidence that breast characteristics are greatly affected by age. Similarly, BMI also had a strong impact on breast anthropometry (Coltman *et al*., 2018).

There are also common myths as regards breast sizes; for instance; asymmetrical breasts are cancerous, which is not usually true, breasts shrink with age, all full figured individuals have larger breasts . This is untrue as women come in all sizes, shapes and also the breasts sizes too. Some women with small size are naturally full busted, while some women are of big size and are not fully busted. Recent research indicates that changes in age and body mass index (BMI) have an impact on the characteristics of female breasts as well as consumer preferences for bra design, colour, style, and market (Clarke and Griffin, 2008).

However, it is still unclear how a woman's age and BMI (an approximation of general body), affect her breast size. Therefore, the goal of this study was to thoroughly evaluate how age and BMI affected breast size (Porter *et al.,* 2004).

Clear anthropometric measurements of the breast and breast-related locations performed from fixed skeletal and soft tissue landmarks are useful in breast aesthetic assessment, patient evaluation, and evaluation of breast surgical outcomes. (Khan and Bayat, 2008).

Data analysis derived from statistical techniques has contributed to our understanding in human variation. (Galdino *et al.,* 2002) used 3D surface scanners to quantify parameters, asymmetry and anatomical landmarks. (Coltman *et al.,* 2017) described the effect of age and BMI on breast characteristics.

This cross-sectional observational study aimed to determine correlation of breast size in relation to Body Mass Index (BMI) in Ado-Odo-Ota Local Government Area.

MATERIALS AND METHODS

The female residents of Ado Odo Ota Local Government Area were accosted in the study between September 2023 and November 2023. All the females were free from breast malformations. Those excluded from the study include females with congenital breast anomalies and breast malformations. The breast circumference, underbust circumference, shoulder to nipple length,

inter-nipple distance and breast projection were taken for the breast parameters using a flexible tape measure. The weight and height of the participants were taken. Body mass index was computed as the ratio of weight to the square of height (kg/m2). All the participants provided and filled the informed consent form and the overall study was approved by the Department of Anatomy, College of Health Sciences. All breast measurements taken were made using a flexible measuring tape and were recorded. Then measurements of the height using a stadiometer, and weight using a digital scale were recorded respectively. All the measurements were taken twice to avoid any form of errors. The Statistical Package for Social Sciences (IBM, Version 27, Armonk, New York, USA was the statistical package used, while the mean + Standard deviation, maximum, minimum and Pearson's correlation and Chi-square analysis was used to analyze the data.

The following are the landmarks used to carry out the measurement on parts of the body.

1)i. Breast Circumference - Measurement of trunk at level of breast, over nipple to the center of vertebral column.

Ii. Under bust circumference- Measurement from the sternal notch to the center of the vertebral column.

iii. Inter-nipple distance- Distance between nipple to nipple.

iv. Shoulder to nipple length- Measurement of the distance from midpoint of clavicular line to the nipple.

v. Breast projection - Measuring the distance of the areolar mammae from the anterior chest wall of the subject standing in an anatomical position.

2)The Height: This is measured while in an upright position from the vertex of the head to the heel

3)The Weight: The subject stands barefooted with both feet in the center of the scale

4)BODY MASS INDEX; BMI was computed as the ratio of weight to the square of height(kg/m2)

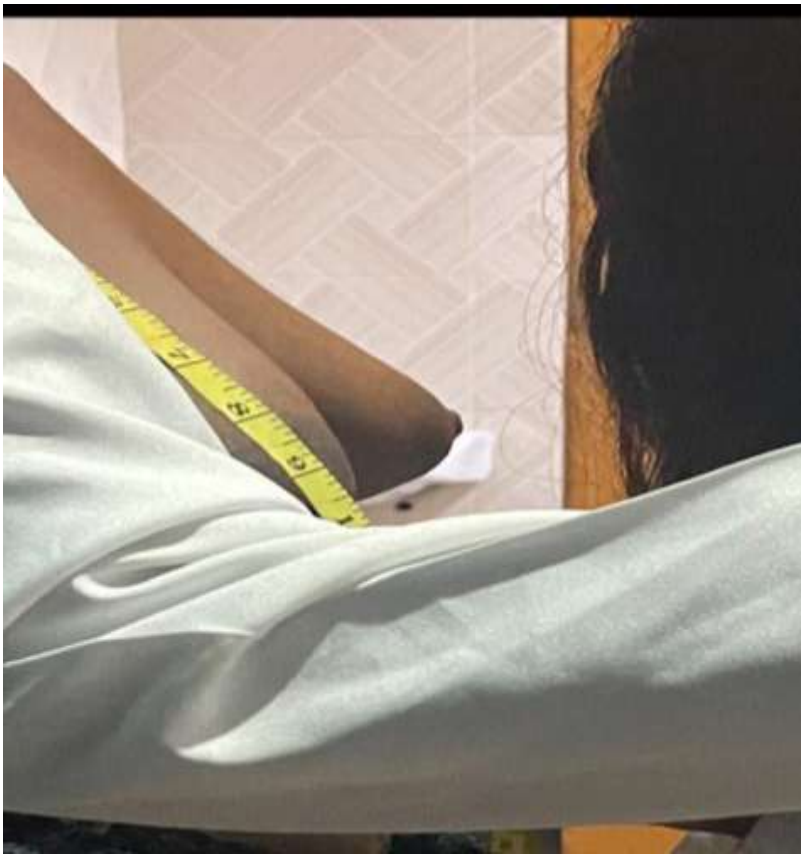

Fig 1.1 Measurement of shoulder-nipple length.

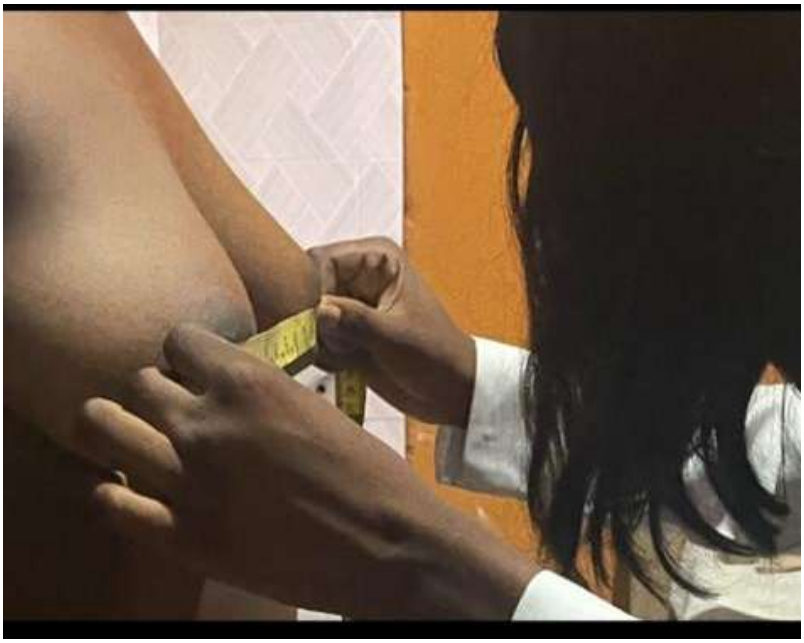

Fig 1.2 Measurement of inter-nipple distance.

Fig 1.3 Measurement of breast circumference.

The following were included in the study and were used in selecting the subjects:

1) Participants who have obtained prior informed consent and voluntarily agree to participate in the study.

2) Participants are residents of Ado Odo Ota Local Government Area.

3) Participants are free from congenital breast anomalies and breast malformations.

4) Participants must be females of age range 12-70years.

The following criteria were used in excluding the subjects:

1) Participants with any breast malformations.

2) Participants with congenital breast anomalies (amastia, amazia, cysts, tumor, lumps etc).

3) Subjects who had surgery done on the breasts.

Statistical Analysis

The Statistical Package for Social Sciences (IBM,Version 27,Armonk,New York,USA) was the statistical package used,while the mean + Standard deviation,maximum,minimum and Pearson's correlation and Chi-square analysis was used to analyze the data.

Ethical Consideration

Ethical approval gotten from the University of Ilorin ethical committee, with the number UERC/ASN2024/2762.

RESULTS

The results were presented based on anthropometric measurements of the breast among females in Ado-Odo-Ota Local Government Area, Ogun state. The values observed from the anthropometric measurements were tabulated and the mean (S.D) values were determined for the sex (female).

The population comprised of 210 females of Ado-Odo-Ota Local Government Area , Ogun state in Nigeria. The results of this study were therefore presented to reflect key critical objectives as stated in chapter one. The values obtained were presented as mean (S.D) values in tabular form. Table 1 represents the descriptive statistics of all observed data. Table 2 shows the relationship between BMI and Breast anthropometry while Table 3(a) is a relationship between the Breast Size(breast circumference) and BMI. Table 3(b) shows a regression analysis on Table 4.3(a) for further examination and prediction. Table 4 and Table 5 shows Chi-square analysis between Breast anthropometry with weight and height respectively.

Table 1: Descriptive statistics of breast measurements of females of Ogun, Nigeria

Variables	**Mean±S.D**	**Min**	**Max**
Breast Circumference (cm)	90.04±12.74	60.00	142.00
Under-bust Circumference (cm)	81.69±12.01	52.00	129.00
Inter-Nipple Distance (cm)	21.13±2.00	16.00	27.00
Shoulder-Nipple Length (cm)	21.67±2.84	15.00	34.00
Breast projection (cm)	17.05±3.38	12.00	27.00
Weight (kg)	61.67±14.90	28.00	120.00
Height (cm)	160.23±7.20	140.00	175.00
Body Mass Index (kg/m^2)	24.90±5.62	13.90	44.90
N	**210**		

Note: *S.D= Standard deviation, N= Number of cases*

According to Table 1 is the representation of the Mean±SD, minimum and maximum values of the measured dimensions of the female subjects, the mean of the breast circumference was 90.04±12.749(cm) while that of the under-bust circumference was 81.69±12.01(cm). the mean of shoulder to nipple length was 21.67± 2.84(cm), while, the mean of Inter –nipple distance was 21.13± 2.00(cm) and that of the breast projection was 17.05±3.38(cm). The mean of the observed weight was 61.67±14.90(kg), mean of the observed height is 160.23± 7.20(cm) and that of the BMI is 24.90± 5.62 (kg/m^2).

The minimum and maximum values for breast circumference were 60.00 and 142.00 , the minimum and maximum values for under – bust circumference were 52.00 and 129.00 while the minimum and maximum values for inter-nipple distance were 16.00 and 27.00 , the minimum and maximum values for shoulder-nipple length were 15.00 and 34.00 and that of breast projection were 12.00 and 27.00 respectively. The minimum and maximum values of the observed height were 140.00 and 175.00 and that of the BMI were 13.90 and 44.90.

2: Test to determine association between Breast anthropometry and BMI

Variables	**R**	**p-value**	**Inf.**
Breast Circumference (cm)	0.638	**<0.001**	**S**
Under-bust Circumference (cm)	0.628	**<0.001**	**S**
Inter-Nipple Distance (cm)	0.499	**<0.001**	**S**
Shoulder-Nipple Length (cm)	0.530	**<0.001**	**S**
Breast projection (cm)	0.480	**<0.001**	**S**

Note: *R= Pearson"s correlation value, Inf.= Inference, S=Significant*

In the table above (2) is the association between breast anthropometry and BMI. Breast Circumference, Under-bust Circumference, Inter-Nipple distance, Shoulder-Nipple length and Breast Projection (cm) shows a positive correlation with p values of <0.001, <0.001, <0.001, <0.001, <0.001 respectively with BMI.

Table 3(a): Pearson correlation analysis to ascertain the Correlation of Breast size (breast circumference) with BMI.

	BMI		
VARIABLES	R	p-value	Inf.
Breast circumference	0.638	**<0.001**	**S**

Note: *R= Pearson"s correlation value, Inf.= Inference, S=Significant*

Table 3(a) shows the correlation analysis of breast size with BMI of the female subjects. Breast Circumference shows a positive correlation or association.

Table 3(b): Examining the Relationship between Breast circumference and BMI Using Regression Analysis.

	BMI prediction(in kg/m^2)		
VARIABLES	R_E	R^2(%)	p-value
Breast circumference(cm)	-1.254 + 0.281 BC	40.7	**<0.001**

Note: R^2= coefficient of determination, R_E= regression equation, BC= breast circumference

From the table above, the equation for the prediction of BMI using Breast circumference is; -1.254 + 0.281 BC.

In the table above (3b) is the prediction model for BMI amongst Ado-Odo-Ota females in Ogun state (with regression equations). The regression model for the estimation of BMI amongst Ado-Odo-Ota females in Ogun state shows breast circumference significantly predicted the BMI in a positive way ($p<0.001$).

Table 4: Determination of association between breast anthropometry and Weight.

VARIABLES	**X^2**	**df**	**P- value**	**Inf.**
Breast Circumference(cm)	3637.556	2703	**<0.001**	**S**
Under-bust Circumference(cm)	3626.197	2438	**<0.001**	**S**
Inter-Nipple distance(cm)	1118.052	689	**<0.001**	**S**
Shoulder-Nipple length(cm)	1486.039	954	**<0.001**	**S**
Breast Projection(cm)	1475.297	1007	**<0.001**	**S**

Note: df= Degree of freedom, X^2= Chi-square, Inf= Inference, S= Significant

Table 4 shows a significant relationship between breast circumference, under-bust circumference, Inter-nipple distance, shoulder –nipple length, breast projection and Weight with p values of p<0.001, p<0.001, p<0.001, p<0.001 and p<0.001 respectively.

Table 5: Determination of association between breast anthropometry and Height .

VARIABLES	X^2	df	P- value	Inf.
Breast Circumference(cm)	1870.949	1581	**<0.001**	**S**
Under-bust Circumference(cm)	1576.035	1426	**0.003**	**S**
Inter-nipple distance(cm)	399.917	403	0.534	NS
Shoulder-Nipple length(cm)	632.583	558	**0.015**	**S**
Breast Projection(cm)	628.336	589	0.127	NS

Note: df= Degree of freedom, X^2= Chi-square, Inf= Inference, NS=Not Significant, S= Significant

Table 5 shows no significant relationship between Height, the Inter– nipple distance and the Breast projection with p values of 0.534 and 0.127 respectively. Unlike the Breast circumference, Under-bust circumference and shoulder-nipple length which shows positive association with height.

DISCUSSION

The findings of this study provide valuable insights into the complex interplay between anthropometric parameters and breast morphology among Ado Odo Ota females in Ogun State, the analysis revealed several significant correlations, notably positive associations between breast projection, underbust circumference, inter-nipple distance, and shoulder-nipple length (p<0.001). These results align with previous research conducted in Israel (Weistreich ,1997) in , Avsar *et al*., (2010) and Demiroz *et al*., (2021) in Turkey, corroborating the universality of certain patterns in breast morphology across diverse populations.

Impact of Body Mass Index on Breast size

The purpose of the current study was to investigate the relationship between female participants' body mass index (BMI) and breast size in Ado-Odo-Ota, Ogun state. According to previous research on the topic (Smith *et al*., 2018), the results show a significant correlation between BMI and breast anthropometry measurements (breast circumference, under-bust circumference, inter-

nipple distance, shoulder-nipple length, and breast projection). These findings highlight how crucial it is to take into account a variety of anthropometric factors when evaluating a person's body composition and overall health.

Moreover, according to Ooi *et al.,* (2019), there is a positive link between breast size and BMI, indicating that higher BMI values are typically associated with larger breast sizes. This correlation adds to the understanding of the intricate link between breast form and body composition by highlighting the interaction between the distribution of adipose tissue and total body fat percentage. Additionally, the results of the regression analysis show that among the female participants in the study, breast circumference is a significant predictor of BMI. Healthcare practitioners can use this predictive model to evaluate body composition and health risks related to BMI and breast size (Zhao *et al.,* 2021).

Furthermore, the results show a strong correlation between height and weight as well as breast anthropometry measurements, highlighting the complex interplay between stature, total body composition, and breast size. These findings underscore the value of thorough anthropometric evaluations for assessing risk factors and health outcomes.

Breast size in relation to Weight

Weight has a major impact on the morphometric findings. The lateral part of the breast slides inferolaterally when weight increases, but the medial region remains suspended (Al-Qattan *et al.,* 2019). Contradictory findings have been found in recent research on the association between changes in height and weight and breast morphology. Breast size was found to be independent of both weight and chest diameter by (Vandeput and Nelissen, 2002). On the other hand, breast size, also known as breast volume was shown to rise by 20 mL for every kilogram of weight gain over the optimal weight in Westreich's study. The body weight of the individuals in this study was found to have a substantial link with all observed breast measurement metrics. Furthermore, the results show a strong correlation between weight as and breast anthropometry measurements, highlighting the complex interplay between weight and breast size. These findings underscore the value of thorough anthropometric evaluations for assessing risk factors and health outcomes.

In addition to weight, BMI emerged as a significant correlate of breast size in the study, consistent with previous research by Avsar *et al.,* (2010) and Westreich (1997). These findings highlight the importance of considering overall body total mass, which is simply known as weight, in

understanding variations in breast morphology, with BMI serving as a proxy for adiposity and its impact on breast tissue composition.

Breast size in relation to Height

Huang *et al*. (2017) found that a bigger breast volume was positively connected with height, post-menopausal status, higher BMI, and nursing for more than six months in the multivariate ordinal logistic regression analysis.

In comparison to Westreich's (1997) study, a negative connection was seen between breast size and height. According to Brown *et al.* (1999), there was no correlation between height and the morphometric parameters of the breast. Similar findings were made in this investigation, which revealed no evidence of a significant relationship between height and a few assessed breast anthropometric measures. In contrast, the underbust circumference, shoulder-nipple length, and breast circumference all exhibit a positive correlation with height.

Moreover, the results show a strong correlation between height and breast anthropometry measurements, emphasizing on the intricate interactions between height (stature) and breast size., which highlight the importance of thorough anthropometric evaluations for assessing risk factors and health outcomes.

Breast size in relation to Shoulder-Nipple length

The study also explored the relationship between breast size and other anthropometric parameters, such as Shoulder-nipple length (SNL), also known as Clavicle-nipple length (CNL). While CNL has been previously associated with breast volume in studies by Avsar *et al*. (2010) and Archibong *et al*., (2021), SNL was measured in the investigation, revealing significant associations with breast circumference ($p < 0.001$). These findings underscore the multidimensional nature of breast morphology and the importance of considering various anatomical measurements in assessing breast characteristics comprehensively.

Furthermore, Huang *et al*. (2017) found that the mean CNL value was 22.6 cm in their research of Asian individuals. Based on their varied studies, almost all of the aforementioned were directly significant with breast size. However, Shoulder-Nipple length (SNL) was measured for this investigation. The study's mean SNL value was 21.67 cm, with minimum and highest values of 15.00cm and 34.00cm, respectively, with a mean breast circumference of 90.04 cm.

Breast size in relation to Breast projection

The findings of this study support that of Huang *et al.,* (2017) in that it shows a strong positive link between Breast projection values and breast size as well as a similar range for breast projection (BP). In the study conducted by Huang *et al.,* (2017) and Nguyen *et al.,* (2023), the Vietnamese youth had a mean Breast projection of 19.4 cm and 4.3 cm, respectively. With a minimum and maximum of 12.00cm and 27.00cm, the mean Breast projection in (cm) for this study was 17.05 ±3.38(cm). The study's mean Breast projection value was greater than Avsar *et al*., (2010), which was 4.0 cm. These discrepancies may be related to the respondents' varying racial and regional backgrounds as well as age groups.

Furthermore, the analysis revealed discrepancies in breast size across different racial and regional backgrounds, as evidenced by variations in breast projection (BP) observed in studies by Huang *et al.,* (2017), Nguyen *et al.,* (2023), and Archibong *et al.,* (2021). These variations may reflect genetic, cultural, or environmental influences on breast morphology, highlighting the need for nuanced approaches to breast surgery planning tailored to individual patient characteristics.

Conclusion

This study shows that among female residents of Ado-Odo-Ota, Ogun state, the mean breast size was 90.04±12.74 cm calculated physically with tape rule. Body weight, height, breast circumference and other observed parameters (breast projection, underbust circumference, Inter-nipple distance, shoulder-nipple length) were all dependent factors for determining breast size and BMI, there is a considerable correlation between breast anthropometry and BMI. The findings demonstrate how important it is to include breast size when estimating overall body composition and health. Additionally, the breast circumference-based BMI prediction model has practical implications for assessing the health risks associated with obesity for medical practitioners. Future research should focus on increasing sample sizes and looking into additional factors that affect breast size and BMI, such as hormonal fluctuations and genetic predispositions. Furthermore, standardized protocols for the objective assessment of breast shape would expedite the development of anthropometric research technique and enhance study comparability.

Finally, the Mahmoud *et al*. (2006) study demonstrated that plastic surgeons are committed to improving their techniques and attaining better outcomes in the constant pursuit of perfection. The evaluation of breast volume is a crucial component of breast surgeries, both cosmetic and reconstructive, especially when implants are being considered. This highlights the study's

contribution to the continuous improvement of breast evaluation methods in clinical practice and emphasizes the findings' practical importance in the context of surgical procedures.

Acknowledgement

The authors thank all participants for their participation in this research.

Source of financial support

Personal

Conflict of interest: The authors declare no conflict of interest. The manuscript has not been to sent to any journal.

Author's contribution

Alabi A.S: Directed the team and designed the research procedure.
Oyedele T.F: Data collection.
Alabi A: Analysed the data.
Olasehinde O.: Manuscript writing.
Owa J.A: Manuscript writing.
Babatunde D.E: Manuscript writing
Olawepo A.: Proof-read the manuscript.

Corresponding author: Alabi Ade Stephen. Email:adealabistephen14@gmail.com**,**

alabi.as@unilorin.edu.ng

REFERENCES

Al-Qattan MM, Aldakhil SS, Al-Hassan TS, Al-Qahtani A (2019) Anthropometric breast measurement: analysis of the average breast in young nulliparous Saudi female population. *Plast Reconstr Surg* – Glob Open 7(8):e2326

Archibong OR, Abikoye FO, Osisanya TO (2021). Anthropometric Breast Measurements of Nulliparous Women in Lagos Nigeria. *J West Afr Coll Surg*.11(4):1-6

Avşar, D. K., Aygıt, A. C., Benlier, E., Top, H., & Taşkınalp, O. (2010). Anthropometric breast measurement: a study of 385 Turkish female students. *Aesthetic Surgery Journal*, *30*(1), 44-50.

Boyd, N., L. Martin, S. Chavez, A. Gunasekara, A. Salleh, O. Melnichouk, M. Yaffe, C. Friedenreich, S. Minkin, and M. Bronskill. (2009). "Breast-Tissue Composition and Other Risk Factors for Breast Cancer in Young Women: A Cross-Sectional Study." *The Lancet Oncology* 10 (6): 569–580.

Clarke, L. and Griffin, M. (2008) 'Visible and invisible ageing: beauty work as a response to ageism', *Ageing and Society*, 28(5), 653–674.

Coltman, C. E., D. E. McGhee, and J. R. Steele. (2017). "Effect of Aging on Breast Skin Thickness and Elasticity: Implications for Breast Support." *Skin Research and Technology* (in press,23(3),303-311

Coltman, C. E., Steele, J. R., & McGhee, D. E. (2018). Breast volume is affected by body mass index but not age. *Ergonomics*, 60(11), 1576-1585.

Demiroz, A.,Turkeymen, A.,Yildiz, T. F.,and Daghan, B. (2021). Anthropometric breast measurements of young women with no history of pregnancy or surgery in Turkey. *Journal of plastic surgery and hand surgery*, 55(10),13-16.

Galdino, G. M., Nahabedian, M., Chiaramonte, M., Geng, J. Z., Klatsky, S., & Manson, P. (2002). Clinical application ns of three-dimensional photography in breast surgery. *Plastic and Reconstructive Surgery*, 110(1), 58-70.

Gefen A, Dilmoney B. (2007). Mechanics of the normal woman's breast. *Technology Health Care* 15:259–271

Haars, G., P. A H. van Noord, C. H. van Gils, D. E. Grobbee, and P. H. M. Peeters. (2005). "Measurements of Breast Density: No Ratio for a Ratio." Cancer Epidemiology, Biomarkers and Prevention: A Publication of the American Association for Cancer Research, Cosponsored by the *American Society of Preventive Oncology* 14 (11 Pt 1): 2634–2640.

Huang HY, Tsai WC, Chou WY, et al (2017). Quality of life of breast and cervical cancer survivors. *BMC Womens Health.* 17:1-12

Jemström H, Olsson H (1997). Breast size in relation to endogenous hormone levels, body constitution, and oral contraceptive use in healthy nulligravid women aged 19-25 years. *Am J Epidemiol. 145(7):571-80.*

Khan HA, Bayat A. (2008). A geometric method for nipple localization. *Canadian Journal of Plastic Surgery*, 16(1),45-47.

Mahmoud, E.O., Hosnia, A.M., Bothaina, A. and Mahmoud, E.S., (2006). Assessment of the breast volume by a new simple formula. *Indian Journal of Plastic Surgery* ,39(01), pp.13-16.

Nguyen, D. M., Tran, T. S., Nguyen, N. T., Le, T. N., Nguyen, D. H., & Nguyen, T. T. (2023). Breast anthropometry in Vietnamese youth: a comprehensive study of 128 women. *European Journal of Plastic Surgery*, *46*(6), 1049-1058.

Ooi BNS, Loh H , Ho PJ, Mine RL, Giles G , Gao C , Kraft P, John EM ,Swerdlow A , Brenner H ,Wu AH ,Haiman C, Evans DG, Zheng W, Fasching PA, Castelao JE, Kwong A , Shen X, Czene K, Hall P, Dunning A , Easton D, Hartman M ,Li J (2019). The genetic interplay between body mass index, breast size and breast cancer risk: a Mendelian randomization analysis. *International Journal Of Epidemiology* 48(3):781-794.

Porter, J. M., K. Case, R. Marshall, D. Gyi, and R. Sims Neé Oliver. (2004). "'Beyond Jack and Jill': Designing for Individuals Using HADRIAN." *International Journal of Industrial Ergonomics* 33 (3): 249–264.

Smith, B.D., Bellon, J.R., Blitzblau, R., Freedman, G., Haffty, B., Hahn, C., Halberg, F., Hoffman, K., Horst, K., Moran, J. and Patton, C., (2018). Radiation therapy for the whole breast; Executive summary of an American Society for Radiation Oncology (ASTRO) evidence based guideline. *Practical radiation oncology*,8(3), pp.145-152

Vandeput JJ, Nelissen M (2002) Considerations on anthropometric measurements of the female breast. *Aesthetic Plast Surg* 26(5):348–355

Westreich M (1997) Anthropomorphic breast measurement: protocol and results in 50 women with aesthetically perfect breasts and clinical application. *Plast Reconstr Surg* 100(2):468

Zhao C ,Hu W, Xu Y, Wang D, Wang Y, Lv W, Xiong M,Yi Y ,Wang H,Zhang Q,Wu Y(2021) . Current Landscape; The Mechanism and Therapeutic Impact Of Obesity for Breast Cancer. *Front Oncology* . Jul 19,11:704893