Developing a Standard Measurement to Produce Garments for Pear-Shaped Nigerian Women

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ABSTRACT

Garment production and merchandising seasonally is major a money-spinning industry globally, particularly in the developed economies of the world. However, their major underpin is standardised anthropometric data base and sizing measurement system of the human anatomy which has given them the ability to mass produce trending garments seasonally. This study realising that Africa, most particularly Nigeria seems not to have any indigenous sizing system, but relies on western standard measurement which are largely diametrically at variance with our measures. This study has attempted to provide a standard fitting measurement chart, starting with the Nigerian pear-shaped women as case study. Two hundred and twenty-two women were measured to develop a size chart. The statistical package for social sciences data (SPSS) was employed for data imputing and analysis. Finally, the standard measurements developed from the analysis of the measurements of pear-shaped women, was used to draft patterns for selected garments designed and produced.

INTRODUCTION

The textile and apparel industry is a major industry in the global marketplace considering the numerous components of the supply chain involved in transforming raw materials into useable products and bringing products to the final consumer. The textile and apparel industry production and supply chain includes the manufacture and the subsequent wholesale and retail sale of fibres, yarns, fabrics, garments and accessories for adults and children as well as home furnishings and textile soft goods. All these stages have high economic value to individuals, governments and other stakeholders globally. As at 2004, the industry was ranked third in global commercial exchanges, behind automobiles and electronics (Hallnäs, 2007). This is despite the relatively small start-up capital and low-skilled labour requirements of the industry (Tian & Hu, 2016). This implies that the industry has been vital to the economic growth of underdeveloped and developed countries since the industrial revolution.

The fashion aspect of the industry is a multibillion-dollar global enterprise committed to the business of producing and merchandizing clothes (Ruppert & Hawley, 2014). The fashion industry involves the design, manufacturing, distribution, marketing, retailing, advertising, and promotion of all types of apparel for men, women, and children from the most exclusive and expensive haute brands and designer fashions to ordinary everyday clothing. From tailored ball gowns to branded sweat pants. Some researchers have grouped the fashion industry into two categories, namely the high-end fashion and mass-produced fashion. While the first represents luxury fashion brands, the second signifies fashion made up of common clothes or brands for general usage (Matos, Juliana, & Broega, 2012). Clothes primarily are to cover and protect the body from the external environment, but also clothes need to have proper fit, be fashionable and at the same time be aesthetically pleasing to the eye (Nkabule, 2010). The standard measurements approved by standard bodies like International Organisation for Standardisation (ISO) and American Society for Testing and Materials (ASTM) are mostly useful in Europe, the United Kingdom and the United States of America, but are not so applicable in Africa where the pear shape is prevalent (Zwane & Magagula, 2007). Sizing standard developers have overlooked the

sizing and clothing needs of the African pear-shaped figure, with the impression that the group with the pear-shape fall within a small percentage of the population (Ola-Afolayan & Mason, 2013). Furthermore, a pilot study by the researchers suggests that Africa, most particularly Nigeria does not seem to have any anthropometric data base and sizing system. The local designers and tailors rely on foreign measurement charts, which seems not to efficiently meet the need of the Nigerian woman. Over the years, women's shapes and sizes have undergone changes, while the size chart used by the apparel industry remains the same. Notwithstanding the changes and differences of women's shapes and sizes, well-fitting garments remain an important requirement for consumer selection. Unfortunately, most women with pear-shape get frustrated with cloth sizes sold in Nigerian retail outlets. Mass produced garments are mostly designed using standard size charts that do not cater for shapes that are outside the traditional proportion. One of the author's with over 15 years' experience in the industry observe that some pear-shaped women find it difficult getting ready-to-wear sizes that fit both bust and hip. It is therefore important to carry out research focusing on how to mass produce garments that fit pear-shaped women. Although, there are pear-shaped women all over the world, the need to develop a home-grown measurement chart unique to the Nigerian woman is imperative.

Statement of Problem

Clothes that are well- fitted make an individual look different in appearance. A garment is said to be well fitted when it conforms to the body shape, allows space to breath, move and does not make the frame look bulky (worksgroup.co.za, 2021). Most often we find that a lot of ready-to-wear garments do not meet these fit standards. While some companies use out of date body-size charts, some companies use no body size chart at all (Goldsberry et al., 1995; Simmons et al., 2003; Ashdown, 2007). Workman and Lenz (2000) suggest that some of the companies use garment measurements and not body measurements. Some companies buy garments of their competitor with the intent of using the measurement of the garment to develop their own size chart (Frings, 2008). This practice does not make room for improvements in the fit of the garment, (Hisey, 2003). Tamburrino (1992) conducted studies regulating apparel sizes for Americans and the results showed that the circumferential dimension is the girth of the most critical point needed to fit the garment. However, only a small percentage of the population (America and Europe) actually fell into the pre-determined size categories created. As Nigerians import most of their ready-to-wear garments, they end up as major recipients of these ready-to-wear garments. Incidentally, there is a significant difference between the European pear-shaped woman and the Nigerian. The authors observed that the difference between the bust and the hip is larger for the pear-shaped Nigerian woman than that in the standard measurement chart supplied from Europe and America.

Furthermore, it was observed from experience in the south-south and south-west of Nigeria where the researchers have their practice, that most of the ready-to-wear garments available for pear-shaped women have issues with the fitting of the lower parts of the garment. Most often a larger skirt is picked to complement the small size upper part. This makes it difficult for pear-shaped Nigerian women to get satisfactory ready-to-wear garments. The researchers are of the opinion that there is a need to create a standard measurement to perfectly accommodate the pear-shaped Nigerian woman. Even though there are pear-shaped women all over the world, there is still the need to develop a sizing system unique to the Nigerian woman. Consequently, the study aimed to develop standard measurements for pear shape Nigerian women that will be used to make garments that will to a large extent reduce if not completely eliminate the issues of ill-fitting garments.

LITERATURE REVIEW

Bodies as Identity

The first representation of a truly fashionable woman appeared in the 14th century. Between 14th and the 16th century in Northern Europe, bulging bellies were desirable, however the stature of the rest of the figure were generally thin. This is most visible from the paintings of nudes from that time when looking at clothed image. The last 100 years envelope the period in which that overall body type has been seen as attractive, though there has been small changes within the period as well. The 1920s was the time in which the overall silhouette of the ideal body slimmed down. There was a dramatic flattening of the entire body resulting in a more youthful aesthetic (Hollander, 1993). As the century progressed, the ideal size of both the breast and buttocks increased. From 1950s to 1960s that trend continued with the interesting twist of cone shaped breast due to the popularity

of the bullet bra. In the 1960s, the invention of the miniskirt and pants for women, promoted the idealization of the long leg that has lasted to this day (Hollander, 1993). Following the invention of the push up bra in the 1970s the ideal breast has been rounded and fuller and larger.

Each society develops a general perception of what an ideal female body shape would be like. This ideal is often reflected in the art and literature produced by or for a society as well as in popular media, such as films, and magazines. The ideal or preferred female body size and shape has varied over time and continue to vary among cultures but a preference for small breast has remained throughout history. The late 1950s brought about the rise of the ready-to-wear fashion, which implemented a standardized sizing system for all mass-produced clothing. Along with that shift came the standardization of sizes, in which garments were not made to fit the body anymore, but instead the body must be altered to fit the garment (Sypeck & Gray, 2004).

The Female Body Shape

The female figure is the cumulative product of a woman's skeletal structure and the quantity and distribution of muscle and fat on the body (Macdonald, 1995). The female body is typically narrower at the waist than at the bust and hips. The waist bust and hips are called inflection points, and the ratio of their circumferences is used to define basic body shapes. A woman's dimensions are expressed by the circumference of the three inflection points, for exemple36-29-38 would mean 36 inches bust, 29 inches waist, 38 inches hip (Gordon, Castro, Sitnikov, iHolm-Denoma, 2010). There are a lot of evidence to suggest that fashion somewhat dictates what people believed are the proper female body proportions seen through the garment. This is the case because the body is primarily seen through clothing, which always changes the way the underlying structures are conceived (Hollander, 1993).

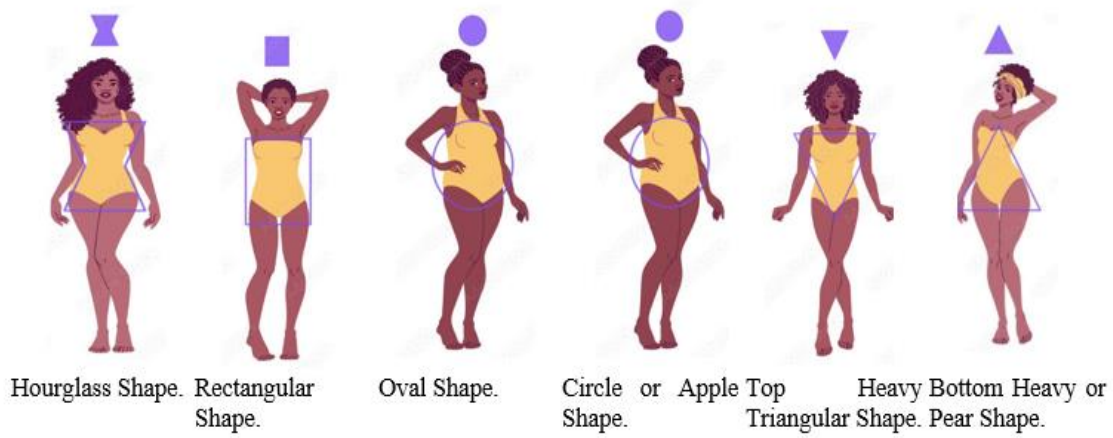

Figure. 1: The Basic Female Body Shapes.

Source: theprincientist.com

The following body shapes in *Figure 1.* has over time been identified as the major shapes of the human female figure: hourglass, rectangular, oval, circle/apple and triangular shapes. (Gill, 2015). It further divided the triangular shape into top heavy triangular shape and bottom- heavy triangular shape, also referred to as pear shape. Devarajan, Istook, and Simmons (2002) however opine that all types of body shapes in the fashion industry are derived from one of two elementary geometric shapes, the rectangle and triangle.

Pear Shape

The pear female body shape is also called the bottom-heavy triangular shape. The pear shape tends to be more bottom-heavy; a major characteristic of this shape includes a well-defined waist and shoulders are narrower. The body top half is smaller than the bottom half, full hip and thighs, legs are full and muscular, weight gain tends to be visible around hips, thighs, and lower midriff. The pear body shape is one of the most common body shapes for women in Africa, (Makhanya, 2015). The pear-shape has waist that is 9 inches smaller than the hips or has

hips which is two or more inches larger than the bust. The pear-shape woman has hip that is 5% or more larger than bust or shoulder. Hips divided by shoulder or bust is equal to or greater than 1(one). Each body shape has design that best compliment the woman. The pear shape woman is not an exception. The outfit of the pear-shaped woman should be used to balance the shoulder, bust, waist and hips-lines can be used to focus the eye where it should go. This can help create curves, increase or emphasize your favourite parts of the body. Colour and pattern and light attract the eye. Bright colours attract more than solid black or navy. Best tops for pear shape; to accentuate the top half also the defined waist. Light, bright colour or prints in peplum, square or V-neck to show off collar bone and chest, cowl neck, boat neck, goes well with puff sleeves and other eye-catching details. Jeans should slightly roomier cuts and darker colours in straight, boot-cut, high-waist. Best pants: curve skimming styles in stretch fabrics that will not suffocate your hips. In boot-cut, flat-front, high-waist, fitted or straight. Best dresses for pear shaped woman include A-line, flare, warp off-the-shoulder, fitted dress. Best jacket; cropped jacket, patterned, textured (heavy fabrics), wrap.

Accessing the Unique Shape of the African Woman

One undercurrent to the recent focus on the black woman's body has been the idea that while the majority of culture has strict beauty standards, black people do not care much. In our communities, black women – whatever they look like – are A- OK. Standards for woman body are generally predicted on the male gaze. That is small waist, round bottom, juicy thighs, bust optional. The true African beauty is taking pride in our own bodies. In Africa, beauty is believed to be curvaceous, traditional African beauty celebrates a woman's curvy yet voluptuous figure. A girl's ability to bear and conceive a healthy baby is very much associated with the broadening of her hips and a woman's lustrous round body implies her desirability, her value in being a suitable pick for a wife and also reflective of her family's wealth, hence the "bigger and healthier the better". African women have the same general types of body shape as other women globally. Although some certain body shapes are more distinct amongst different African tribes, for instance, in Kenya, the rectangular body shape is the most distinct body shape. In South Africa, the triangle or the pear shape is the most distinct body shape, followed by the hour-glass and the rectangle. The least common are the rectangle. However, in Nigeria the apple and the pear shapes and the hour-glass shape are the most distinct body shape (Ozougwu & Ekeowa, 2022).

Current Practices in Sizing System

Takebira (2016) noted that most clothing brands make clothes to fit the "standard woman". The standard woman has an hourglass shape, a B size bust cup and good posture. There is a certain difference between her bust and waist measurements called "the drop" and a similar difference between the waist and the hip measurements. There is an assumed shoulder slope, shoulder length, neck size, and proportions of the front arc to the back. Habib (2016) observed that most fashion labels make their basic design to fit this standard woman; generally, on a model they use in-house models as their fit model. They perfect the design on this person making sure she can bend, sit, walk, and move comfortably in the garment. The pattern they make for the prototype and their fit model is not for their smallest size – it is usually for an Australian size 10 or smaller. The way fashion designers now make larger and smaller sizes of that pattern to make the smaller and larger garments is through a process called Grading. The measurements of that size 10 pattern is increased up and down at certain body points to make the smaller and larger sizes (Aldrich, 2011). Fan et al (2004) opine that it is obvious the more a woman differs from the standard figure, the more difficult it is to find a ready-to-wear cloth that fit well. They also noted that the problem arising from the above practices suggest that only a small percentage of women have the hourglass shape, and in support an American survey showed that only about 8% of American women have the hourglass shape. Therefore, most standard measurements for women suit less than 10% of the population, the pieces that results from Grading (the system of making the pattern pieces of the original size 10 pattern bigger or smaller) to create different sizes does not actually reflect the measurements of those larger sizes. This is further complicated if the woman has a larger bust cup size, if the woman has poor posture. As women grow older the body shape changes and the way the weight is distributed is not reflected in the way the grading is done. The standard figure also has some assumptions about the slop of the shoulders, the shoulder length etc. The more the part of the body that differ to the standard the harder it will be to find clothes that fit well. Recently despite the introduction of 3D scanning equipment, there is still no readily available data for everyone. The companies that create these pods make their business profit by selling the data to fashion labels. One of the drawbacks of the new anthropometric studies is that there are more apple shape than hourglass shape. So, most companies target

their clothing to that segment of the population, thus, the average apple shape woman find it easier to find clothes that fit (Gupta & Gangadhar, 2004).

The bottom line is that clothing cannot be made to fit the large range of figure shapes and even within a certain body shape. Within a standard there will be people on the fringes of their standard. The more the persons' body differs from the mean the harder it will be to find clothing that fit (Gill, 2015).

Fitting Problems in Body Measurement

Traditional methods of taking body measurements to be used in the clothing industry have resulted in several major problems, apart from being complex and difficult to learn. The most important problem is that of poor fit, which leads to returned goods and consumers' dissatisfaction (Conner, 1995). The Lack of good picture of a target population means that manufacturers must produce and retailers must buy far more stock than would be otherwise necessary, including odd-sized garments which will not be sold, thereby reducing margins. Attempts by manufacturers and shops to limit their overheads by carrying restricted size ranges has resulted in many customers, particularly those needing a larger fitting not being catered for (Tait, 1998). To be able to offer better fitting garments to a wide variety of people, one need not only look at the size of the body, but also the shape, a point clearly made during a conference by Graham Hutton from Computer Clothing Research (Tait, 1998).

Clothing is associated with body satisfaction. Feather, Herr and Ford (1997) mention that clothing has the potential to improve an individual's body satisfaction, because females evaluate their body higher when clothed than when unclothed. Good fit of clothing is vital to an individual's psychological and social well-being. Because of the outdated and inadequate nature of some national databases like that of the US Department of Agriculture, many apparel manufacturers have been developing their own version of the sizing system, using their own criteria. Most individual company charts of body measurements and proportions focus on a sample of a very specific market segment which they think is representative of their market (Workman & Johnson, 1991).

Goldsberry et al. (1995) noted that in addition to assisting retailers in reducing floor inventories in recent years, manufacturers have offered fewer figure type categories and more apparel sized as just small, medium and large. When the base measurements are inconsistent among manufacturers for a given figure type, proportion and size, or when tag numbers vary for the same body proportions in the name of flattering the consumer, the consumer becomes more confused and frustrated. Tailor (1990) noted that when designing a size chart, it is always advisable to base it on close fitting clothing, which means placing the sizes as close together as possible. This will lend itself to all degrees of fit, as two sizes can be coupled together to indicate the range of body sizes that a garment will be suitable for.

RESEARCH METHODOLOGY

Research Design

This research adopted a practice-based research method, which is a methodology where knowledge is gained via practicing rather than reading about it. Personal experience in the fashion design business was employed in this research.

MATERIALS AND METHODS

Materials

The materials used for this study are basically the measuring tape; for taking measurements, sewing equipment ranging from different specialized sewing machine, instruments for illustration; different grade pencils, computer aided designs, drawing paper, pattern drafting instruments; different types of rules and curves, ironing and finishing equipment; steam iron, hemming stay, and ironing board.

Sourcing for materials (Fabrics): The materials needed for this research work were sourced from a local market in Benin. Some qualities such as texture and ability of fabric to drape among others were considered while

choosing the fabrics. Different types of fabrics that will be suitable for the different designs were picked, Ankara, damask, chiffon, taffeta, and cotton fabrics.

Methods

Development of standard measurement for pear-shaped body type

Two fashion houses were visited to collect body measurements. These fashion houses were selected because they have been operating for more than ten (10) years and were willing to release their measurement booklet. Peer shaped body measurements were extracted from the measurement book of the fashion houses. The measurement taken for the purpose of this research includes shoulder, bust waist, hip and half-length. The statistical package for social sciences data (SPSS) was employed for data imputing and analysis. Descriptive statistics including the mean, standard deviation and variance were calculated and used for analysis. The values were calculated in centimetres. There was one vertical measurement, four girth measurements.

Method of Data Analysis

A total of 222 measurements were analysed to get the mean, standard deviation and variance. The mean and the standard deviation were the statistical value used in calculating the values for developing the size chart. The mean is the most commonly used value in developing size steps (Gupta and Gangadhar, 2004).

Table 1. Showing result of the *Descriptive* statistical analysis of the 222 sampled population. (In inches)

	N	Mean	Std. Deviation	Variance
SHOULDER	222	15.705	.9804	.961
BUST	222	39.115	4.6841	21.940
WAIST	222	34.545	5.3409	28.525
HIP	222	43.074	4.5074	20.317
HALF LENGTH	222	16.626	2.4596	6.050

Table 2. Showing result of the *One-sample* statistical analysis of the 222 sampled population. (In inches).

	N	Mean	Std. Deviation	Std. Error Mean
SHOULDER	222	15.705	.9804	.0658
BUST	222	39.115	4.6841	.3144
WAIST	222	34.545	5.3409	.3585
HIP	222	43.074	4.5074	.3025
HALF LENGTH		16.626	2.4596	.1651

Determination of Size Range from Raw Data

The development of the size chart was carried out by using the information of the body measurement. The mean value and the standard deviation were used to determine size steps for the size chart. The mean value is the average value of the total measurements analysed. Five steps Approach was used to develop the chart. To obtain seven steps of seven categories of sizes, one standard deviation (1SD) and two standard deviation (2SD) values were added to the mean to obtain two values that are higher than the mean. One standard deviation (1SD), two

standard deviation (2SD) are subtracted from the mean to obtain three values that are lower than the mean. He was of the opinion that the entire population is statistically catered for by using five standard deviation divisions. All figures were rounded off to the nearest decimal. This was to ensure easy calculation on the size chart. Table 3.4.3 shows the additions and subtractions of the standard deviation value.

Table 3. Showing the mean, the additions and subtractions to get the size levels (in inches)

	mean-2SD	mean-1SD	mean	Mean+1SD	Mean+2SD
Shoulder	13.8	14.8	15.7	16.7	17.7
Bust	29	34	39	44	49
Waist	24.5	29.5	34.5	37.5	42.5
Hip	33	38	43	48	53
Half-length	12.6	14.6	16.6	18.6	20.6

Determination Of Inter Size Interval

The division of sizes in a size chart is called size interval (Kunick,1984). In order to accommodate variation in height by a company system 4cm to 8cm for women is standardized. Also, 4cm to 6cm is allowed for both bust and waist, and 4cm and 5cm for hip, in order to have flexible link between the bust, waist and hip (BS EN 13402-3(2004). Aldrich (2011) stated that many British companies use 5cm interval between all sizes. Kunick, (1984) stated that there is variability of size interval some as low as 3cm and some as high as 8cm, but he proposed that an interval of 6cm was more logical and this is used by most countries.

Determination of Size Code

The size codes were based on the numerical coding methods which are NIGERIA (NGN) size 8, 10, 12, 14, and 16. Table 3.4.4 shows the size codes together with the measurement

Table 4. showing the size code in centimetres

Size code	NGN Size 8	NGN Size 10	NGN Size 12	NGN Size 14	NGN Size 16
Shoulder	35	38	40	42	44
Bust	74	86	99	111	125
Waist	62	70	88	95	107
Hip	84	97	109	122	135
Half-length	32	37	42	47	52

Determine the Lower and The Upper Size Limits

The lower and the upper size limit determine the limit for each size and the extent of coverage of inter size ranges. The value obtained for each size code is used as the midway point and the lower and the upper limits are determined by adding or subtracting half value of the standard deviation of each body dimension to the mid-point value

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Table 5. Showing the upper and lower size limits in centimetres. **Source**: Researchers' fieldwork.

	Size 6	Size 9	Size 12	Size 15	Size 18
Shoulder	36.10 35.00 33.70	39.00 38.00 37.00	41.00 40.00 39.00	43.00 42.00 40.70	46.30 45.00 44.00
Bust	79.95 74.00 68.10	91.95 86.00 80.00	105.00 99.00 93.00	116.90 111.00 103.00	130.90 12500 119.00
Waist	68.75 62.00 55.25	67.00 70.00 63.00	94 88 81.7	102 95 88	114.00 107.00 100.00
Hip	90.00 84.00 78.00	103.00 97.00 63.00	115 109 103	128 122 116	141.00 135.00 129.00
½ Length	35.00 32.00 29.00	39.90 37.00 34.00	45.90 42,00 40.00	40.90 47.00 44.00	55.00 52.00 49.00

DATA ANALYSIS AND DISCUSSION

The Pear-Shape: The measurements for this research were gotten from two fashion houses in Akure: *Rutodol Xklusive Clothiers* and from *House of Nouveau*. A total of two hundred and twenty-two (222) was used. The figure below shows the body measurements that were taken for this study.

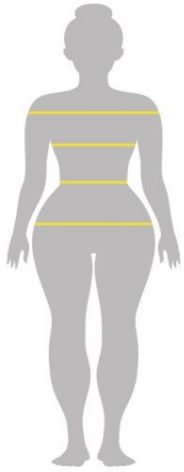

Figure 2: Showing the female inflection points and body measurements that were taken Source: pinterest.com

The body type or shape this research is focused on is the pear shape. Two hundred and twenty-two measurements of pear-shaped women was taken from two fashion houses and a statistical analysis was carried out on the measurements to determine the mean, standard deviation and variance. The mean value from the analysis was used as the anchor for the new chart. From this anchor grading was done to derive the different ranges of sizes to create the chart using the standard deviation. To get larger measurements upward grading was done by adding the standard deviation to the standard mean to get the immediate larger size. Then the standard deviation was added to the value gotten to get the next larger size. This was done till the smallest size range was achieved. To grade downwards the value of the standard deviation was subtracted from the standard mean for each girth, to get the immediate smaller size. Then the value of the standard deviation was added to the result to get the next size. This was done until the desired size range were gotten, the researcher then used a pre-determined size range to group the measurement into small, medium, large and extra-large sizes. A size labelling was chosen in figure. A fit model was gotten to fit the garments made for each of the labelled group. This was to access" fit" drape and appearance of the garment. Necessary adjustments were then made to ensure a good fit. The measurements were adopted for each group.

Grading:

Two statistical analyses were used to ensure accuracy. The descriptive statistics and one-sample statistics (Table 1 and 2). A *Size-Chart* is the ideal customer body type across a size set. It is a series of main body measurements to act as a guide for developing styles and maintaining a consistent fit. A size chart is a document that reflects the measurement in fashion designer's size range within the brand. This is the method of taking the initial sample size also known as the base size and making it a full range of size patterns for production. For the purpose of this research grading was done on the mean value of all the girth taken by adding the standard deviation for the larger sizes and subtracting the standard deviation for the lower sizes

Table 6. showing the mean, the additions and subtractions of standard deviation to get the size levels measurements centimetres.

	mean-2SD	mean-1SD	mean	Mean+1SD	Mean+2SD
Shoulder	35	38	40	42	44
Bust	74	86	99	111	125
Waist	62	70	88	95	107
Hip	84	97	109	122	135
Half-length	32	37	42	47	52

Table 7. Showing final charts with the assigned size codes in centimetres

Size code	NGN Size 8	NGN Size 10	NGN Size 12	NGN Size 14	NGN Size 16
Shoulder	35	38	40	42	44
Bust	74	86	99	111	125
Waist	62	70	88	95	107
Hip	84	97	109	122	135
Half-length	32	37	42	47	52

Design Generation and Illustration

The research generated some designs that would accommodate the lower portion of the pear-shaped woman and enhance wearer's comfort. In addition, the designer created new designs from old design concepts to meet the needs of pear-shaped women in the study area. For the purpose of this research much thought was not given to

the principles and element of designs. The fit of the garment on the pear-shaped woman was the main aim of each of the design chosen.

Pattern Drafting

The research used the standard measurements developed from the analysis of the measurements of pear-shaped women, to draft patterns for all the designs chosen. The basic block pattern was made for the different sizes. Then each basic block pattern was modified to the individual designs to be made. Pattern for sleeves, bands and waist coat were drafted. Different sketches of the designs were developed and patterns were drafted to ensure they can be replicated. The sketches below were generated. Seven (7) designs were made:

1. Ankara top for a jean trouser,
2. Taffeta big sleeve dress with Ankara embellishments,
3. Damask and georgette combination corporate dress,
4. Short Cotton dress,
5. Cotton mono-sleeve long dress,
6. Chiffon flowing draped dress with front embellishment, and
7. Taffeta casual short dress.

Cutting the Fabric

The fabrics were ironed to remove wrinkles and then the prepared pattern placed on it and cut out. The different parts of the garments were cut out; bodies, sleeve, facing, band, gathered and flare effects were cut out.

Sewing the Garments

Each sketched design was labelled as indicated below for easy referencing. In addition, a description of each design was given.

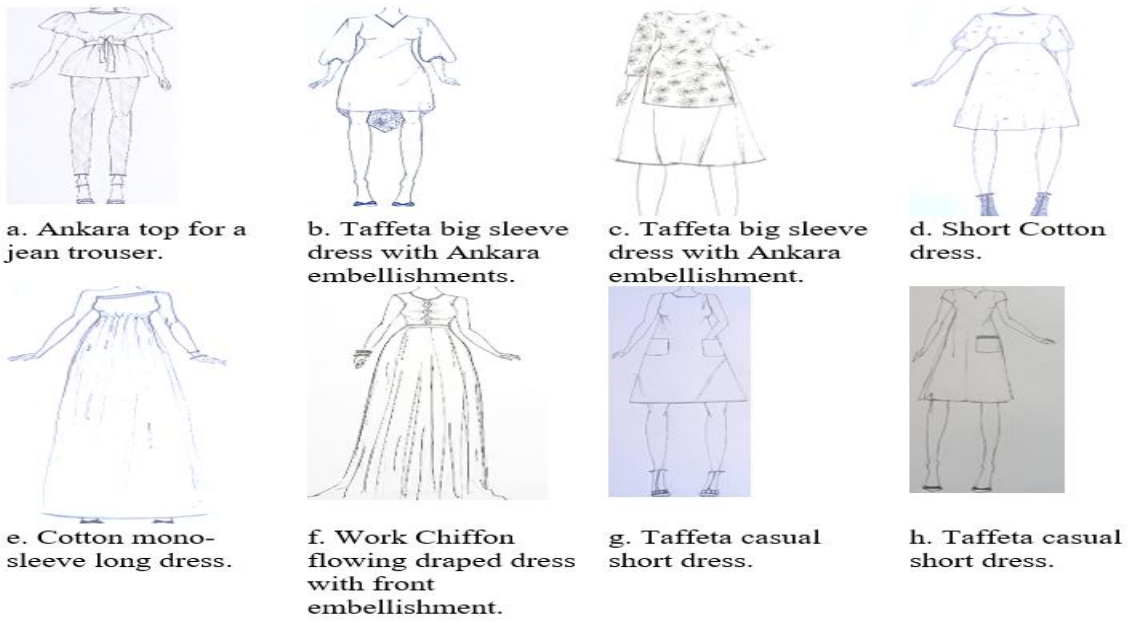

Figure 3: Sketches generated in the course of the research.

Source: Researcher field work

Figure 3a: Ankara top for a jean trouser, Colour; multi-coloured red navy blue and white,

Distinct features; short flare sleeve cut, flare with gathered effect at waist, long waist belt for adjusting waist.

Sewing: Lining was cut for all cut fabrics and inter-facing was attached to the bodies and the flare, the front and back bodies were joined at the shoulder, the side seam stitched. The flared sleeve was inter-faced with lining and attached to the bodies along the dart line across the back to the waist –line. The peplum was prepared with the interfacing and attached to the waist line of the bodies the belt was prepared and attached to the waist at the front. The zip is attached at the back of the dress. All seams are over-locked and all seam lines ironed.

Figure 3b: Taffeta big sleeve dress with Ankara embellishments; **Colour:** wine, **Distinct features**: big ¾ tapped sleeves, high-low hem, Ankara embellishment.

Sewing: Inter facing was cut for both front and back neck-line and for the hem of the dress. The inter-facing was attached to the neck and the hem of the dress. The shoulder of the front and the back are stitched together, the side seams were stitched, the sleeve was prepared gathered at the wrist and piped with the Ankara. The sleeve was attached, zips attached to the back of the dress all seam were over-locked and seam lines ironed.

Figure 3c: Taffeta big sleeve dress with Ankara embellishment. **Colour**: multi-coloured green, gold, pink on black background. **Distinct features:** high front neck-line, ¾ sleeves. Black georgette combination, with side slits.

Sewing: The plain free bottom part of the front was attached to the front bodies, by using fusible inter-face and then top-stitched, the back cut is done in the same manner. The shoulder of both the back and the front are stitched together, the side seam are stitched together. Both sides of the sleeve seam, over-locked and attached to the arm hole of the garment. All seams are over-locked and all seam line are ironed. The hem of the garment is finished with fusible hemming stay.

Figure 3d: Short Cotton dress. **Colour**: peach; **Distinct features**: high front neck-line, overlap back neckline, banded sleeve, side slit.

Sewing: The back and front bodies were stitched together at the shoulder, and the edges over-locked. The bodies were stitched at the side with one inch seam allowance, the over-lap at the back was set in place and pinned together, and the entire neck-line was over-locked and hemmed. The two sides of the sleeve were stitched together on the wrong side, then the band was stitched together and folded in two, it was then attached to the sleeve. The sleeve was attached to the arm hole of the bodies of the dress. The back and front part of the lower part of the dress were stitched together leaving allowance of five inches for side slits. Then the hem of the dress was finished with hemming stay, gathers was ran through the waist of the lower part of the dress to the exact waist measurement to fit into the prepared bodies. Then the bodies and the lower part of the dress were stitched together at the waist. All the seams were over-locked all points of sewing are ironed to set the stitches.

Figure 3e: Cotton mono-sleeve long dress. **Colour**: green: **Distinct features:** mono-sleeve, gathered waist, long flowing dress.

Sewing: The back and front bodies were stitched at the shoulder, then, over-locked, the side seams were stitched and over-locked. Neck-line band was stitched together and folded into two, ironed and attached to the neck-line, running through the front, down the sleeve-less portion and up to the back of the bodies and to the shoulder. The long sleeve is stitched together, over-locked and the band is stitched, folded into two, ironed and sewn on the hem of the sleeve while being stretched as it was being sewn to create a gathering effect at the cuff of the sleeve. The front and back cut of the lower part of the garment was stitched at the sides and over-locked, the hem finishing was done with hemming stay. Gathers was ran across the waist of the lower part to fit into the prepared bodies, and both were stitched together. All seam lines were over-locked and ironed.

Figure. 3f: work Chiffon flowing draped dress with front embellishment. **Colour**: gold; **Distinct features:** draped front bodies, embellished front bodies, gathered waist-line., sleeve-less.

Sewing: The drape effects on the front bodies was prepared by placing the cut out front bodies on the cutting table and draping was done on it. Both the front and the back bodies were interfaced with lining, at the neck and arm hole. The shoulder cut was stitched together, the side seams were stitched to the desired measurements. The flowing lower portion was prepared by working gathers at the waist line and the lower part was attached to the bodies. All seams were over-locked. The idle of the front was then embellished with applique to cover the drape line.

Figure. 3gh: Taffeta casual short dress. **Colour**: peach; **Distinct feature**: A line from bust, to front pockets, mini side slits; small high-low hem effect.

Sewing: The front patch pocket for both were prepared and attached to the front bodies. Facing was done on the neck-line, and on the arm hole for the sleeve-less dress. The shoulder was stitched and the sides of both dresses stitched. Inter-facing was done on the hem of the dress taking into consideration the mini slit and the high-low effect of the hem. All seams were over-locked, all finished garment were ironed.

Pictures of Finished Garments.

Figure 4.: Finished Garments for Nigerian Pear-Shaped Women.

Source: Researcher field work.

DISCUSSION

The fit model effectively acted as a life mannequin. The fit model has well-proportioned body that met the required standard measurements of the researcher. A fit model played an integral role in the design process, giving feed-back on fit, and design of garment in the stead of the consumer. Fitting trials were done on the models five subjects were used; horizontal girth was used to select the models for the trials. Evaluation was made while in standing, sitting, and walking positions by the researchers.

Comparism with UK and US Standard Measurements Charts

Table 4. Showing final charts with the assigned size codes in centimetres.

Size code	NGN Size 8	NGN Size 10	NGN Size 12	NGN Size 14	NGN Size 16
Shoulder	35	38	40	42	44
Bust	74	86	99	111	125
Waist	62	70	88	95	107
Hip	84	97	109	122	135
Half-length	32	37	42	47	52

Comparing the research developed Size-Chart with the standard American size measurements show that a small size bust 32 inches has a hip measurement of 34.5 inches, while a bust 32 in the research developed chart has a hip measurement of 36 inches. An American bust 36.5 inches has hip 38.5 inches, while the new chart bust 36.8 inches has hip 40.5 inches. It was observed that the hip measurements of the newly developed chart are larger than the hip measurement of the standard American chart with about 4 to 3 inches. This extra allowance at the hip creates more room to accommodate the hip of the pear-shape Nigerian woman. This development eliminates the hip fit problem and gives the woman more comfort.

Limitations

1. This research was limited to only five basic girths. Measurements were not taken for: under bust, length of top, length of dress, arm, and lap and so on. More comprehensive measurements will be needed for more complicated designs
2. Very extreme pear-shape bodies were not located in the compilation of measurement; those women with very extreme pear-body shape may still have fit problems with the hip.
3. Only 222 measurements were used for this research, considering the population of Nigeria, more measurements should be used for higher accuracy.

RECOMMENDATION

More extensive work needs to be done on developing a comprehensive standard body measurement for the pear-shaped Nigerian woman. There are other body shapes in Nigeria like the apple shape, the rectangular shape, the top-heavy triangular shape, without standard body measurements. More detailed body measurements need to be used to have an all-encompassing body size chart. The federal government and corporate organizations should be involved in this research as individuals may not be able to fund a successful national anthropometric study. Nigeria should have SIZE NIGERIA across board.

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