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IMPORTED WEARS AND THE ANTHROPOMETRIC DIMENSIONS OF ADULT YORUBA WOMEN: A REFLECTION OF SUITABILITY

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ABSTRACT

Anthropometric study, a method of distinctions among different ethnic groups, is an important element for designing ergonomic products. This cross-sectional study evaluated the variations in body composition of adult women in Yoruba ethnic groups (aw-Yeg) and the adult female anthropometric data used to produce foreign-made wares (F-Mws) imported into Nigeria by some unidentified F-Mws industry. Conducted in two sections, assessments of F-Mws usage and fitness and the measurement of anthropometric data of the aw-Yeg, the primary data was collected from 400 aw-Yeg, in the south-western Nigeria, using structured questionnaires. About 57% of the aw-Yeg had patronized F-Mws within the past two years and 77.5% of them made some adjustments, on the wears prior to use. Some of the affected parts of the wares (reported) include; hip circumference (54%), waist circumference (53%),chest circumference (36%),chest-depth (34%), thigh and mid-thigh circumferences (35%). The study indicated some variations in the anthropometric data of aw-Yeg and the data used to produce the imported wares. Hence, aw-Yeg carried out fitting adjustments on the F-Mws. The 95th percentile anthropometry measurements of an average aw-Yegheight was 64cm, buttock popliteal was 20 cm, hip circumference (50 cm), chest breadth (20 cm) and anterior posterior chest-depth (15 cm),waist circumference (45 cm)among others.The results of this study is relevant to foreign industries who may invest in making products such as gowns, pants, skirt, bra, long or trousers for aw-Yeg in Nigeria.

Keyword: *Yoruba, ethnic groups, anthropometry, data, measurement, imported wares*

INTRODUCTION

Anthropometry is a simple, reliable method for quantifying body size and proportions by measuring the body length, width, circumference and skinfold thickness (Wang *et al.,* 2000). Anthropometric dimensions, are the most typical distinctions among ethnic groups(Liu *et al.,* 2004). An anthropometric study of a group of people, is important when designing ergonomic products and workstations for the group. This is because the dimensions of the human body vary by age, sex, race and nationality.

Relevance of anthropometric measurements in product design may require two points: how recently data was collected and the type of population measured. For instance, some measurements such as height or weight may change over 25years. Anthropometric dimensions are ranked by size and described as percentiles. It is a common practice to design for the 5th percentile (5th %) female to the 95thpercentile (95th %) male. The 5th % to 95th % range accommodates approximately 90% of population. This is accomplished in three ways: designing to the average, extreme (designing to the 5th or 95th percentile of the population), and range of the population (the majority of the population). Designing for the range however is the most appropriate for ergonomic product designs (Openshaw and Taylor, 2006; Samuel and Adetifa, 2016).

Among other industries producing products for human use, anthropometric dimensions is a vital database for clothing design. Failure to take into account,the human physical characteristics, can place unnecessary restrictions upon the users of any products. This is the case with most parts of Africa (Beeghly-Fadiel, 2013; Archana, 2014; Mohammad and Anisul, 2014).

In Africa, there are several ethnic groups that are challenged with unfit product because their anthropometric data were not considered before making the products for them. Nigeria, a subset of Africa, has 250 ethnic groups. The most populous among these group are; Hausa and Fulani (29%), Yoruba (21%), Igbo (18%), Ijaw (10%), Kanuri (4%) Ibibio (3.5%) and Tiv (2.5%) (UnitedStates Embassy in Nigeria, 2012). The anthropometric dimensions reported of these groups of people may not have been detailed. For instance, Numan (2013) carried out the standard anthropometric values for stature estimation among Hausa, Igbo and Yoruba origins using only hand length. Obaje *et al.,* (2008) studied cephalic indices among Igede and Idoma in Benue ethnic groups. Oladipo *et al.,* (2008) reported the circumference interorbital index of Ijaws and Igbos ethnic groups. Nasoficial Anthropometry of Adult in Bini Tribe was carried out by Omotoso *et al.,* (2011). Recent anthropometry dimensions of adult women in Yoruba ethnic groups (aw-Yeg) may be missing among thestudies. Hence the main focus of this present study.

Yoruba people, of the western coast of Africa, are considered to be the largest single ethnic or tribal group among the many tribes in Nigeria. While the majority of the Yoruba live in western Nigeria, the Yoruba nation is also said to be the most widely dispersed around the world through the trans-Atlantic slave trade. History locates the golden age of the Yoruba nation between 1100AD and 1900AD with the emergence of the great Ife kingdom, Oyo Empire, and finally Benin kingdom (Hood,1990; Izzett, 1961)

MATERIALS AND METHODS

This cross-sectional study was conducted within the last two years (February 2017 till January 2019) in two sections. The first part assessed the prevalence of foreign made wears (F-Mws) usage among aw-Yeg and its fitness. Thereafter the anthropometric data of the subjects were established by measuring some basic body parts.

Data was collected from four hundred (400) aw-Yegin the cities of Lagos (Lagos State), Ibadan (Oyo State), Abeokuta (Ogun State) and Ife (Osun State) all in the south-western Nigeria. The subjects involved were between 35 to 45 years old. 100 subjects were drawn randomly from each of the study area.

The Yoruba women are fashion conscious and live mainly in the southwestern part of Nigeria occupying virtually all of the area formerly known as western Nigerian region. The Yoruba are one of the largest African ethnic groups south of the Sahara Desert. They are a collection of diverse people bound together by a common culture. The Yoruba population is estimated to be 5.3 million.

Lagos is the most populated urban settlement in Nigeria. Located in the South Western region of Nigeria and dominated by Yoruba tribes. Ibadan is the third largest city in Nigeria by population. Ibadan is mostly dominated by Yoruba ethnic group. Abeokuta, Ogun State, is located in the southwest part of Nigeria. It has the majority of its dwellers as Yorubas. Ife is an ancient city in south-western Nigeria. Ife city is located in Osun State with population of 509, 813. (Aliu and Adebayo, 2010; Azeez *et al.,* 2016; Oguntoyinbo *et al.,* 1983).

Dependable measurements are rooted in following standardized measurement techniques. To establish the bases for the main study, a structured questionnaire with an open ended section was used to collect relevant data from 400 aw-Yeg. Apart from the structured questionnaires, subjects were able to express their additional views on the open section of

the questionnaire. Some of the information captured with the research tool include, but not limited to, demographic, relevant question on whether the subjects use foreign-made wears (F-Mws) or not, the prevalence of usage and the categories of the F-Mws commonly used. Information, on whether or not users adjust the sizes of F-Mwsto fit before put into use, were also collected.

Ethical issues during data collection

Standardized method of measurement, as narrated by International Society for the Advancement of Kinanthropometry (2001), was adopted for data collections. Each subject was notified on what measurements are to be taken. Consents were received before the commencement of the exercise. The subjects were asked to wear minimal clothing that followed the natural contours of their body so that measurements can be made as easy as possible and this will allow access to some bare areas of skin. In each study site, a measurement room was created. It was ensured that the rooms used were comfortable enough and provided for privacy. The front parts of the participants were avoided to minimise abuse to their private parts as much as possible by taking most of the measurements from the sides or behind.

Anthropometry data collection

All the personnel involved in the study were properly trained. A recorder, who entered data in data book, was used to assist the measurer. The recorder also helped the measurer wherever possible most especially to verify the accuracy and right sequences of the measurement procedures. To enhance accuracy, measurements were repeated and the mean values were recorded. The recorder also repeated the measured values as they were being recorded; this helped the measurer to do an immediate check.

Basic measurement items and the procedures

The following elements were measured;

Stature: All the subjects were healthy and were able to stand upright, hence statures against the wall technique was used.

Girths: The subjects assumed a relaxed standing position while taking measurements of head, chest, waist, hip, thigh, mid-thigh.

Length: The subject assumed a relaxed standing position with the feet comfortably apart and weight evenly distributed.

Breadths: Breadths and depth were measured as the subjects assume seated position with their torso erect.

Measured body regions

The following body regions were measured;

Shoulder Height sitting- the vertical distance from the sitting surfaces to the uppermost point on the lateral edge of the shoulder

Sitting Height –the distance from the highest point on the head to the back sitting surface

Sitting Height Erect- the vertical distance from the sitting surface to the top of the head.

Thigh Clearance Height- the vertical distance from the sitting surface to the top of the thigh at its intersection with the abdomen

Buttock Knee Length- the horizontal distance from the back of the uncompressed buttock to the front of the kneecap

Buttock Popliteal- the horizontal distance from the back of the uncompressed buttock to the popliteal angle at the back of the knee

Knee Height – the distance from the sole of the foot to the anterior surface of the thigh with the ankle and knee each flexed to angle 90 angle.

Popliteal Height- the vertical distance from the floor to the underside of the thigh immediately behind the knee

Elbow Rest Height-the vertical distance from the seat surface to the underside of the elbow.

Elbow To Elbow Breadth- the gap between the two elbows

Shoulder Height Sitting- the vertical distance from the seat surface to the bony point of the shoulder

Girt Inter Pupillary Breadth – the distance measured in millimetres between the centres of the pupils of the eyes

Hand Length- the distance measured from the end of the small wrist bone at the base of the thumb to the tip of the middle finger of the right hand palm turned up

Hand Width – the measure across the thickest point from left to right

Foot Width – the measurement of the widest part of foot

Foot Length –the measurement of the distance between the two longest points

Chest Breadth –the maximum horizontal breadth of the chest at the level of the chest point anterior landmark

Shoulder Breadth – the horizontal distance across the shoulders measured between the bony points

Eyes Height Siting –the vertical distance from the sitting surface to the inner corner of the eyes

Waist Depth – the distance between the front and the rear of the waist

Head Circumference – the measurement of a head around its longest area

Chest Circumference – the maximum circumference of the chest at the fullest part

Waist Circumference – the measurement around the upper hip bone

Shoulder Breadth – the maximum horizontal breadth across the shoulders measured to the protrusion of the deltoid muscles

Hip Circumference – the maximum posterior extension of the buttock

Thigh Circumference – usually performed 15 cm proximal to the superior pole of the patella

Mid-Thigh Circumference – the measurement taken at the level of the mid-point on the lateral surface of the thigh, midway between the trochanterion and tibiale laterace

Weight- the body mass measured in Kilogram.

Anthropometry equipment

The following measuring instruments were used;

Stadiometer: was used to measure statures. It was attached to a well secured wall and the subjects were made to align vertically while taking the reading. The stadiometer have a minimum measurement of 60 cm and maximum of 220 cm.

Anthropometric tape: a flexible steel tape of 2.5 m length was used to take measurement of all girths. The instrument had millimetre gradations and was calibrated in centimetres. The measuring tape was non-extensible and was flexible.

Sliding calliper: this instrument was used to measure chest breadths, foot width, anterior-posterior chest depth. It contained two straight branches that permitted measurements of large breadths.

All measuring devices were properly checked to ensure they were in good order.

RESULTS AND DISCUSSION

Use of imported wares by adult women in Yoruba ethnic group

Figure 1 reported the level of patronage of F-Mws by aw-Yeg.From the Figure, 57% (228) of all the women, in one way or another, had patronized F-Mws within the past two years.

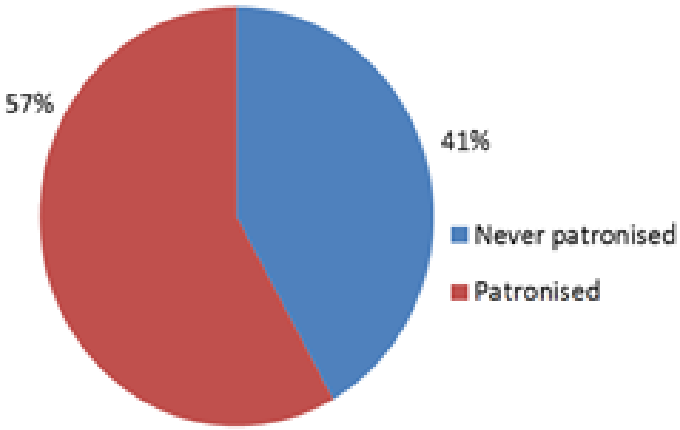

Figure 1: Prevalence of patronage of imported wares by aw-Yeg

From Figure 2 below, 140 women (61.4%) patronized only fairly-used foreign-made wears (FFMws). About 28% (64 women) used both the new F-Mws and FFMws, while 10.5% only used new F-Mws.

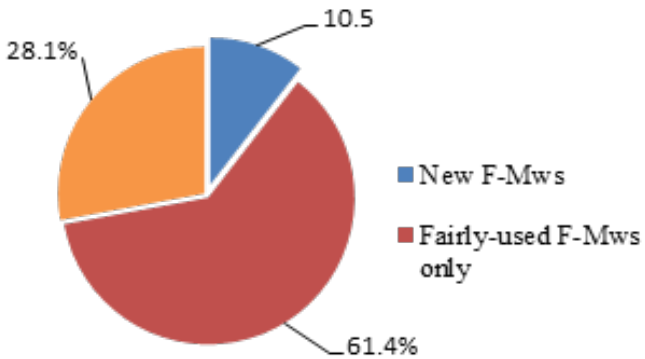

Figure 2: Categories of usage of foreign-made wares among aw-Yeg

Considering all the women (204) in the two groups (those that had used FFMws (140) and those who used both the new F-Mws and FFMws (64)), Figure 3 shows some of the reported reasons for patronizing FFMws. About 62% (127 women) mentioned that they like to use FFMws because of its availability. More than 45% of them patronize FFMws because it was long-lasting. However less than 10% (20 women) reported selecting FFMws because it was easy to find their sizes and can properly fit their body dimensions (8.6%).

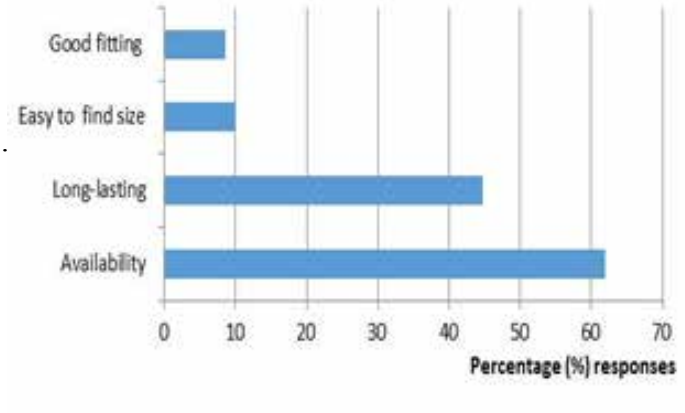

Figure 3:Reported reasons for patronizing foreign-made fairly-used wares

Among this group of women (204),77.5% (158) of them effected some minor fitting adjustments before putting the wears into use. Figure 4 shows the various reported areas (and percentage response) where such adjustments were made. Hip circumference (54%) and waist circumference (53%) were the highly reported areas in FFMws where fitting adjustments were made, either by hand stitching or by professional fashion designers, before the wears could match with their body dimensions. These minor fitting adjustments affected those women who used imported gowns and skirts. Other commonly reported areas included chest circumference (36%) and chest depth (34%) for users of imported bras, thigh and mid-thigh circumferences (35%) for users of imported trousers, length (32%), buttock waist depth (17%) and tooth width (16%) for users of imported shoes.

Table 1: Recorded anthropometric data of typical 400 aw-Yeg

S/N	DISCRIPTIONS	MEAN	SME	MODE	SD	MIN	MAX	PERCENTILES					
								5	25	50	75	90	95
1	Height	61.12	0.47	60	4.68	45	72	52.1	61	61	64	64	71
2	Sitting Height Erect	28.47	0.34	31	3.44	20.5	36	21.525	28	29	31	33.975	34
3	Thigh Clearance Height	6.33	0.11	7	1.10	4.5	10.5	5	6	6	7	8.475	9
4	Buttock Knee Length	20.275	0.22	21	2.21	15	31.5	16	20	20.5	21	23.475	24.98
5	Buttock Popliteal	16.96	0.21	17	2.15	8.5	21	13	17	17	18.75	20	21
6	Knee Height	19.021	0.30	21	3.03	1.8	24	16	19	19	21	22	23.96
7	Popliteal Height	16.605	0.23	16	2.30	10.5	23	13.5	16	16	18	21	22.98
8	Elbow Rest Height	9.258	0.22	6.5	2.18	5.5	20	6.5	9	9.5	10.5	12.475	15.93
9	Elbow To Elbow Breadth	18.76	0.42	17	4.16	12.5	30	12.5	17	17.5	22.75	25.975	28.96
10	Seat Breadth	15.575	0.31	13	3.11	12	28	12	15	15	16.75	22	25.94
11	Mid-Shoulder Height Sitting	20.025	0.23	20	2.32	12	24	16.5	20	20	22	23	24
12	Girt Inter Pupillary Breadth	3.775	0.06	4	0.63	2	6	2.5	4	4	4	4	5
13	Girt Inter Pupillary Length	9.01	0.22	9	2.21	4	19	4.7	9	9	9.5	11	18.86
14	Hand Length	5.777	0.14	5	1.40	3	9	4	5	5.5	7	8.475	9
15	Hand Width	4.068	0.41	4	4.14	2	44.5	2.5	3.545	3.75	4.1	4.5	5.5
16	Foot Width	4.27	0.03	4	0.33	3.6	5	3.705	4.2	4.2	4.5	4.8	4.996
17	Foot Length	9.1	0.11	9	1.06	4.5	11	8	9	9	9.5	11	11
18	Chest Bredth	16.42	0.25	16	2.57	4	22	14	16	16	18	20	21
19	Shoulder Breadth	19.04	0.28	18	2.8	11	25	15	18	18	21	24	24
20	Eyes Height Siting	20.1	0.34	20	3.4	9	28	16	20	20	22	27.4	24
21	Waist Depth	7.05	0.1	6	1.2	5	11	5.5	6.5	7	8	9	10.5
22	Head Circumference	22.28	0.22	23	2.2	17.5	27	18	22.7	23	24	25	26.99
23	Chest Circumference	35.4	0.61	34	6.069	21	52	24	34	35	40	45	46
24	Waist Circumference	36.57	0.54	40	5.4	23	46	28	37	37	40.37	45	46
25	Hip Circumference	39.2	0.558	39	5.58	28.5	55	30.5	38	38.5	41.75	50	54.95
26	Thigh Circumference	21.21	0.6	19	6.07	11	43	14	19.22	20	22.75	39.42	43
27	Mid-Thigh Circumference	17.77	0.34	17	3.43	11	32	13	17	17	19	25	25
28	Anterior Posterior	10.22	0.21	10	2.19	6	20	8	10	10	10.87	15	17.49
29	Weight	63.13	1.31	58	1.32e+01	30	100	44.05	61	62	69	89.7	99.96

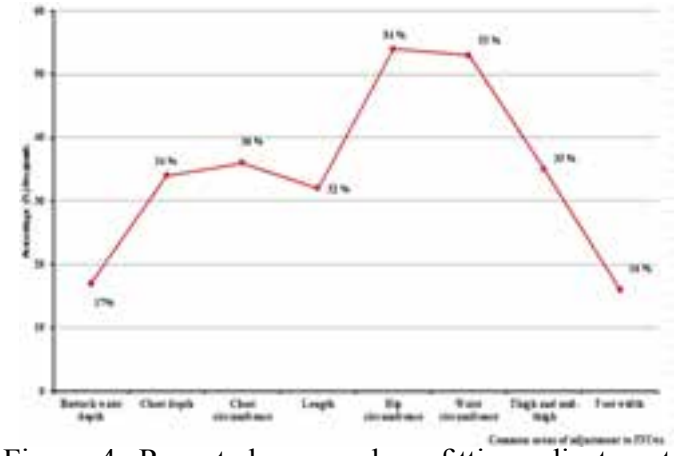

Figure 4: Reported areas where fitting adjustments were made to FFMws

Measured Body Dimensions of aw-Yeg

Detail of statistical description and percentiles of 400 women that participated in the study is as shown in Table 1. The anthropometric parameters measured were all in centimeters and the analysis presented in the table reveal the combined body sizes of the subjects.

All the measurements are grouped into six: 5th, 25th, 50th, 75th, 90th and 95th . The 5th percentile represents small size population, the 50thstands for 'medium' populations and the 'large size' represents the 95th percentile population.

From the Table, the average height of aw-Yegis 61.12cm. The 90th percentile of this dimension is 64cm. This information is relevant in women wears-making industry that may venture into production of gowns for aw-Yeg. The average dimension of buttock popliteal was 16.96 cm and 20 cm for 90th percentile. The buttock popliteal dimension will be of relevance for female pants' making. Hip circumference (means = 39.2, 90thpercentile = 50) will be useful for making skirt, chest breadth (means = 16.42, 90thpercentile = 20) and anterior posterior chest depth (mean = 10.22, 90th percentile = 15) may be important for bra making. Sitting Height Erect (mean = 28.47,90thpercentile = 33.975), waist circumference (means = 36.57, 90th percentile = 45) may be part of the design criteria for skirt making. Thigh circumference (means = 3621.21, percentile = 39.42 and mid-thigh circumference (mean = 17.77 cm, 90thpercentile = 25cm) will be the needed data for long or mini women trousers. Foot length (mean = 9.1, 90thpercentile = 11) and foot width (mean = 4.27, 90thpercentile = 4.8) will serve as the needed data for women's shoes making.

As part of the limitations recorded in this study, there is the possibility that errors may occur in the recording of data. Due to poor pronunciation by the measurer, distractions by the recorder or there corder's failure to follow all the steps possible to eliminate measurement errors

CONCLUSION

This study evaluated the variations in body composition of adult women in Yoruba ethnic groups (aw-Yeg) and the adult female anthropometric data used to produce foreign-made wares (F-Mws) imported into Nigeria by some unidentified F-Mws industry. Measurement of anthropometric data for the aw-Yeg was also conducted. From the study, majority of the aw-Yeg had patronized F-Mws within the past two years. Majority of the women in this category effected some fitting adjustments, on the wears, to make them useable. The fitting adjustments were affected in; hip circumference, waist circumference, chest circumference, chest-depth, thigh and mid-thigh circumferences, length, buttock waist-depth and tooth width.The study show some variations in the anthropometric data of aw-Yeg and the data used by some of the unidentified F-Mws industry to produce the imported wares. These variations necessitated the needs for fitting adjustments on the imported wares before aw-Yeg could use them.

The study, therefore, developed an anthropometric data for aw-Yeg and classified the sample standard into: 5th, 50th, 90thand 95thpercentile,as presented in Table 1. The 95th percentile is the largest size groups. This data may serve as relevant and recent data for F-Mws industries who will specifically venture into making products like gowns, pants, skirt, bra, trousers for aw-Yeg in Nigeria. Using these data will make imported wares more fitting and ready for use among aw-Yeg in Nigeria.

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