



**Preschool Children (2 To 5 Years) Anthropometry in Abia State, Nigeria:**

**A Determination of Mean Body Dimension**

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**Abstract**

*The study determined the mean body dimension of preschool children (2 to 5 years) in urban, rural, private and public schools in Umuahia and Aba zones of Abia State. The research design was a survey design. The sample consisted of 928 preschool children who were randomly selected from the population. The research instrument was a Body Measurement Chart (BMC). Data obtained on the dimension of the preschool children (2 to 5 years) in urban, rural, private and public schools were analyzed using means. The mean body dimension of the preschool children increased as the ages of the subjects increased for all the variables that were measured. Result from this study showed that there was variability in the mean body dimension of the preschool children in the various locations that were used for the study. Research result revealed that preschool children in private urban schools in Umuahia zones were taller than their age mates in the rural as well as their age mates in the public urban schools for all the ages (2, 3, 4 and 5 years) of the subjects that were studied. Highest mean height measurements obtained in private urban preschool children in Umuahia zone were 100.85cm, 104.66cm, 109.61cm, 115.00cm for ages 2, 3, 4 and 5 respectively. The mean body measurements established in this study were recommended for use as anthropometric data that can be useful in evaluating the nutritional and growth status of preschool children in urban, rural, private and public schools in Umuahia and Aba zones of Abia State, Nigeria.*

**key words:** mean, body, measurements, preschool, children.

**Introduction**

Children are found both in urban and rural areas in Nigeria (Ezirim, 2001; Ibetoh, 2001). In early childhood, the rate of height gains exceeds weight gains. The typical preschooler is expected to grow about 6.25cm each year during the period. The average child should be about 95cm tall while by age five the average child is about 107.5cm. A gradual lengthening of the body occurs such that the individual changes from the appearance of a baby to that of a young child. A child at 4 years begins to lose the chubby appearance of a baby. Therefore, a potbelly appearance is quite prominent (Bigner, 1983). Preschoolers grow faster in height than in width. The length of the arms, legs and trunk (measurement from shoulder to crotch) change much more quickly than the width of the shoulders, chest and hips. Therefore,



designers of preschooler's garments should understand the requirements and the lifestyle of babies and children at different ages. Clothes are specifically designed to meet the special needs of children. Presently, children's wear is a separate and very important part of the clothing industry. The preschool years are between the ages of two (2) to five (5) years. It is an exciting and active period for young children. Research findings revealed that the preschool period is the period children develop fastest (Papalia, Olds & Feldman, 2002; Simplicity Pattern, 2004; Duncan, 2004).

Garments for children can be manufactured as made- to-measure (custom-made ) or ready -to- wear. They can be made with patterns. A pattern is a piece of paper, drafted and cut to size and shape which is used for sewing dresses. A designer uses a foundation pattern (block pattern) as a basis for making the pattern for a design (style pattern). Successful blocks can only be drafted if the personal measurements are taken accurately in the correct positions of the body ( Hosegood 2006; Igbo & Iloeje, 2012 ; Duncan, 2004 ).

Anthropometry is the measurement of the different physical dimensions of the body. These physical dimensions are influenced by environmental factors notable nutrition, especially in early childhood when growth is rapid. The physical dimensions of the body mostly used in anthropometry are weight, height or (length in children), mid-upper arm circumference (MUAC), skin-fold thickness, waist and hip circumferences ( for adults), head and chest circumferences (for children). The measurements of these physical dimensions of the body are used to derive indices such as length - for - age, weight- for - age, weight - for - height and waist- hip ratio (Okeke, Onyechi & Ibeanu, 2011).

Personal measurements refer to the body measurements needed for drafting the blocks for individual figures. Components of personal or body measurements required for drafting the blocks include, chest/bust, waist, hip/seat, across back/back width, neck size, shoulder, upper arm/biceps, wrist, scye depth, neck to waist/back waist length, waist to hip, cervical height, waist to knee, body rise/crotch, inside leg, sleeve length, head circumference, vertical trunk, leg base, foot, skirt length and trouser length. Accurate personal measurements are required for drafting patterns for constructing perfectly fitted garments.

Prior to the introduction of the Structural Adjustment Programme (SAP) by the Federal Government in July, 1986, commercial patterns were imported into Nigeria. However, with the introduction of SAP, government banned the importation of some textiles, ready-to wear clothes, second-handed clothes and commercial patterns in a bid to conserve foreign exchange as well as promote economic self-reliance. Commercial patterns which are important in large scale production of clothes are usually unavailable in the country. Even where they are available, the patterns are very expensive (Nya & Igwe, 1989; Kaka, 1990; Olori, 2005; Ugwoke, 2005).



However, Aldrich (1999) and Aldrich (2006) explained that age alone is an unreliable guide to garment fit as children's stature in relation to age is very variable. It is no wonder that Kaka (1990) observed that commercial patterns that are produced from standardized body measurements of individuals in the Western World do not fit Africans accurately as a result of the difference in body structure. The current research opined that a conclusive study on standard body measurement of Nigerians that can be used in drafting patterns is not available.

Research reports reveal that children in their rapid growth stage and growth patterns have been shown to differ from one locality to another ( Santrock, 2005; Papalia, Olds & Feldman, 2002). Therefore, a comparative study on the establishment of mean body measurements for development of block patterns for constructing perfectly fitted garments of preschool children in urban, rural, private and public schools in Abia State was necessary. This is a measure towards meeting the clothing needs of Nigerian preschool children.

### **Purpose of the Study**

The purpose of the study was to determine the mean body dimensions of preschool children (2 to 5 years) in urban, rural, private and public schools in Abia State, Nigeria.

### **Hypothesis**

There is no significant difference in the mean body dimensions of preschool children ( 2 to 5 years) in urban, rural, private and public schools in Abia State, Nigeria.

### **Methodology**

The study was carried out in Abia State. The study was carried out in Abia State, Nigeria. Abia State is located in Eastern part of Nigeria. It is bounded in the south by Rivers State, South- East by Akwa- Ibom sharing boundary with Cross River State in the North- East while in the West and South, it shares boundaries with Imo, Anambra and Ebonyi respectively. It is made up of seventeen local government areas. Administratively, preschools and primary schools in the state are zoned under Umuahia, Aba and Ohafia. The Abia State Universal Basic Education Board (ASUBEB) takes charge of the pre-primary and primary schools in the seventeen local governments in Abia State, Nigeria.

### **The Design and Procedure for the study was as follows:**

The study design was a survey design. The procedure for the study involved the following:

- i. obtaining a sample of the preschool children (2 to 5 years) to measure.
- ii. taking body dimension at 21 designated parts of the body of preschool children (2 to 5 years) sampled.
- iii. Obtaining average body dimension of parts of the body measured.



The population which comprised the entire preschool children (males and females) (2 to 5 years) in Abia State was 44, 865. Information on the statistical data on school enrolment in Abia State was collected from the Abia State Universal Basic Education Board (ASUBEB). Multistage sampling procedure was used in selecting the sample for the study. Administratively, preschools and primary schools in the state are zoned under Umuahia, Aba and Ohafia. Two zones namely Umuahia and Aba were randomly selected for the study.

Fifty percent of preschool children were randomly selected from each school. Two private and two public schools were selected in each zone while eight schools were used for the study. A Simple random technique was used in selecting the children in order to ensure that every child had equal chance of being selected. Altogether, 928 preschool children (males and females) were used as the sample size. The sample size was considered adequate owing to the fact that the population was homogenous.

### **Instrument for Data Collection**

The research instrument was a Body Measurement Chart (BMC) developed by the researcher on essential body dimension needed for drafting flat patterns and constructing garments for accurate fit. The researcher developed the instrument through a review of literature. The form was developed to collect information in the following aspects: age, location of school, local government area, twenty-one different body parts to be measured namely height, chest/bust, waist, hip/seat, across back/back width, neck size, shoulder, upper arm, wrist, scye depth, neck to waist, waist to hip, cervical height, waist to knee, body rise, crotch depth, inside leg, sleeve length, head circumference, vertical trunk, leg base and foot.

The instrument was validated by five lecturers. Two lecturers each in Textiles and Clothing and Statistics at Michael Okpara University of Agriculture Umudike, Abia State as well as one lecturer in Textiles and Clothing at University of Nigeria, Nsukka, Enugu State validated the instrument. Validation of the instrument was based on content validity.

The body measurements were pretested on (10) pupils in a study area that did not form part of the study. The reliability of the instrument was established using test-retest reliability method. The mean body dimension of pre/post test was 0.84. This indicated high consistency reliability of the instruments.

### **Data Analysis:**

Data obtained on the mean body dimensions of height, chest/bust, waist, hip/seat, across back/back width, neck size, shoulder, upper arm, wrist, scye depth, neck to waist, waist to hip, cervical height, waist to knee, body rise, crotch depth, inside leg, sleeve length, head



circumference, vertical trunk, leg base and foot of preschool children ages 2 to 5 years in urban, rural, private and public schools in Umuahia and Aba zones of Abia State was analyzed using means and standard deviation.

**Table 1:** Average Body dimension of Preschool Children (Aged 2 Years) in Private, Public, Urban and Rural Schools in Abia State

| Variables                                    | Umuahia zone<br>Public (urban) | Umuahia zone<br>Private (urban) | Umuahia zone<br>Public (Rural) | Umuahia zone<br>Private (Rural) | Aba zone<br>Public (urban) | Aba zone<br>Private (urban) | Aba zone<br>Public (Rural) | Aba zone<br>Private (Rural) |
|--|--------------------------------|---------------------------------|--------------------------------|---------------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|
|  | $\bar{X}$ (CM)                 | $\bar{X}$ (CM)                  | $\bar{X}$ (CM)                 | $\bar{X}$ (CM)                  | $\bar{X}$ (CM)             | $\bar{X}$ (CM)              | $\bar{X}$ (CM)             | $\bar{X}$ (CM)              |
| Height (X <sub>1</sub> )                     | 99                             | 100.85                          | 92.55                          | 94.63                           | 99.75                      | 92                          | 96.08                      | 94.2                        |
| Chest/Bust (X <sub>2</sub> )                 | 56.6                           | 54.54                           | 55.1                           | 54.18                           | 56.17                      | 53.06                       | 56.08                      | 55.3                        |
| Waist (X <sub>3</sub> )                      | 53.4                           | 54.32                           | 55.91                          | 53.27                           | 53.25                      | 51.76                       | 58.25                      | 55.3                        |
| Hip/seat (X <sub>4</sub> )                   | 56.8                           | 58.88                           | 61.27                          | 55.36                           | 56.33                      | 55.18                       | 65.83                      | 60.6                        |
| Across Back/Back<br>Width (X <sub>5</sub> )  | 22.87                          | 22.29                           | 20.36                          | 20.09                           | 24                         | 18.89                       | 19.83                      | 21.3                        |
| Neck size (X <sub>6</sub> )                  | 32.93                          | 27.17                           | 32.18                          | 26.55                           | 33.08                      | 26.65                       | 33.08                      | 32.6                        |
| Shoulder (X <sub>7</sub> )                   | 7.13                           | 6.44                            | 7.82                           | 7.45                            | 7.42                       | 8.35                        | 7.33                       | 7.3                         |
| Upper Arm (X <sub>8</sub> )                  | 22.47                          | 20.2                            | 21.18                          | 17                              | 22.92                      | 19.82                       | 22.58                      | 21.6                        |
| Wrist (X <sub>9</sub> )                      | 16.13                          | 13.98                           | 13.64                          | 12.36                           | 16.17                      | 14.71                       | 14.83                      | 14.3                        |
| Scye Depth (X <sub>10</sub> )                | 11.27                          | 24.46                           | 11.45                          | 13.45                           | 11                         | 9.82                        | 10.67                      | 9.9                         |
| Neck to waist (X <sub>11</sub> )             | 24.47                          | 24.46                           | 23                             | 22.82                           | 24.33                      | 21.18                       | 22.33                      | 23.1                        |
| Waist to Hip (X <sub>12</sub> )              | 10.27                          | 11.24                           | 12                             | 9.36                            | 10.42                      | 11.47                       | 15.25                      | 10.4                        |
| Cervical Height<br>(X <sub>13</sub> )        | 84.4                           | 80.44                           | 77.45                          | 77.73                           | 85.25                      | 78.23                       | 80.25                      | 79.1                        |
| Waist to Knee<br>(X <sub>14</sub> )          | 30.4                           | 30.12                           | 26.45                          | 23.55                           | 31.25                      | 23.41                       | 29.42                      | 28.91                       |
| Body Rise crotch<br>Depth (X <sub>15</sub> ) | 14.2                           | 14.32                           | 15.09                          | 11.64                           | 14.42                      | 11.76                       | 15.58                      | 14                          |



|  |       |        |       |       |        |       |        |       |
|--|-------|--------|-------|-------|--------|-------|--------|-------|
| Inside leg (X <sub>16</sub> )          | 46    | 42.80  | 37.64 | 44.82 | 46.83  | 41.29 | 36.08  | 42.1  |
| Sleeve Length (X <sub>17</sub> )       | 41.47 | 35.51  | 38.91 | 37.36 | 42.5   | 43.65 | 40.17  | 40.7  |
| Head /circumference (X <sub>18</sub> ) | 53    | 50.63  | 46.27 | 50.82 | 51.42  | 52.18 | 44.83  | 47.6  |
| Vertical trunk (X <sub>19</sub> )      | 104.8 | 122.88 | 103   | 97.18 | 107.17 | 92.06 | 108.08 | 104.7 |
| Leg Base (X <sub>20</sub> )            | 17.2  | 17.98  | 17.91 | 16.73 | 16.92  | 17.94 | 18.33  | 18.9  |
| Foot (X <sub>21</sub> )                | 16.53 | 17.68  | 15.55 | 14.45 | 16.42  | 15.76 | 15.92  | 16.1  |

$\bar{X}$  = Mean, (CM) = Centimeter

The grand mean body dimensions of preschool children (2 years) in urban, rural, private and public schools in Umuahia and Aba zones of Abia State were obtained for twenty one (21) body parts measured. Data analysis revealed that the average height measurement of the subjects in private urban school in Umuahia zones was rated highest with a mean of 100.85cm. The highest chest / bust measurement (X= 56.6cm) was obtained in the public urban school in Umuahia zone. Preschool children (2 years) in public rural school in Aba zone had the highest waist and hip measurement (58.25cm) and 65.83cm) respectively as revealed in Table 1.

**Table 2:** Average Body dimension of Preschool Children Aged (3 Years) in Private, Public, Urban and Rural Schools in Abia State

| Variables                    | Umuahia zone Public (urban) | Umuahia zone Private (urban) | Umuahia zone Public (Rural) | Umuahia zone Private (Rural) | Aba zone Public (urban) | Aba zone Private (urban) | Aba zone Public (Rural) | Aba zone Private (Rural) |
|------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|
|                              | $\bar{X}$ (CM)              | $\bar{X}$ (CM)               | $\bar{X}$ (CM)              | $\bar{X}$ (CM)               | $\bar{X}$ (CM)          | $\bar{X}$ (CM)           | $\bar{X}$ (CM)          | $\bar{X}$ (CM)           |
| Height (X <sub>1</sub> )     | 101.00                      | 104.66                       | 93.66                       | 95.64                        | 101.75                  | 96.00                    | 97.08                   | 95.20                    |
| Chest/Bust (X <sub>2</sub> ) | 57.40                       | 56.49                        | 56.09                       | 55.18                        | 57.17                   | 55.47                    | 57.08                   | 56.30                    |
| Waist (X <sub>3</sub> )      | 54.40                       | 56.32                        | 56.91                       | 54.27                        | 54.25                   | 55.00                    | 59.17                   | 56.30                    |
| Hip/seat (X <sub>4</sub> )   | 57.67                       | 60.71                        | 62.27                       | 56.36                        | 57.25                   | 57.18                    | 66.83                   | 61.60                    |



|   |        |        |        |       |        |       |        |        |
|---|--------|--------|--------|-------|--------|-------|--------|--------|
| Across Back/Back                          | 23.87  | 24.07  | 22.18  | 21.09 | 24.75  | 20.35 | 20.33  | 22.30  |
| Width (X <sub>5</sub> )                   |        |        |        |       |        |       |        |        |
| Neck size (X <sub>6</sub> )               | 34.13  | 27.71  | 33.09  | 27.54 | 33.17  | 27.65 | 33.50  | 33.60  |
| Shoulder (X <sub>7</sub> )                | 7.13   | 7.44   | 8.82   | 7.91  | 7.42   | 8.29  | 7.58   | 7.70   |
| Upper Arm (X <sub>8</sub> )               | 22.93  | 21.90  | 22.18  | 18.00 | 23.75  | 20.82 | 23.25  | 22.60  |
| Wrist (X <sub>9</sub> )                   | 16.33  | 14.71  | 14.91  | 12.91 | 17.08  | 15.71 | 15.33  | 15.30  |
| Scye Depth (X <sub>10</sub> )             | 11.13  | 11.59  | 12.36  | 13.91 | 11.83  | 10.82 | 11.08  | 10.90  |
| Neck to waist (X <sub>11</sub> )          | 24.73  | 25.10  | 24.00  | 23.55 | 24.83  | 22.24 | 22.33  | 24.10  |
| Waist to Hip (X <sub>12</sub> )           | 10.27  | 11.59  | 13.00  | 9.82  | 11.42  | 10.29 | 15.58  | 11.40  |
| Cervical Height (X <sub>13</sub> )        | 86.53  | 82.95  | 72.09  | 78.73 | 87.25  | 82.29 | 81.58  | 81.10  |
| Waist to Knee (X <sub>14</sub> )          | 24.67  | 30.61  | 28.00  | 24.18 | 32.08  | 24.41 | 30.50  | 29.90  |
| Body Rise crotch Depth (X <sub>15</sub> ) | 14.80  | 15.27  | 15.273 | 12.27 | 15.42  | 12.76 | 16.42  | 15.00  |
| Inside leg (X <sub>16</sub> )             | 47.27  | 43.88  | 38.64  | 45.73 | 47.75  | 43.29 | 36.58  | 43.10  |
| Sleeve Length (X <sub>17</sub> )          | 42.47  | 37.17  | 39.91  | 37.45 | 43.50  | 44.65 | 39.83  | 41.70  |
| Head /circumference (X <sub>18</sub> )    | 53.93  | 51.54  | 47.27  | 51.82 | 52.42  | 53.12 | 49.58  | 48.60  |
| Vertical trunk (X <sub>19</sub> )         | 105.80 | 102.00 | 104.00 | 98.18 | 109.17 | 96.00 | 109.08 | 108.70 |
| Leg Base (X <sub>20</sub> )               | 17.53  | 19.07  | 18.91  | 17.73 | 17.83  | 18.94 | 19.17  | 19.90  |
| Foot (X <sub>21</sub> )                   | 16.73  | 18.80  | 16.55  | 15.45 | 17.42  | 16.76 | 16.50  | 17.10  |

*X = Mean, (CM) = Centimeter*

The grand mean body dimensions of preschool children (3 years) in urban, rural, private and public schools in Umuahia and Aba zones of Abia State were obtained for twenty



one (21) body parts measured. Results revealed that the highest mean body measurements were obtained in public urban school in Umuahia zone in their chest (57.40cm), neck size 34.13cm and head circumference (53.93cm). However, highest mean ratings were obtained were obtained in the private urban school in Umuahia zone in their height (104.66cm), neck size (34.13cm) and head circumference (53.93cm). In Aba zone, highest mean body measurements were obtained in public urban preschool children in their upper arm (23.75cm), wrist (17.08cm), cervical height (87.25cm), waist to knee ( 32.08cm), inside leg (47.75cm) and vertical trunk (109.17cm) measurements.

**Table 3:** Average Body dimension of Preschool Children (aged 4 Years) in Private, Public, Urban and Rural Schools in Abia State

| VARIABLES                                      | Umuahia zone<br>Public (urban)<br>$\bar{X}$ (CM) | Umuahia zone<br>Private (urban)<br>$\bar{X}$ (CM) | Umuahia zone<br>Public (Rural)<br>$\bar{X}$ (CM) | Umuahia zone<br>Private (Rural)<br>$\bar{X}$ (CM) | Aba zone<br>Public (urban)<br>$\bar{X}$ (CM) | Aba zone<br>Private (urban)<br>$\bar{X}$ (CM) | Aba zone<br>Public (Rural)<br>$\bar{X}$ (CM) | Aba zone<br>Private (Rural)<br>$\bar{X}$ (CM) |
|--|--|---|--|---|--|---|--|---|
| Height (X <sub>1</sub> )                       | 107.36   | 109.61  | 104.33   | 102.79  | 107.16                                       | 99.83   | 106.11                                       | 105.8   |
| Chest/Bust (X <sub>2</sub> )                   | 60.73  | 57.8  | 57.78  | 55.92   | 60.68  | 56.81   | 59.64  | 61.72   |
| Waist (X <sub>3</sub> )                        | 55.67  | 56.6  | 56.1   | 53.79   | 55.64  | 56.6  | 58.13  | 59.16   |
| Hip/seat (X <sub>4</sub> )                     | 61.15  | 58.34   | 58.86  | 56.85   | 61.16  | 58.14   | 60.82  | 62.44   |
| Across<br>Back/Back<br>Width (X <sub>5</sub> ) | 25.17  | 23.85   | 20.51  | 20.29   | 25.32  | 23.14   | 20.38  | 21.72   |
| Neck size (X <sub>6</sub> )                    | 33.69  | 28.37   | 30.4   | 26.93   | 33.92  | 28.67   | 32.51  | 32.08   |
| Shoulder (X <sub>7</sub> )                     | 7.71   | 7.18  | 8.35   | 7.79  | 7.84   | 8.88  | 8.42   | 8   |
| Upper Arm (X <sub>8</sub> )                    | 22.21  | 20.97   | 21.29  | 17.21   | 22.36  | 19.93   | 23.96  | 22.04   |
| Wrist (X <sub>9</sub> )                        | 16.1   | 14.6  | 14.39  | 12.86   | 16.38  | 15.33   | 15.44  | 19.24   |
| Scye Depth (X <sub>10</sub> )                  | 11.48  | 13.32   | 12.76  | 13.71   | 11.08  | 11.05   | 11.47  | 12.8  |
| Neck to waist<br>(X <sub>11</sub> )            | 25.83  | 26.15   | 24.02  | 27.57   | 25.88  | 25.88   | 24.27  | 23.28   |
| Waist to Hip<br>(X <sub>12</sub> )             | 12.94  | 14.10   | 12.12  | 10.5  | 11.36  | 19.83   | 15.62  | 16.04   |





|   |        |        |        |        |        |       |        |        |
|---|--------|--------|--------|--------|--------|-------|--------|--------|
| Cervical Height (X <sub>13</sub> )        | 90.17  | 90.56  | 86.73  | 85.21  | 92.38  | 86.95 | 88.49  | 87.84  |
| Waist to Knee (X <sub>14</sub> )          | 34.23  | 32.22  | 29.69  | 27.86  | 33.38  | 22.38 | 30.73  | 26.32  |
| Body Rise crotch Depth (X <sub>15</sub> ) | 16.06  | 17.32  | 14.96  | 12.71  | 15.42  | 23.14 | 17.58  | 15.68  |
| Inside leg (X <sub>16</sub> )             | 49.9   | 49.33  | 49.08  | 51.14  | 49.78  | 46.07 | 47.82  | 45.2   |
| Sleeve Length (X <sub>17</sub> )          | 43.38  | 40.16  | 42.55  | 39.37  | 43.32  | 45.64 | 43.6   | 43.56  |
| Head /circumference (X <sub>18</sub> )    | 55.5   | 53.22  | 52.04  | 50     | 55.28  | 51.98 | 52.76  | 53.88  |
| Vertical trunk (X <sub>19</sub> )         | 110.19 | 103.34 | 105.33 | 103.21 | 109.98 | 95.76 | 109.27 | 107.56 |
| Leg Base (X <sub>20</sub> )               | 17.58  | 19.69  | 18.51  | 17.07  | 17.94  | 17.88 | 19.13  | 20.4   |
| Foot (X <sub>21</sub> )                   | 17.52  | 19.64  | 17.22  | 16.28  | 17.8   | 19.88 | 18.02  | 18.36  |

$\bar{X}$  = Mean, (CM) = Centimeter

The grand mean body dimensions of preschool children (4 years) in urban, rural, private and public schools in Umuahia and Aba zones of Abia State were obtained for twenty one (21) body parts measured. The private urban preschool children (4years) in Umuahia zone had the highest mean height measurement (109.61cm). However, preschool children in private rural school in Aba zone had the highest mean body measurements in the following body parts: Chest/ bust (61.72cm), waist (59.16cm) and hip (62.44cm) as shown in Table 3.

**Table 4:** Average Body dimension of Preschool Children (aged 5 Years) in Private, Public, Urban and Rural Schools in Abia State

| VARIABLES                | Umuahia zone   | Umuahia zone    | Umuahia zone   | Umuahia zone    | Aba zone       | Aba zone        | Aba zone       | Aba zone        |
|--------------------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
|                          | Public (urban) | Private (urban) | Public (Rural) | Private (Rural) | Public (urban) | Private (urban) | Public (Rural) | Private (Rural) |
|                          | $\bar{X}$ (CM) | $\bar{X}$ (CM)  | $\bar{X}$ (CM) | $\bar{X}$ (CM)  | $\bar{X}$ (CM) | $\bar{X}$ (CM)  | $\bar{X}$ (CM) | $\bar{X}$ (CM)  |
| Height (X <sub>1</sub> ) | 109.29         | 115.00          | 105.33         | 103.79          | 109.30         | 103.81          | 107.24         | 106.80          |



|   |       |       |       |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Chest/Bust<br>(X <sub>2</sub> )                 | 61.73 | 59.85 | 58.78 | 56.93 | 59.36 | 57.83 | 60.82 | 62.72 |
| Waist (X <sub>3</sub> )                         | 56.67 | 58.60 | 57.10 | 55.29 | 57.44 | 57.86 | 58.42 | 60.16 |
| Hip/seat (X <sub>4</sub> )                      | 61.85 | 63.56 | 59.63 | 58.29 | 62.20 | 59.26 | 61.42 | 63.44 |
| Across<br>Back/Back<br>Width (X <sub>5</sub> )  | 24.81 | 25.21 | 22.73 | 21.29 | 25.80 | 23.21 | 20.84 | 22.72 |
| Neck size<br>(X <sub>6</sub> )                  | 34.19 | 29.27 | 31.39 | 27.79 | 34.34 | 29.76 | 32.84 | 34.24 |
| Shoulder<br>(X <sub>7</sub> )                   | 7.71  | 7.55  | 9.33  | 8.29  | 7.88  | 8.74  | 8.53  | 8.76  |
| Upper Arm<br>(X <sub>8</sub> )                  | 22.98 | 22.97 | 22.29 | 17.93 | 24.16 | 20.95 | 24.93 | 23.12 |
| Wrist (X <sub>9</sub> )                         | 16.23 | 15.60 | 15.18 | 13.00 | 16.44 | 15.93 | 16.42 | 20.24 |
| Scye Depth<br>(X <sub>10</sub> )                | 11.25 | 11.95 | 13.76 | 15.36 | 12.28 | 12.33 | 12.33 | 13.80 |
| Neck to waist<br>(X <sub>11</sub> )             | 26.23 | 26.40 | 25.16 | 28.29 | 26.18 | 26.52 | 25.11 | 25.08 |
| Waist to Hip<br>(X <sub>12</sub> )              | 11.00 | 12.98 | 13.02 | 11.07 | 11.64 | 11.36 | 16.51 | 12.44 |
| Cervical<br>Height (X <sub>13</sub> )           | 93.10 | 95.56 | 85.78 | 86.21 | 94.32 | 89.02 | 87.93 | 88.76 |
| Waist to<br>Knee (X <sub>14</sub> )             | 34.54 | 36.65 | 30.67 | 28.21 | 34.02 | 24.90 | 31.91 | 27.28 |
| Body Rise<br>crotch Depth<br>(X <sub>15</sub> ) | 18.29 | 17.63 | 15.96 | 13.71 | 15.84 | 15.19 | 16.24 | 16.68 |
| Inside leg<br>(X <sub>16</sub> )                | 50.81 | 50.47 | 50.10 | 52.29 | 50.30 | 46.09 | 48.98 | 46.44 |
| Sleeve<br>Length (X <sub>17</sub> )             | 43.38 | 42.16 | 43.76 | 40.64 | 43.68 | 46.62 | 44.22 | 44.68 |



|  |        |        |        |        |        |       |        |        |
|--|--------|--------|--------|--------|--------|-------|--------|--------|
| Head /circumference (X <sub>18</sub> ) | 54.21  | 54.05  | 53.04  | 51.00  | 55.12  | 54.02 | 55.56  | 55.24  |
| Vertical trunk (X <sub>19</sub> )      | 114.27 | 110.48 | 106.53 | 104.21 | 113.52 | 97.67 | 108.16 | 112.52 |
| Leg Base (X <sub>20</sub> )            | 17.96  | 21.23  | 19.51  | 17.14  | 18.88  | 18.83 | 20.09  | 21.40  |
| Foot (X <sub>21</sub> )                | 17.77  | 21.02  | 18.22  | 17.29  | 18.58  | 18.43 | 19.09  | 19.36  |

$\bar{X}$  = Mean, (CM) = Centimeter

The grand mean body dimensions of preschool children (5 years) in urban, rural, private and public schools in Umuahia and Aba zones of Abia State were obtained for twenty one (21) body parts measured. Research findings revealed that the highest mean body measurements were obtained in private rural school in Aba zone in their chest (62.72cm), waist (60.16cm), neck size (34.24cm), scye depth (13.80cm), sleeve length (44.68cm), head circumference (55.24cm) and leg base (21.40cm).

However, research findings also showed that no body parts measured in the 5 year old preschool children in both public and private urban schools in Aba zone was rated highest compared to other schools as presented in Table 4.

### Findings of the Study

The following findings were made:

- 1) The mean body dimension of the preschool children increased as the ages of the subjects increased for all the variables that were measured. (See Tables 1, 2, 3 and 4).
- 2) Result from this study showed that there was variability in the mean body dimension of the preschool children in the various locations that were used for the study.
- 3) Research result revealed that preschool children in private urban schools in Umuahia zones were taller than their age mates in the rural as well as their age mates in the public urban schools for all the ages (2, 3, 4 and 5 years) of the subjects that were studied. Highest mean height measurements obtained in private urban preschool children in Umuahia zone were 100.85cm, 104.66cm, 109.61cm, 115.00cm for ages 2, 3, 4 and 5 respectively as shown in Tables 1, 2, 3 and 4 respectively.
- 4) The average body dimension of the subjects in the public schools were greater than those of their age mates in the private schools in most of the body parts that were



measured for ages 2 and 4 as shown in Tables 1 and 3. On the contrary, the mean body measurements of the preschool children in the private schools were greater than those of their age mates in the public schools in most of the body parts that were measured for ages 3 and 5 respectively.

### Discussion of Findings

The grand mean body measurements of preschool children ( 2 to 5 years) in urban, rural, private and public schools in Abia State, Nigeria were established for the following variables: height, chest/bust, waist, hip/seat, across back/back width, neck size, shoulder, upper arm/biceps, wrist, scye depth, neck to waist/back waist length, waist to hip, cervical height, waist to knee, body rise/crotch, inside leg, sleeve length, head circumference, vertical trunk, leg base, foot, skirt length and trouser length.

Results from this study revealed that the average body measurements of the preschool children increased as the ages of the subjects increased for all the variables measured. A similar report were made by Aldrich (1999) and Schlenker *et al.* (1996) who recorded an increase in the mean body measurements of British preschool children as the ages of the children increased. According to Santrock (2005) changes in body proportion and appearance will be attributed to the growth of muscles and bones. Hence, bone growth results in increased stature. In view of this, Halliburton & Gable (2002) also reported that in early childhood, changes in bone proportions are prominent. Hence, a gradual lengthening of the body occurs as bone and muscle growth progress. The individual therefore changes from appearance of a baby to that of a young child.

The mean body measurements of preschool children in the public schools were greater than those of their age mates in the private schools for most of the body parts that were measured for ages 2 and 4 as shown in Tables 1 and 3. On the contrary, data from the study showed that the mean body measurements of the preschool children in the private schools were greater than those of their age mates in the public schools in most of the body parts that were measured for ages 3 and 5 respectively.

Analysis of data presented in Tables 1, 2, 3 and 4 showed that private urban preschool children in Umuahia zone were taller than their rural age mates as well as their age mates in the public urban schools for all the ages of the respondents that were studied. Mean height measurements for the subjects in private urban schools in Umuahia zone were 100.85cm, 104.66cm, 109.61cm and 115cm for ages 2, 3, 4 and 5years respectively. Highest average height measurement observed in private urban preschool children in Umuahia zone could be attributed to the fact that that these children may be better nourished than their counterparts. A similar finding was made by Bigner (1983) who reported that physical growth in early childhood is an indication of a child's nutritional and health status, degree of exercise, need for



food and other factors. Besides this, the general health status of children improves as age increases. It is essential to maintain good health in early childhood since growth needs and energy demands are essential to a child's physical, social and psychological well-being. Eating habits, food preferences and social interaction patterns are formed at meal times in early childhood.

In this regard, Birren *et al.*, (1981) have shown that individual growth rates exist as well as different sports in growth and maturation and different rates of aging in later life. Furthermore, in a study of the development of infants and children, it is essential to remark that all children are different (Shaw, 1988). Several authors (Birren *et al.*, 1981) reported that the most marked secular trend has been in the degree of early physical maturity. Individuals who were born more recently do not only reach a maximum height earlier but also show an earlier growth spurt, so that they reach the maximum height at an earlier age.

Research studies have shown that individual differences become observed more frequently in early childhood. These characteristics are based on biological, cultural and social factors and are very noticeable in the difference between females and males for example, differences occur in the rate of growth, height, weight, motor skills, sex-role development, aggression and other related aspects (Lloyd & Lederman, 2002; WHO, 2000; Peisner-Feinberg, 2004). Other aspects where unique differences in development occur involve broader social class and ethnic group characteristics, personality difference due to birth order among siblings and expressions of creativity. In the study of the development of infants and children, it has been shown that all children are different. (Bigner, 1983; Huston, Mcloyd & McColl, 1994). Similarly, Okeke; Madukwe; Eme & Nwagbo (2013) investigated the anthropometric and nutrient intake of pre-school children (2-5years) in Nsukka Local Government Area of Enugu State, Nigeria and reported that socio-economic/ cultural factors do affect child growth. Therefore, individual differences occur in the rate of growth, height, weight, and other related aspects of preschool children.

## Conclusion

The mean body dimension of preschool children (2 to 5 years) in urban, rural, private and public schools in Abia State have been established in this study. Home Economics teachers and lecturers as well as their students in tertiary institutions can use the average body dimension in drafting patterns for different body sizes of preschool children. This is necessary for meeting the heavy demand for Nigerian children's clothing following the ban on importation of clothing. Hence, Nigeria can export children's commercial patterns and garments to other African countries with similar body structure.



### Recommendations

The following recommendations were made based on the findings of this study:

1. The mean body measurements of preschool children in Abia State, Nigeria should be provided for use in pattern drafting courses in Textiles and Clothing.
2. the mean body measurements of preschool children in Abia State, Nigeria should form data base for commercial pattern production in Nigeria which is necessary for large scale garment production. Hence, Nigeria can export children's commercial patterns and garments to other African countries with similar body structure.
3. the mean body measurements of the preschool children (2 to 5 years) in Abia State, Nigeria can serve as anthropometric data that can be useful in evaluating the nutritional and growth status of preschool children in Abia State, Nigeria.

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