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PATTERN OF GROWTH OF SCHOOL CHILDREN AGED 5-12 YEARS FROM KAZAURE EMIRATE OF NORTHERN NIGERIA

Gudaji, A. Department of Anatomy, Bayero University Kano, Nigeria

Danborno, B. Department of Human Anatomy, Ahmadu Bello University, Zaria, Nigeria

Adebisi, S. S. Department of Human Anatomy, Ahmadu Bello University, Zaria, Nigeria

Hamman, W. O. Department of Human Anatomy, Ahmadu Bello University, Zaria, Nigeria

Abstract

The aim of the study was to establish the influence of level of urbanization on the pattern of growth of school children aged 5-12 years from Kazaure emirate of northern Nigeria by determining the difference in growth between males and females due to influence of urbanization using anthropometric measurements such as height, weight and body mass index(BMI).It was a cross-sectional study on 863 pupils (432 boys and 431 girls). The objectives of this study was to investigate difference in growth between males and females, and to investigate influence of level of urbanization on growth. The participants went through anthropometric measurements of height and weight using stadiometer, while their BMI was calculated from standard formula.Sexual dimorphism between male and female pupils was observed with males showing statistical significant difference in height, weight and BMI with p=0.01, p<0.001, and those from urban area had shown better growth than their rural peers with statistical significant difference, respectively.

Keywords: Anthropometry, Kazaure emirate, urbanization, Nigeria, age

Introduction

Anthropometry is widely used in surveys as an indicator of nutritional and health status Khalid*et al*., 1997; Al-Sendi *et al*., 2003). No two persons are ever alike in all their measurable

characters, that the character tends to undergo changes in varying degrees from birth to death, in health and in diseased conditions since persons live under different conditions, and are members of different ethnic groups and the offspring of unions between them, frequently present interesting differences in bodily form and proportions (Ashley, 1960).Age, sex and stature are the primary characteristics of identification[5]. Anthropometric characteristics have direct relationship with sex, shape and form of an individual and these factors are intimately linked with each other and are manifestation of the internal structure and tissue components which in turn, are influenced by environmental and genetic factors (Krishan, 2007).

Aim of the study

The aim of the study was to establish the influence of level of urbanization on the pattern of growth of school children aged 5-12 years from Kazaure emirate of northern Nigeria.

Materials and Methods

Materials

Stadiometer (Holtain Ltd., Crymych, Dyfed, UK),Sliding caliper (Ross craft Campbell 10 CAM 10 long bone caliper),Primary school pupils,Map of Kazaure emirate and the Map of Jigawa State.

Methods

Anthropometric assessment

All participants were randomly selected between the age of 5 and 12 years based on modified criteria (Vander Merwe, 1988)and their height, weights and BMIusing standard equipment. The heights were measured to the nearest 0.1cm andweight to the nearest 0.5kg respectively.

Location of the study

It was a cross-sectional survey. It involved four (4) local governments of Kazaure emirate (Kazaure, Roni, Gwiwa and Yankwashi Local Governments).From each local government, three towns with their primary schools were randomly selected and the exercise carried out.

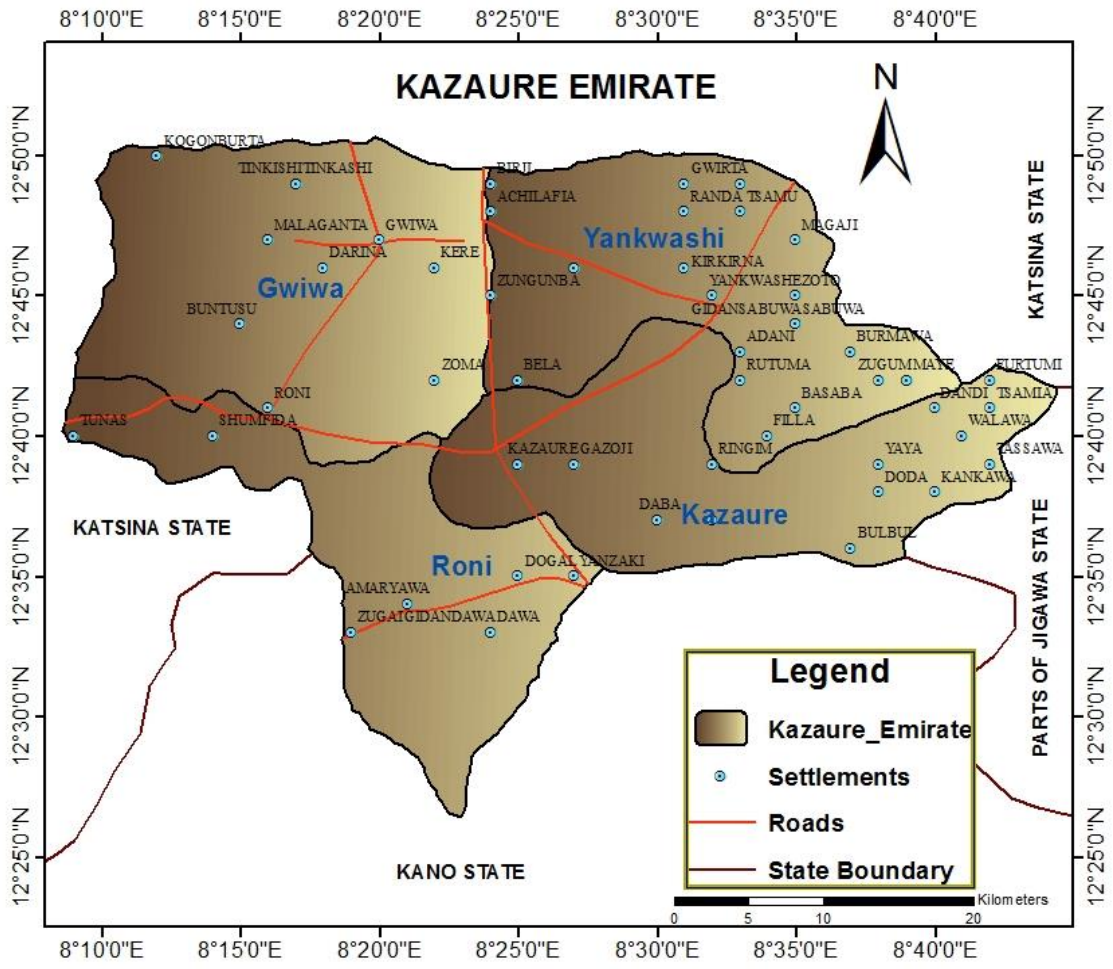

Figure 1: Modified Administrative map of Kazaure emirate (Jigawa State Ministry of Land and Survey).

Subjects

The sample population that participated in this study comprised of 863 primary school pupils randomly selected from public schools in Kazaure emirate.

Selection criteria

Participant must be in public primary school pupil, between 5-12 years of age, physically and apparently, mentally fit, from Kazaure emirateand ofHausa ethnic group up to grandparental level.

Statistical analysis

Data were expressed as mean and standard deviation (SD). Differences between boys and girls were tested using the students t– test. One-way analysis of variance (followed by Bonferoni Post Hoc test) was used to investigate the influence of socio-economic factor (urbanization) on the different anthropometric parameters. Statistical significant difference

was deemed acceptable at P<0.05. The data was analyzed using Statistical Package for Service Solutions(SPSS) version 20.0 (IBM Corporation, Armonk, NY).

Result

Tables 1 showed the descriptive statistics of male pupils who participated in this study. The result showed the minimum and maximum for age as 5.00 and 12.00 years, height as 99 and 150 cm, for weight as 10.90 and40.30kg, and for BMI as 8.27 and 20.44 kg/m^2 respectively. Similarly, their mean values were obtained to be8.56 ± 2.27 years,124±14.00 cm, 25.14±4.07kg and 15.64±1.52kg/m^2 respectively. Similarly, the descriptive statistics of female pupils showed the minimum and maximum for age as 5.00-12.00 years, height as 96.00 and 148.00 cm, for weight as 13.30 and 37.30kg, and for BMI as 11.54 and 20.08 kg/m^2 respectively. Similarly, their mean values were obtained to be 8.43 ± 2.34 years, 121.00±14.00 cm, 23.60±4.83 kg and 15.24±1.60 kg/m^2 respectively.

Table 2 showed sexual dimorphism between male and female pupils with males showing statistical significant difference in height, weight and BMI with p=0.01, p<0.001 respectively.

Table 1: Descriptive statistics of male and female pupils aged 5-12 years from Kazaure emirate

	Male (n= 432)		Female (n= 431)	
Variables	Mean ± SD	Min - Max	Mean ±SD	Min-Max
Age (years)	8.56 ± 2.27	5.00-12.00	8.43 ± 2.34	5.00-12.00
Height (cm)	124.00 ± 14.00	99.00 -150.00	121.00 ± 14.00	96.00-148.00
Weight (kg)	25.14 ± 4.07	10.90-40.30	23.60 ±4.83	13.30-37.30
Body Mass Index (kg/m^2)	15.64 ± 1.52	12.27-21.44	15.24 ±1.60	11.54-20.08

Table 2: Sexual dimorphism between male and female pupils from Kazaure emirate

Variable	Male (432) Mean±SD	Female (431) Mean±SD	t	p-value
Age (years)	8.56 ± 2.27	8.43 ± 2.34	0.818	0.414
Height (cm)	124.00 ± 14.00	121.00 ± 14.00	2.574	0.01
Weight (kg)	25.14 ± 4.07	23.60 ±4.83	3.756	<0.001
BMI (kg/m^2)	15.64 ± 1.52	14.24 ±1.41	3.999	<0.001

Figure 2 shows the pattern of growth in height of males from urban area was statistically significant than their semi-urban and rural peers ($p<0.001$) respectively. Figure 3 shows the pattern of growth in weight of males from urban area was statistically significant than their semi-urban and rural peers ($p<0.001$) respectively.Figure 4 shows the pattern of growth in body mass index of males from urban area was statistically significant than their semi-urban and rural peers ($p<0.001$) respectively. Figure 5 shows the pattern of growth in height of females from urban area was statistically significant than their semi-urban and rural peers($p<0.001$) respectively. Figure 6 shows the pattern of growth in weight of females from urban area was statistically significant than their semi-urban and rural peers ($p<0.001$) respectively.Figure 7 shows the pattern of growth in body mass index of females from urban area was statistically significant than their semi-urban and rural peers ($p<0.001$) respectively.

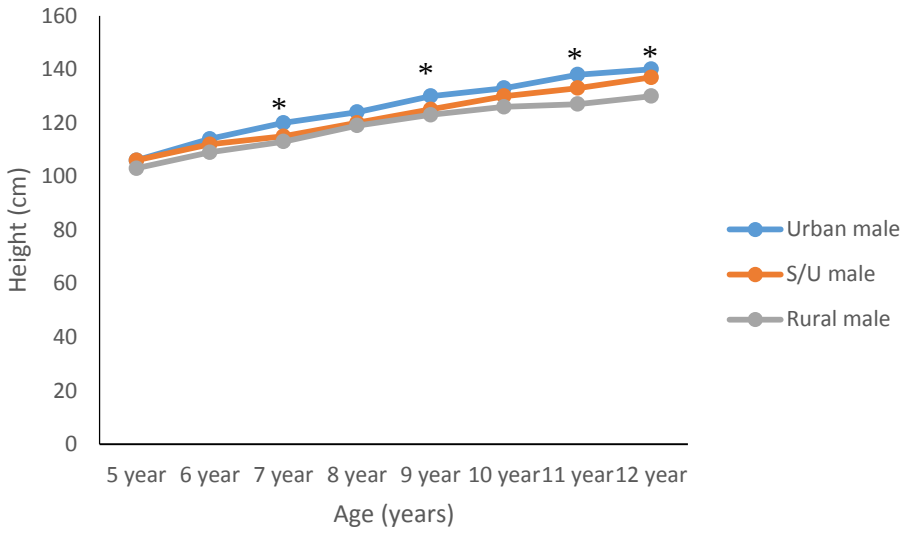

Figure 2: Pattern of height of male pupils aged 5-12 years from Kazaure emirate by level of urbanization

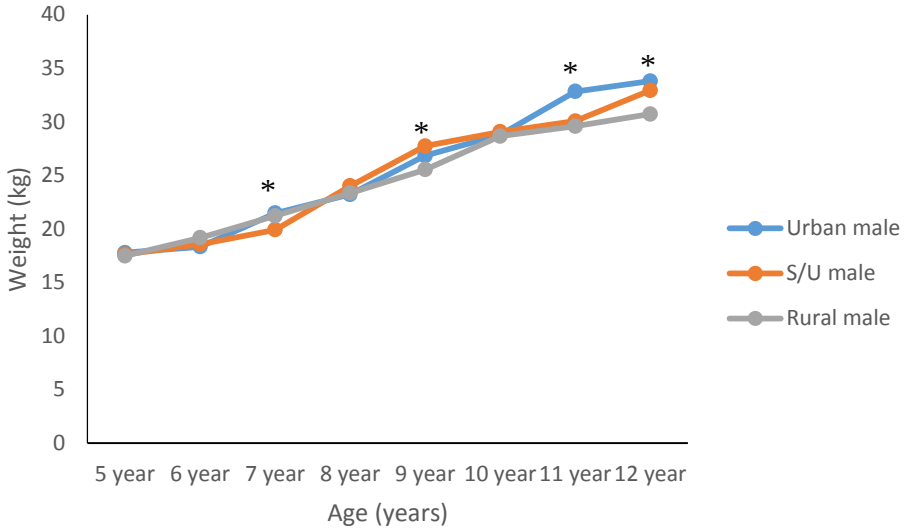

Figure 3: Pattern of weight of male pupils aged 5-12 years from Kazaure emirate by level of urbanization

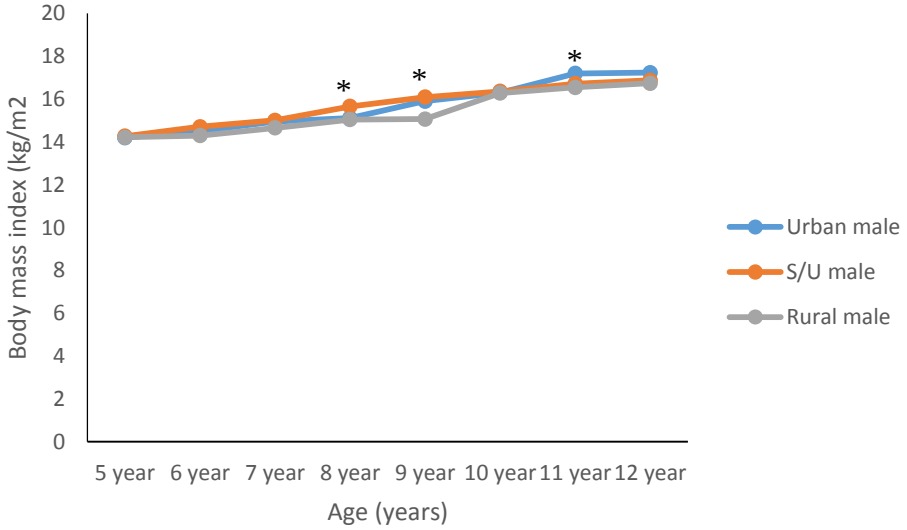

Figure 4: Pattern of body mass index (BMI) of male pupils aged 5-12 years from Kazaure emirate by level of urbanization.

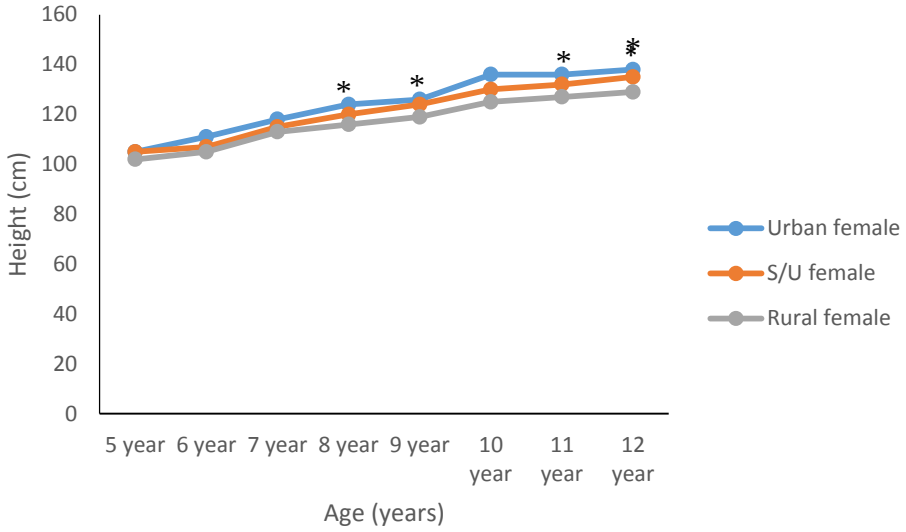

Figure 5: Pattern of height of female pupils aged 5-12 years from Kazaure emirate by level of urbanization.

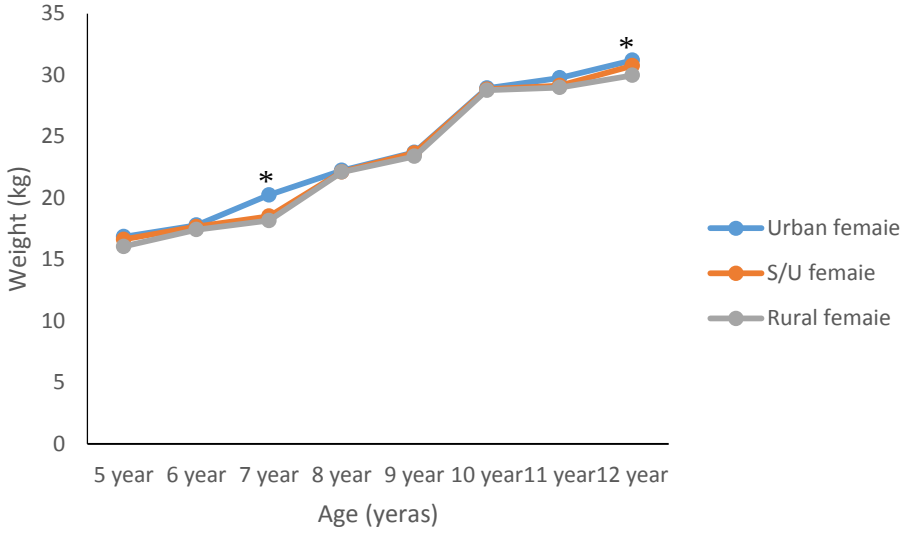

Figure 6: Pattern of weight of female pupils aged 5-12 years from Kazaure emirate by level of urbanization

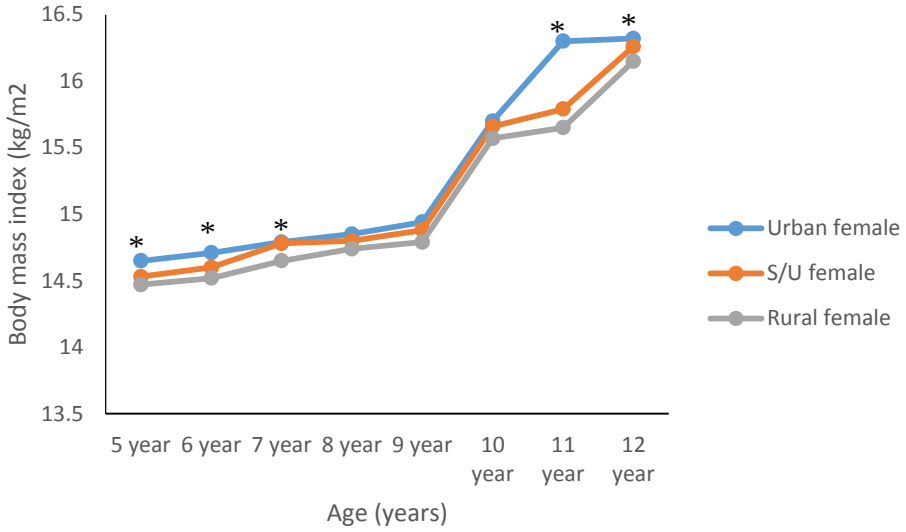

Figure 7: Pattern of body mass index of female pupils aged 5-12 years from Kazaure emirate by level of urbanization

Discussion

The anthropometric parameters of growth examined in this study population showed that the males had higher height, weight and BMI than females. These findings are in line with those of Pena Reyes et al (2002) in his report on Mexican children whereby the males had higher weight and BMI than the females, and Khalid *et al*(1997) in his reports from Bahraini adolescents that showed their males to have higher height and weight than the females. Ezekie *et al* (2015) reported that males have higher height than the females respectively. However, findings by Bolzan *et al* (1999) on the children of Buenos Aires, Argentina differ from those obtained in this present study whereby the females were found to be taller, heavier and had higher BMI than the males. This could be due to the fact that growth variation in geographical location. In general, children living in urban environments in developed countries reflect a better growth status than their rural peers. They have greater heights and weights for age and enter pubertal development at earlier ages (Bogin, 1988; Eleveth & Tanner,1991). Urban environments in developed countries are associated with higher socio-economic status (SES), greater opportunity for educational attainment, easier access to high quality health services and a lack of seasonal effects on food availability.

The variation in growth of the males to females was possibly due to genetic difference since all the subjects of the study live in the same environment and had the same access to equal social amenities and exposure to virtually the same economic situation.

Conclusion

This study showed that males had faster growth pattern by having higher height, weight and BMI than the females, thus indicating sexual dimorphism in growth and changes in body form. Similarly, urban children showed better growth than their rural peers.

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