

## ORIGINAL RESEARCH ARTICLE

# Explaining the Rapid Increase in Nigeria's Sex Ratio at Birth: Factors and Implications

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## Abstract

This paper examines the rapid increase in Nigeria's sex ratio at birth from 1.03 boys born for every 1 girl born in each year from 1996-2008 to 1.06 in each year from 2009-2014, second only to Tunisia in Africa at 1.07. The average sex ratio at birth in the world in 2014 was 1.07. In most Black African nations or Black majority nations, it is 1.03 or less. Among the factors presented for this development are: historical fluctuations of sex ratio at birth; geography and ethnicity; male preference/chasing a son; Age of parents; high death rates of male infants and males in general; and wealth/socioeconomic status. Among the potential implications are: young and poor men in Nigeria may not be able to find brides and form families due to a potential shortage of females; emigration of young and poor Nigerian men to West (Africa) and elsewhere to seek brides and form families; immigration of marriage age women from West (Africa) and around the world to Nigeria to seek husbands; and low contraceptive use and high fertility rates in Nigeria. (*Afr J Reprod Health 2015; 19[2]: 17-33*).

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**Keywords:** age; ethnicity; historical fluctuations; infant mortality; male preference; region; socioeconomic status.

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## Résumé

Cet article examine l'augmentation rapide de les proportions des sexes à la naissance au Nigeria à partir de 1,03 garçons nés pour chaque fille née e chaque année de 1996 à 2008 à 1,06 chaque année de la période 2009-2014, en second lieu seulement à la Tunisie en Afrique à 1,07. La proportion des sexes à la naissance dans le monde en 2014 était de 1,07. Dans la plupart des pays d'Afrique noire ou des nations dont la majorité de la population est noire, il est de 1,03 ou moins. Parmi les facteurs présentés pour ce développement sont les suivants: les fluctuations historiques des proportions des sexes à la naissance; la géographie et l'origine ethnique; la préférence pour les garçons / la recherche d'un fils; l'âge des parents; le taux de mortalité élevé de bébés de sexe masculin et les hommes en général; et de la richesse / la condition socio-économique. Parmi les implications potentielles sont: les hommes jeunes et pauvres au Nigeria peuvent ne pas être en mesure de trouver des épouses et de former des familles en raison d'un risque de pénurie de femelles; l'émigration des jeunes et des pauvres hommes nigériens en Afrique de l'Ouest et d'ailleurs à rechercher les épouses et de commencer les familles ; l'immigration des femmes en âge de mariage de l'Afrique de l'Ouest et dans le monde au Nigeria pour chercher des maris; et une faible utilisation de la contraception et des taux de fécondité élevés au Nigeria.. (*Afr J Reprod Health 2015; 19[2]: 17-33*).

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**Mots clé :** âge, ethnicité, fluctuations historiques, mortalité infantile, préférence pour les garçons région, état socio-économique.

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## Introduction

One of the most important phenomena pertaining to human creation is the fact that regardless of race or ethnicity, the sex ratio at birth data shows more males born than females. As of 2014, the average sex ratio at birth in the world was 1.07 boys born for every 1 girl born. In 2014, the sex ratio at birth in China was 1.11; 1.12 in India; 1.06 in the European Union; and 1.05 in the United States<sup>1-5</sup>.

Another important phenomenon pertaining to this topic is that regardless of geographic location, the sex ratio at birth data show that Black females give birth to fewer boys than non-Black females. For example, in 2008, while the average sex ratio at birth in the world was 1.06, it was 1.03 in Black African nations, Black America (in 2003), and in 2006 it was 1.03 or lower for Black nations or Black majority nations of the Caribbean such as Anguilla (1.03), Bahamas (1.02), Barbados (1.01),

Cayman Islands (1.02), Grenada (1), and Haiti (1.03). This was the case for the most populous and the least populous Black majority nations in the world<sup>6,7,2,8-12</sup>. Citro et al. present a list of the 13 nations with sex ratio at birth above the standard range, from 1.08 to 1.26 as of April 2014, and no Black African nation or a Caribbean nation with a Black majority is among them. They also present another list of nations with the lowest sex ratio at birth below the standard range, from 0.94 to 1.02 as of April 2014, and 4 of them are in sub-Saharan Africa (Kenya, Malawi, Mozambique, and South Africa, all at 1.02); 4 nations are Black majority countries in the Caribbean (Barbados and Haiti at 1.01; Cayman Islands and Saint Kitts and Nevis, at 1.02). There is also one Caribbean nation, Puerto Rico, with a substantial Black population, with sex ratio at birth data of 1.02<sup>2</sup>. Egwuatu points out that the sex ratio at birth was 1.03 "...reported for Zaire and for the black populations of the US and the Caribbean..." (p.399)<sup>9</sup>.

There is a new development, however, whereby Nigeria, the most populous Black nation in the world has experienced a rapid increase in its sex ratio at birth data from 1996-2008 to 2009-2014. For example, in each year from 1996-2008, the sex ratio at birth in Nigeria was 1.03 boys born for every 1 girl born. However, in each year from 2009-2014 that figure increased to 1.06 boys born for every 1 girl born<sup>69</sup>. This new development is not the case for most other Black nations or Black majority nations, large or small.

Most nations in Africa, especially in sub-Saharan Africa tend to possess many similar characteristics. Indeed, it is those similar characteristics that these nations share that caused the need for this study because Nigeria has suddenly deviated from the norm of having a sex ratio at birth of 1.03 to 1.06. What has changed in Nigeria in the period from 2009-2014 that has caused such a rapid increase in its sex ratio at birth data? It is likely that the various factors presented below in this paper may contribute to answering that question. One such factor presented below is geography and ethnicity. Nigeria's massive population and geographic size are not like most African nations. Therefore, the hundreds of relatively large ethnic groups, in addition to the geographic vastness of the country could result in

changes in sex ratio not observed in other sub-Saharan African nations. Another factor presented is the age of parents at birth. Nigeria is relatively younger than most countries in Africa, with over four out of every ten people (41.2%) below the age of 15, but 40.8% average in Africa. This is connected to another factor presented that could have been a level of change not experienced in other African nations in the past several years – Nigeria's relatively high total fertility rate (5.3 children born per woman), compared with an average of 4.1 children born per woman in Africa. Nigeria's total fertility rate is not declining as fast as other African nations.

This paper examines the rapid increase in the sex ratio at birth data of Nigeria from 1.03 in each year from 1996-2008 to 1.06 in each year from 2009-2014. The paper begins by presenting sex ratio at birth data for African nations for 2008 and 2014 and illustrates that while the rates have remained the same or even declined for a number of Black African nations, the rate for Nigeria shows a sharp increase. Next, the paper presents some factors that may be contributing to this new development. Finally, the paper presents some potential implications as a result of this development.

#### ***Sex Ratio at Birth Data for African Nations: 2008 and 2014***

Tables 1 and 2 (in appendix) present sex ratio at birth data for African nations for 2008 and 2014. According to Table 1, five of six North African nations have 2008 sex ratio at birth data of 1.05 (Algeria, Egypt, Libya, Morocco, and Sudan), and the sixth, Tunisia at 1.07. For sub-Saharan African nations, Mauritius, Reunion, Angola, and Saint Helena each has sex ratio at birth of 1.05, and Chad has a figure of 1.04. All of the remaining nations of sub-Saharan Africa have a sex ratio at birth rate of 1.03 or lower, with Nigeria at 1.03 (Table 1).

Table 2 shows that in 2014, five of seven nations of North Africa have a sex ratio at birth rate of 1.05 (Algeria, Egypt, Libya, Morocco, and Sudan), the sixth, Tunisia at 1.07, and the seventh, Western Sahara at 1.04. For sub-Saharan African nations, Mauritius, Reunion, Angola, Benin, and

Saint Helena each has sex ratio at birth of 1.05. Chad has a figure of 1.04. Nigeria has the highest rate in sub-Saharan Africa and the second highest on the entire continent (1.06). All of the remaining nations of sub-Saharan Africa have a sex ratio at birth rate of 1.03 or lower (Table 2).

As Table 2 shows, Nigeria is Africa's most populous nation, with its 177.2 million people accounting for 15.9% of the 1.117 billion people in Africa in 2014. Nigeria is also the most populous Black nation in the world. This makes it a very important development that needs some examination. What are the factors responsible for the 0.03 points increase in Nigeria's sex ratio at birth rates in each year from 1996-2008 to each year from 2009-2014?

### ***Factors Contributing to the Rapid Increase in Nigeria's Sex Ratio at Birth (1996-2008 and 2009-2014)***

A number of possibly interrelated factors could be contributing to what appears to be Nigeria's unusually high current sex ratio at birth. The following are examined as potential factors contributing to the rapid increase in the sex ratio at birth in Nigeria: (1) historical fluctuations of sex ratio at birth; (2) geography and ethnicity; (3) male preference/chasing a son; (4) Age of parents (5) high death rates of male infants and males in general; and (6) wealth/socioeconomic status.

### ***Historical Fluctuations of Sex Ratio at Birth***

A careful examination of the sex ratio at birth data published over the past four decades reveals that regardless of race, ethnicity, nationality and geographic location, whether it is due to the environment at the time or nature, sex ratio at birth tends to go through periods of highs and lows. For example, the study by Davis et al. find that from 1970 to 1999 Japan's sex ratio at birth declined from 0.5172 to 0.5135. In the United States, the sex ratio at birth declined for non-Hispanic Whites from 0.5143 in 1970 to 0.5122 in 2002. For non-Hispanic Blacks, it increased from 0.5076 in 1970 to 0.5079 in 2002 (pp.942-943)<sup>8</sup>. Garenne claims that the sex ratio at birth in Korea between 1921

and 1929 was 1.13<sup>10</sup>. According to the 2014 CIA World Fact book, the sex ratio at birth in 2014 in South Korea was 1.07 and 1.05 in North Korea<sup>1</sup>.

Garenne continues by claiming that the sex ratio at birth in France from 1900 to 1913 was 1.041; 1.064 from 1918 to 1920; 1.051 in 1921; 1.038 in 1941; 1.059 from 1942 to 1948; 1.053 in 1949; 1.046 in 1963; 1.055 in 1972; and 1.051 in 1999 (pp.889-890)<sup>10</sup>. According to the 2014 CIA World Fact book, the sex ratio at birth in 2014 in France was 1.05<sup>1</sup>. Garenne also points to a 1967 study that claims that the sex ratio at birth in the Democratic Republic of Congo (former Zaire) was 0.978 (p.890)<sup>10</sup>. In a table entitled: "Sex Ratios at Birth in 56 Demographic Sample Survey" of African countries, Garenne shows that in 1982, the survey for Benin shows a sex ratio of 1.037; 0.981 in Botswana in 1988; 1.048 in Cameroon in 1978; 1.051 in Liberia in 1986; 1.059 in Burundi in 1987; 1.044 in Ghana in 1979; 1.053 in Guinea in 1999; 1.078 in Mali in 1987; 1.068 in Madagascar in 1997; 1.053 in Niger in 1992; 1.045 in Senegal in 1986; 0.992 in Rwanda in 1992; 0.994 in Uganda in 1988; and 0.993 in Zambia in 1992 (pp.892-893)<sup>10</sup>. Egwuatu notes that sex ratio at birth "...values of 1.12-1.14 [have been] observed among Africans of Uganda and Cameroon" (p.399)<sup>9</sup>. Garenne's study of the World Fertility Survey (WFS) and the Demographic and Health Surveys (DHS) conducted between 1977 and 2006, included 2,000,812 recorded births in 33 sub-Saharan African nations with 85% of their populations. "Two surveys were conducted in Ethiopia, both with high sex ratios (1.074, 1.092)" (pp.474-475)<sup>11</sup>.

Nigeria could be experiencing these historical fluctuations as the nations mentioned above. Tables 1 and 2 show that Nigeria's sex ratio at birth increased from 1.03 in 2008 to 1.06 in 2014. Garenne points to research that claims that "...in Nigeria the sex ratios were higher than elsewhere in Africa (>1.050)..." (p.474)<sup>11</sup>. The table in Garenne's study entitled: "Sex Ratios at Birth in 56 Demographic Sample Survey" of African countries, shows that the survey in Nigeria had a sex ratio at birth in 1982, 1990, and 1999 of 1.121, 1.070, and 1.104, respectively (p.892)<sup>10</sup>. Garenne's study shows that: "Four surveys were conducted in

Nigeria, all with high sex ratios (1.121, 1.070, 1.104, 1.068)” (pp.474-475)<sup>11</sup>.

### **Geography and Ethnicity**

The data presented above in this paper so far illustrate that geography in the context of different continents and countries, and race are contributing factors to the differences in sex ratio at birth data among the peoples of the world. In fact, in the case of geography, specifically pertaining to different countries or continents, studies have shown this to be the case<sup>13,2,7,14</sup>.

Within Africa, especially sub-Saharan Africa, the data presented above show that while most of the countries have similar sex ratio at birth data, there are still some visible differences<sup>10,11</sup> (Tables 1 and 2). Garenne points to a 2002 study that claims that, “...southern and eastern Africa had lower sex ratios than the average and that Ethiopia was also a typical in Africa, with higher values” (p.474)<sup>11</sup>. Garenne’s study finds that:

*“When the sex ratios at birth were computed for each of the 33 countries, they were significantly different from the average in 12 countries.... When grouped into three categories, no country had a sex ratio different from the average of its group (with the exception of Burundi, which had a small sample size), ... The first group includes countries on or south of the equator populated primarily by Bantu groups: Botswana, Burundi, Congo, Gabon, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Uganda, Tanzania, Zambia, and Zimbabwe. The second group includes most countries in West Africa or in the Sahelian band: Benin, Burkina-Faso, Cameroon, Central African Republic, Chad, Cote d’Ivoire, Ghana, Guinea, Liberia, Mali, Niger, Senegal, Sudan, and Togo. It also includes two islands located in the Indian Ocean: the Comoros and Madagascar. The third group includes two atypical countries with high sex ratios: Nigeria and Ethiopia” (p.475)<sup>11</sup>.*

Within Nigeria, to determine whether geography is a contributing factor to the rapid

increase in its sex ratio at birth, it is important to link it with ethnicity because in African nations, ethnic groups tend to reside in particular geographic regions<sup>13,9,15</sup>. As Egwuatu points out “... the sex ratio at birth is influenced by geographic and genetic distribution” (p.399)<sup>9</sup>. Garenne points out that sex ratio at birth rates “... were higher in northern Nigeria than in southern Nigeria” (p.474)<sup>11</sup>. Ayeni’s study of sex ratio at birth records for seven years of the Yoruba ethnic group of Southwestern Nigeria shows that: “Among 548 558 hospital live births the male proportion was 51.37%, while vital registration records for one urban and one rural town showed a figure of 51.39% in 315 735 live births. Of the total 864 331 live births, the overall proportion was 51.4 ± 0.05%...” (pp.137-141)<sup>13</sup>. Rehan’s study of sex ratio at birth of infants of the Hausa ethnic group in Katsina province of Nigeria examined data from 1961 to 1980 and finds that for 1,113,313 live births, the sex ratio ranged from 1.05 to 1.11, and the mean was 1.07. Another data from the records of the Maternity Hospital for 5,780 live births from 1976 to 1980, showed sex ratio of 1.2. “The results are consistent with other reports based on hospital deliveries from other parts of Africa, including: a sex ratio of 1.06 for births in Lagos City, 1.05 in Igbo-ora, 1.06 in Ibadan...” (pp.163-167)<sup>15</sup>. In a study of sex ratio at birth of infants of the Igbo ethnic group of Southeast Nigeria, Egwuatu claims that:

*“Data were drawn from the 1973 record of registered live births from hospitals, health centers, and maternity homes among Igbos; records of live births in Anambra State in 1976-79; and live births at the University of Nigeria Teaching Hospital in 1976-82. Of the 31,685 Igbo infants born at the University of Nigeria Teaching Hospital in 1976-81, 16,389 were males and 15,296 were females, giving a sex ratio of 1.07. The sex ratio of the 5,905 live births recorded at the hospital from July 1981-June 1982 was 1.08.... Of the 70,662 births recorded at all medical institutions in 1973, 36,104 were males and 34,648 were females, for a sex ratio of 1.039 (1.07 for hospital deliveries, 1.037 for deliveries in maternity homes, and 1.02 for births in*

*community health centers). Finally, of the 184,352 live births registered in Anambra State in 1976-79, 93,916 were males and 90,436 were females, giving a sex... (ratio) of 1.038. These findings suggest a sex ratio at birth for Igbo infants of about 1.04. ... this figure is lower than ... the 1.06 and 1.07 ratios reported for the other 2 [largest] ethnic groups in Nigeria (the Yorubas and Hausa-Fulanis, respectively)...” (pp.399-402)<sup>9,6</sup>.*

The examples presented in this section of this paper substantiate the claim by many scholars that there are geographic differences in the sex ratio at birth data among continents, countries, regions within countries, racial groups, and ethnic groups. The sex ratio at birth data for the various regions, cities and ethnic groups of Nigeria help to explain why that nation's sex ratio at birth data has increased on average by 0.03 points from 1996-2008 to 2009-2014. This is understandable because Nigeria is not just a very populous nation, but also geographically relatively large. For example, according to the 2014 CIA World Fact book, the total area of Nigeria is 923,768 sq km (slightly more than twice the size of California): 910,768 sq km of land; and 13,000 sq km of water<sup>1</sup>. This means that although all Nigerians are under one flag and carry one passport, the geographic vastness of the country can make the various characteristics of the people in each region seem like they reside in different countries. Nigeria shares a land border with Cameroon, Benin, Chad and Niger. This means that Nigerians residing in the border towns or cities next to each of these countries might have different cultural and physiological characteristics from the others.

### ***Male Preference/Chasing a Son***

There appears to be an almost universal desire among parents and families all over the world who prefer to have a son or sons rather than a daughter or daughters. It has been claimed that this is especially the case among many cultures in Africa and Asia. Some of the explanations for parents

desiring sons are that a son can take the last name of the father or family and continue the line of descent by inheriting a household. In most cultures, sons are the ones most likely to inherit any family accumulated wealth or property. Mothers in many societies believe that their sons would provide for them or take care of them during old age. A daughter, the argument goes, will eventually get married and leave her parents' household for her husband's household and also take the last name of her husband. So some believe that parents can get their investments back from a son, but would get little or nothing back from their daughter because they would eventually lose her to her husband and his family<sup>16-19</sup>.

This male preference, it is claimed is so serious that parents or families in different parts of the world end up practicing sex selective abortion, with China and India the two countries commonly cited as examples of this phenomenon<sup>2,20,21,19,5</sup>. It has also been noted that this phenomenon is practiced in Africa. For example, Navara claims that, "...gender selection through preferential induced abortions of males or females ... has been reported in many Asian and African countries" (p.2)<sup>14,22</sup>.

However, a careful examination of this topic finds that while there is a significant number of scholarly publications substantiating the claim that expected mothers in Nigeria tend to prefer sons, there was no evidence found that they seek, or performed sex selective abortion, even as hundreds of thousands of abortions are performed annually in Nigeria<sup>23,16,24-27</sup>. In their study that surveyed 134 Nigerian health professionals in a health institution in 'South Western Nigeria', Adeyemi et al. find that 54 (40.3%) of them strongly agreed that sex selective abortion is violence against women; 34 (25.4%) agreed; 21 (15.7%) were uncertain; 14 (10.4%) disagreed; and 11 (8.2%) strongly disagreed (pp.719-722)<sup>24</sup>. According to Maaji et al., governments across the world have banned "prenatal fetal sex determination" as a result of their fear of sex selective abortion. However, "This certainly is not the experience in Nigeria for most of the reasons for seeking prenatal fetal gender are innocuous" (p.12)<sup>26</sup>. It is also noted that sex selective abortions are performed across countries in the world, "... to discriminate in

favour of boys. But not in Africa. Nigeria's sex ratio at birth is the natural one: 106 boys are born for every 100 girls...<sup>28,18</sup>.

Awopetu and Fasanmi claim that: "In Nigeria about 760,000 abortions occur annually despite the country's restrictive abortion law" (p.4263)<sup>25,29,30</sup>. Moreover, if it were not policies supported by western countries, abortion rates in Africa would be a lot less<sup>31</sup>. In a study that surveyed 201 pregnant women in Nigeria who wanted to know their fetal sex, none said they intended to abort the child if the child was a male or a female<sup>26</sup>. The research study by Sedgh et al. surveyed 2,978 Nigerian women age 15-49 in eight states, and found that 28% of them had experienced unwanted pregnancy in their lives, and that of this group 51% (14% of the 2,978 total) had sought to terminate the pregnancy through an abortion. However, of the many reasons provided for termination of the pregnancy (such as being unmarried, birth spacing, economic issues, too young, still in school or problems with their partner), none was for the sex of the child as a female or a male (pp.178-179)<sup>27</sup>. In their study of contraceptive use, unwanted pregnancy, and induced abortions in Southwest Nigeria, Omideyi et al. find that: "Abortion is usually resorted to because pregnancy was unwanted due to incomplete educational attainment, economic hardship, immaturity, close pregnancy interval, and social stigma" (p.552; also see Mitsunaga et al.)<sup>32</sup>.

There is evidence, however, that females or women in Nigeria tend to chase a son, meaning that they would continue to have children until they give birth to a boy<sup>28,18</sup>. According to a study focusing on son preference, fertility and family structure in Nigeria, Milazzo notes of the phenomenon in countries around the world of "...son-preferring fertility behavior (or son-preferring stopping rules) in which women with girls among earlier-born children are more likely to continue having children and to have shorter birth intervals" and finds in the study that: "...compared to women who had a first-born boy, women with a first-born girl exhibit a 2% increase in the number of children ever born" (p.3)<sup>18</sup>. Coney and Mackey conducted a study that surveyed 632 successful men in the United States

including U.S. presidents, listed in the 1975 *Who is Who in the United States* about the sex ratio of their children. They claimed that: "Conceptions of sons tended to occur more often when there was a greater interval between adjacent conceptions: a daughter-daughter tandem occurred in significantly shorter birth intervals" (p.174)<sup>3</sup>.

An observer might note that male preference or male chasing could actually lead to more girls born in Nigeria because females or women continue to have girls until they have a boy. This can be the case. On the other hand, since the average sex ratio at birth in Nigeria is 1.06 or even at the previous rate of 1.03, more boys are born than girls. It is among a sub-set of females or women who may be highly likely to give birth to girls that male chasing might be more prevalent. Also, one could observe that without this sub-set of females or women who chase a son, the proportion of births to girls could be smaller, because their experience leads to more births to girls.

### *Age of Parents*

Researchers have pointed out that age is a contributing factor to the sex ratio at birth data favoring males. They claim that the younger both the mother and father are, the more likely they would give birth to more boys, or the older they are, the more likely they would give birth to a girl<sup>11,7,33</sup>. Kaba quotes a 1997 work in which the author claims that: "Parental age has also been shown to affect the sex ratio. ... as paternal age increased, the sex ratio decreased" (p.146)<sup>11</sup>. Wadley and Martin point to a 1994 study that "...finds a strong, statistically significant tendency for sex ratios to decline with maternal age" and they also cite a 1987 study that finds "...sex ratios at birth declining with increasing paternal age" (pp.79-80)<sup>33</sup>.

Nigerians are among the youngest human beings in the world. For example, as of 2014, while 40.8% of Africa's 1.117 billion population was under the age of 15, it was 42.2% of the 177 million Nigerians under the age of 15<sup>1</sup>. In Nigeria, like in a high number of African nations, substantial proportions of females marry and start having children at an early age.

Ugoji points out that “It is presumed in general, that women in Africa get married at much earlier ages than women elsewhere leading to pregnancies at earlier age” (p.4126)<sup>34</sup>. Oyefara points to a 1998 government report in Nigeria which claims that among young Nigerians 10 to 14 years old, 7.5% of females and 4% of males had been married (p.3985)<sup>35,36</sup>. Ugoji claims that sub-Saharan Africa has the highest teen pregnancy rate in the world and cites a 2003 report that puts the figure at 143 per 1,000 girls aged 15-19 (p.4126)<sup>34</sup>. Ugoji cites a 2008 report that: “...showed that the teen pregnancy rate, globally, as surveyed in 2002, was 1.5% to 1.9% and that it has been increasing rapidly with the highest occurrence in Nigeria (87%)”, and a 1999 study claims that 40% of Nigerian secondary school teenage girls have been pregnant at least one time (p.4126)<sup>34</sup>. Oyefara cites a 1992 study which claims that by age 20, half of Nigerian women have become mothers; 10% to 12% have a child by age 15; and 21% to 28% have a child from 15 to 17 years old. Also, a 1999 survey shows that the fertility rate of Nigerian females/women aged 15 to 19 was 111 births per every 1,000 of their population (p.3985)<sup>35</sup>.

The study by Garenne substantiates the claim that the younger the parent, the higher the chances of giving birth to a boy, claiming that a mother’s age when she gives birth to a child has a significant effect on the sex of the baby, predicting a value of 1.048 when the mother is 15 years old and 0.998 when the mother is 49 years old. For females aged 12-19, with average births of 1.50, the sex ratio ranged from 1.091 at 12 years old to 1.039 at 19 years old. For women 20 to 39 years old, with average age of 26.5 years, their sex ratio “... varied from 1.033 for the second birth to 1.019 for the eighth birth. For women age 40–49 years, who on average had 8.5 births, the sex ratio varied from 1.014 at age 40 to 0.983 at age 49” (pp.475-477)<sup>11</sup>.

The age related examples presented in this section of this paper contribute to explaining why the sex ratio at birth in Nigeria has increased from 1.03 in each year from 1996-2008 to 1.06 in each year from 2009-2014. Nigerians, both males and females are among the youngest human beings in the world. The evidence shows that a substantial number of them tend to get married and have

children at an early age. Those who are not married also tend to have children at an early age. The research shows that the younger parents are, the more likely they would give birth to a son. In addition to the massive number of Nigerians, especially young Nigerians, the median age in Nigeria is 18.2 years; 20.8 years average in Africa; and world average of 29.7 years<sup>1</sup>. All of these age related factors could have contributed to the sharp increase in Nigeria’s sex ratio at birth.

One could claim that it is common for people to experience early marriage in all countries in Africa, and not just in Nigeria. What then is different in Nigeria in recent years? One potential answer to this question is that there might be a certain uniqueness to Nigeria’s demographics. Due to demographics, there could have been a sustained relatively substantial numbers of younger parents who tend to give birth to males. This is because even if the proportion of young Nigerian girls who marry early remains stagnant, the rapid increase in the country’s population means that in absolute numbers there are more such marriages. While females or women have children in Nigeria without being married, research shows that most of those who do are married or had once been married. This may not be the exact situation in other African nations because they are getting a little older on average than in Nigeria. Moreover, females with a first child at a younger age are more likely to have larger numbers of children. There is also an education component connected to demographics. Although the proportion of Nigerians with at least some formal education is increasing, the rapid and massive population increase means that a large number of people in that nation do not have formal education, which could be linked to early marriage and many births to children.

The study by Emelumadu et al. examining when parents in Nigeria start discussing sex with their adolescent children finds that, those parents’ average suggested age for their daughters to marry is 22.4 years (p.296)<sup>70</sup>. The study by Gayawan and Adebayo on age at first birth in Nigeria shows that less than 15 years old, a female would give birth to seven or more children, and they accounted for 31% of the study sample. As age increases, the total number of children decreases. For women

with first birth at age 25, only 8.3% of them had seven or more children (pp.1352-1353; also see Oyefara, 2015)<sup>71</sup>. The study by Ayotunde et al. on maternal age at first birth "... revealed 64.3% prevalence rate of early childbirth with 18.6 years as mean age at first birth" (p.12)<sup>63</sup>.

The study by Adebimpe examines marriage patterns and fertility among women in Southwest Nigeria ( a sample size of 1,024), and finds that their mean age was 19.6 years for those who resided in rural areas, and 22.6 years for those who resided in urban areas. Those aged 15 to 24 comprised the highest proportion of survey respondents: 40.2% in rural areas and 39.6% in urban areas; 21.5% of rural respondents had no formal education, compared to 7.4% of those in urban areas. Of the women from rural areas, 90.4% married between 20 and 29 years, while it was 72.4% for women in urban areas who married from 20 to 29 years. Ninety one percent of women in rural areas and 80.9% of those in urban areas were married. Almost 52% (51.8%) of women in rural areas married for the first time from 15 to 24 years (but 18 years average for entire sample), and the figure was 23% for women in urban areas (but 19.5 years for entire sample) (pp.143-148)<sup>72</sup>.

A study by Olatoregun et al. analyzed the differences in fertility in Ghana and Nigeria. The sample size for Nigeria is 33,385 females aged 15 to 49 and 4,916 females in Ghana aged 15 to 49: 72% of the females in Nigeria were married, compared to 60% in Ghana; females aged 15 to 24 accounted for 38% of Nigerians and 38.8% in Ghana; 68.6% of the females in Nigeria resided in rural areas, compared to 56% of those in Ghana; 35.8% of females in Nigeria had no formal education, compared to 25.3% in Ghana; 21% of the females in Nigeria were first married under 15 years old, compared to 6.2% of females in Ghana; 11% of females in Nigeria had their first intercourse under age 15, compared to 6.4% of females in Ghana; and 59.3% of females in Nigeria said their ideal number of children was more than 4 children, compared to 33.4% of females in Ghana (pp.39-40)<sup>73</sup>.

### ***High Death Rates of Male Infants and Males in General***

One must not omit the possibility that among the

factors that have led to a sharp increase in the sex ratio at birth in Nigeria is that parents in that nation are attempting to provide a sort of insurance of having at least one male child because male infants, regardless of race, ethnicity or geographic location tend to die at an early age than their female counterparts. Although there are more males born than females, by age 65 and over, however, there are more women than men in almost all nations<sup>28,7,18</sup>. Kaba points out that in countries all over the world, more males than females are born at birth. However, from the moment they are born, girls tend to outlive their male counterparts. In the under 15 years old population, there are more males than females in almost all countries (p.140)<sup>7</sup>. Kaba (2008) quotes a scholar who claims that: "Even when a boy manages to be born, he's still behind the survival eight ball: he is three to four times more likely than girls to have developmental disorders like autism and dyslexia; girls learn language earlier, develop richer vocabularies and even hear better than boys. Girls demonstrate insight and judgment earlier in adolescence than boys, who are more impulsive and take more risks than their sisters. Teenage boys are more likely to commit suicide than girls and are more likely to die violent deaths before adulthood" (p.140)<sup>7</sup>. It is also explained that since sex selective abortion is not responsible for Nigeria's relatively high sex ratio at birth of 1.06 favoring boys and, since "...boys are more vulnerable to infant diseases, so this ratio ensures that equal numbers of the sexes reach puberty..."<sup>28</sup>.

In 2014, of the 7.174 billion people in the world, 956.4 million (13.3%) were males aged 15 and younger and 893.6 million (12.5%) were females aged 15 and younger. In 2014, there were 265.5 million men and 331.2 million women in the world aged 65 and over. The infant mortality rate for males in the world in 2014 was 38.5 deaths per 1,000; and 34.5 deaths per 1,000 for females<sup>1</sup>.

Discussing this topic from the perspective of parents in Africa, Milazzo points out that: "... male children are biologically weaker than females and more likely to die at birth and in infancy... As mothers tend to replace a dead child by having more children, those with a first-born boy will thus have more children than they would have had if

there were no biological gender differences in infant mortality” (p.13)<sup>18</sup>. In 2014, the average infant mortality rate in Africa was 53 deaths per 1,000: 58 deaths per 1,000 for males and 48 deaths per 1,000 for females. In Nigeria in 2014, it was 74.1 deaths per 1,000 for both sexes: 79 deaths per 1000 for males and 69 deaths per 1,000 for females. The average life expectancy in Africa in 2014 was 61 years: 59.3 years for males and 62.6 years for females. For Nigeria, in 2014, the life expectancy was 52.6 years: 51.6 years for males and 53.7 years for females. In 2014, 3.5% of Africa’s 1.117 billion people were aged 65 and over: 17.74 million men were aged 65 and over; and 21.6 million women were aged 65 and over. For Nigeria, in 2014, 3% of its 177.2 million population was aged 65 and over: 2.6 million men; and 2.9 million women<sup>1</sup>.

### ***Socioeconomic Status/Wealth***

Scholars have also noted that one’s wealth or socioeconomic status tends to impact sex ratio at birth favoring males or sons<sup>16,3,9</sup>. Egwuatu suggests “... a possible role for socioeconomic status” in the sex ratio at birth study of Igbo infants in Nigeria (p.399)<sup>9</sup>. In their study of the regional differences in the child’s gender preference (CGP) among women in Nigeria, Adebowale et al. point to research that: “... revealed that the women from richer homes have higher CGP particularly for males than those from poorer homes” (p.5881)<sup>16</sup>. In a study on sex ratio at birth and mortality, Dama claims that a country that has a higher gross domestic product is also in a position to: “...afford better education and medical services, leading to reduced mortality and extended life expectancy, which may indirectly lead to increased son births, by enhancing the parental investment ability” (p.4)<sup>4</sup>. The study of Coney and Mackey of the sex ratio at birth of successful men in the United States finds that the wives of U.S. presidents tend to give birth to sons, and that: “More affluent Mormon men had more wives and a higher proportion of sons” (p.174)<sup>3</sup>. The data tend to suggest that “... if a woman has, within her own referent social group, marginally increased levels of resources from her husband, she translate those incremental resources to a son”

(p.174)<sup>3</sup>. Oladeji and Ariyo find in their study examining the socioeconomic factors that influence mate selection among adolescents of reproductive age in Nigeria that: “The results further indicated the significant position between income level and mate selection ... and social factors and marriage partner... (p.6145)<sup>74</sup>.

This brings us to an explanation that Nigeria’s recent economic achievements could be potentially contributing to the increase sex ratio at birth in that nation. In the period from 2008 to 2013, Nigeria and many African nations have experienced visible gains in their economies, including a steady increase in the number of known millionaires and billionaires in the country. Africa’s total Gross Domestic Products (GDP) in 2008 was \$2.652 trillion, with per capita GDP of \$2,660<sup>37</sup>. Africa’s total GDP in 2013 was estimated at \$3.5374 trillion. Its per capita GDP was \$3,167 (\$3.5374 trillion divided by 1.0998 billion people in Africa in 2013)<sup>1,38</sup>. In 2008, Nigeria’s GDP was \$338.1 billion, with per capital GDP of \$2,300<sup>37</sup>. In 2013, Nigeria’s GDP was \$478.5 billion, with per capital GDP of \$2,800<sup>1</sup>. It is useful to note that the per capita GDP of both Africa and Nigeria increased from 2008 to 2013 despite the very large population increase during that period. As Table 1 shows Nigeria’s population in 2008 was 138 million. By 2013 it had increased by almost 41 million (40.8 million) to 172.8 million<sup>38</sup>.

**Table 1:** Population and Sex Ratio at Birth of African Nations, 2008.

N=57		
Country	Population	Sex Ratio at Birth Male(s)/Females
Burundi	8,691,005	1.03
Comoros	731,775	1.03
Djibouti	506,221	1.03
Eritrea	5,028,475	1.03
Ethiopia	78,254,090	1.03
Kenya	37,953,834	1.02
Madagascar	20,042,551	1.03
Malawi	13,931,831	1.01
Mauritius	1,274,189	1.05
Mayotte	216,306	1.03
Mozambique	21,284,701	1.02
Reunion	743,981	1.05
Rwanda	10,186,063	1.03
Seychelles	82,247	1.03
Somalia	9,558,666	1.03
Tanzania	40,213,162	1.03
Uganda	31,367,972	1.03
Zambia	11,669,534	1.03

Zimbabwe	12,382,920	1.03
Angola	12,531,357	1.05
Cameroon	18,467,692	1.03
Central African Rep.	4,434,873	1.03
Chad	10,111,337	1.04
Congo, Rep.	3,903,318	1.03
Congo (D.R.)	66,514,506	1.03
Equatorial Guinea	616,459	1.03
Gabon	1,485,832	1.03
Sao Tome & Principe	206,178	1.03
Algeria	33,769,669	1.05
Egypt	81,713,517	1.05
Libya	6,173,579	1.05
Morocco	34,343,219	1.05
Sudan	40,218,455	1.05
Tunisia	10,383,577	1.07
Botswana	1,842,323	1.03
Lesotho	2,128,180	1.03
Namibia	2,088,669	1.03
South Africa	43,786,115	1.02
Swaziland	1,128,814	1.03
Benin	8,294,941	1.03
Burkina Faso	15,264,735	1.03
Cape Verde	426,998	1.03
Cote d'Ivoire	18,373,060	1.03
Gambia	1,735,464	1.03
Ghana	23,382,848	1.03
Guinea	10,211,437	1.03
Guinea-Bissau	1,503,182	1.03
Liberia	3,334,587	1.03
Mali	12,324,029	1.03
Mauritania	3,364,940	1.03
Niger	13,272,679	1.03
Nigeria	138,283,240	1.03
Senegal	12,853,259	1.03
Sierra Leone	6,294,774	1.03
Togo	5,858,673	1.03
Saint Helena	7,601	1.05
Total	954,753,639	

\*Source: Compiled and computed based on data in the 2008 CIA World Fact book

In addition, it is widely acknowledged that most African nations, including Nigeria have informal or shadow economies that are usually not included when GDP figures are compiled and computed. For example, according to Schneider and Enste, from 1990 to 1993, the average of the size of the shadow or informal economy as percent of GDP in Nigeria and Egypt was 68-76 percent. It was 39-45% in Morocco and Tunisia (p.80)<sup>39,40</sup>. On April 8, 2014, Gillian Parker reported for the *Christian Science Monitor* that Nigeria has become the African nation with the highest GDP of \$509 billion, surpassing South Africa. This means that Nigeria's economy now ranks 26<sup>th</sup> in

the world. Nigeria's economy became the largest in Africa after it did what is called "rebasings" – recalculating and updating its GDP to include the important informal sector such as "...barbershops and tailors to cyber cafes". Parker claims that before rebasing, Nigeria's economy was \$270 billion (p.7). (p.7)<sup>41</sup>.

Nigeria has also continued to increase its share of millionaires and billionaires. For example, both Chris Kay<sup>42</sup> of *Bloomberg News* and the *Business Report*<sup>43</sup> (South Africa) reported on March 4, 2014, that a new annual wealth report shows that Nigeria has substantially increased its number of millionaires. According to Chris Kay the number of individuals in Nigeria: "...with investable assets of at least \$1 million will jump to 23,000 by 2017, after increasing by 44 percent over the past six years to 15,700 in 2013." Kay notes that these wealthy Nigerians have an estimated total wealth of \$82 billion, and that 26% of that amount is overseas, including a very high proportion deposited in the United Kingdom, Switzerland and the Channel Islands<sup>42-44</sup>. Kerry A. Dolan reported for *Forbes Magazine* on November 19, 2014, that for the first time in the four years since that magazine started tracking the wealthiest people in Africa, Nigeria had surpassed South Africa on the annual list of the top 50 richest Africans: "At the top yet again is cement tycoon Aliko Dangote of Nigeria, joined on the list of Africa's 50 Richest by 12 other countrymen. In comparison South Africa claims 11 spots, down from 14 a year ago". There were 28 Africans on the list with \$1 billion or more, with Dangote's figure at \$21.6 billion. There were 22 Africans on the list with \$510 million to \$900 million<sup>45,46</sup>. Mfonobong Nsehe reported for *Forbes Magazine* on March 4, 2014, that Black billionaires accounted for nine out of the 1,645 billionaires in the world in 2014. In 2013, the number was seven. Of the nine Black billionaires, four (44.4%) are Nigerians: Aliko Dangote (\$25 billion); Mike Adenuga (\$4.6 billion); Folorunsho Alakija (\$2.5 billion); and Abdulsamad Rabiu (\$1.2 billion)<sup>47</sup>.

It is useful to take a note of the fact that while Nigeria's GDP per capita increased from 2008 to 2013, both figures are still less than the average for Africa. However, it is important to understand that since GDP per capita figures are computed by

dividing the total GDP for a particular year by the total number of people in that same year, Nigeria's increase of \$500 and Africa's increase of \$507 are about the same. This means that Nigeria made a big improvement because of the massive increase in its population during that period. Nigeria's large population also may have contributed to the \$507 increase in Africa from 2008 to 2013. If Nigeria's increase had been \$250 for example, the Africa average would have been lower than \$507. However, if a country in Africa with a population of 25 million or less were to have had a \$250 increase during that same period, it would not impact the Africa average in a visible way. The 2014 study of Olatoregun et al. using 2008 Demographic and Health Survey data to compare the differences in fertility rates between females aged 15 to 49 in Nigerian and Ghana shows that 19.7% of the females in Nigeria were in the middle-class, compared to 18.2% of females in Ghana (p.40)<sup>73</sup>. This means that by 2014, while both countries have a good chance to increase their rates of middle-class groups, the impact in Nigeria would be felt more because of its large population.

### ***Implications of the Increasing Sex Ratio at Birth in Nigeria***

There are a number of potentially interrelated implications if Nigeria continues to experience an increasing sex ratio at birth favoring males. These implications could also impact the West African region. One potential implication is that a substantial number of males in Nigeria, especially young and poor men may not be able to find wives and form families, because of the shortage of women to marry. This will be a serious issue in a culture that values marriage and expects men in many walks of life or professions to be married with children. This issue is reported to be impacting Asian nations<sup>48-53</sup>. Westly and Choe point out that the preference that parents have for a son: "... has deep social, economic, and cultural roots in many East and South Asian societies. ... Resulting gender imbalances have led to concerns that a shortage of women will make it difficult for men to find wives" (p.1)<sup>51</sup>. Writing about the implications of China's sex ratio at birth favoring

males, Hesketh points out that it has been obvious in the past two decades that large areas of Asia tend to have a lot more young men, and they are likely to stay unmarried and form families in cultures "... where marriage is regarded as virtually universal, and social status and acceptance depend, in large part, on being married and creating a new family" (p.11)<sup>50</sup>. d'Albis and de la Croix also point out that the gender imbalance in South and East Asia has the potential to have serious social and economic implications. One such potential implication is that there could soon be a lot more marriage age men than women, resulting in a substantial number of men unable to find brides or wives. The authors point out that 14% of men in China and 4% of men in Indian "... would not find a partner on the marriage market" (p.358)<sup>48</sup>.

Such a development has the potential to cause more males in Nigeria to emigrate to West (Africa) and other parts of the world where they would be able to marry and form families. It could also result in the immigration of females or women from West (Africa) and other parts of the world to Nigeria because of the demand for brides. Hesketh made a similar claim about Asians (p.12)<sup>50</sup>. What also makes this a potential serious problem is that in Nigeria like many other parts of Africa, wealthy, influential or powerful men tend to have young mistresses, most of them usually in college and fertile child bearing age. Yet these men do not marry them or want them to have children, and these girls or women are afraid to have any other relationships with other men for fear of losing the financial support from these men -- money they use to help support their family. For example, in an article entitled: "Man No Be Wood': Gender and Extramarital Sex in Contemporary Southeastern Nigeria", Smith points out that married men with lovers do not want those lovers to bear them a child, because "It would only complicate their marriages, without bringing the kinds of benefits that accrue from children born within marriage" (p.11)<sup>54</sup>. Smith adds that the young lovers of these men also do not want to have children without being married because they know that "...their lovers are unlikely to marry them, it would be a source of disgrace, and a

**Table 2:** Population, Birth Rates, Total Fertility Rates, Sex Ratio at Birth, Contraceptive Prevalence Rates and Maternal Mortality Rates of African Nations, 2014 (Maternal Mortality Rates, 2010).

		Birth rate (per 1,000)	Total fertility rate (children born/ woman)	Sex Ratio at Birth	Contraceptive Prevalence Use %	Maternal Mortality Rates per 100,000 (2010)
Country	Total	Male(s)/Females (& Year)				
Burundi	10,395,931	42.33	6.14	1.03	21.9 (2010-2011)	800
Comoros	766,865	29.05	3.76	1.03	25.7 (2000)	280
Djibouti	810,179	24.08	2.47	1.03	17.8 (2006)	200
Eritrea	6,380,803	30.69	4.14	1.03	8 (2002)	240
Ethiopia	96,633,458	37.66	5.23	1.03	28.6 (2010-2011)	350
Kenya	45,010,056	28.27	3.54	1.02	45.5 (2008-2009)	360
Madagascar	23,201,926	33.12	4.28	1.03	39.9 (2008-2009)	240
Malawi	17,377,468	41.8	5.66	1.02	46.1 (2010)	460
Mauritius	1,331,155	13.46	1.77	1.05	75.8 (2002)	60
Mayotte	231,139	38.76	5.4	1.03	..	..
Mozambique	24,692,144	38.83	5.27	1.02	11.6 (2011)	490
Reunion (2006)	787,584	18.9	2.45	1.05	..	..
Rwanda	12,337,138	34.61	4.62	1.03	51.6 (2010-2011)	340
Seychelles	91,650	14.54	1.88	1.03	..	..
Somalia	10,428,043	40.87	6.08	1.03	14.6 (2006)	1,000
South Sudan	2,699,556	37.68	5.43	..	3.5 (2006)	2,054 (2006)
Tanzania	49,639,138	36.82	4.95	1.03	34.4 (2009-2010)	460
Uganda	35,918,915	44.17	5.97	1.03	30 (2011)	310
Zambia	14,638,505	42.46	5.76	1.03	40.8 (2007)	440
Zimbabwe	13,771,721	32.47	3.56	1.03	58.5 (2010-2011)	570
Angola	19,088,106	38.97	5.43	1.05	17.7 (2009)	450
Cameroon	23,130,708	36.58	4.82	1.03	23.4 (2011)	690
Central African Republic	5,277,959	35.45	4.46	1.03	19 (2006)	890
Chad	11,412,107	37.29	4.68	1.04	4.8 (2010)	1,100
Congo, Republic	4,662,446	36.59	4.73	1.03	44.7 (2011-2012)	560
Congo (D.R.)	77,433,744	35.62	4.8	1.03	17.7 (2010)	540
Equatorial Guinea	722,254	33.83	4.66	1.03	10.1 (2000)	240
Gabon	1,672,597	34.64	4.49	1.03	31.1 (2012)	230
Sao Tome & Principe	190,428	35.12	4.67	1.03	38.4 (2008-2009)	70
Algeria	38,813,722	4.31	2.78	1.05	61.4 (2006)	97
Egypt	86,895,099	23.35	2.87	1.05	60.3 (2008)	66
Libya	6,244,174	18.4	2.07	1.05	..	58
Morocco	32,987,206	18.47	2.15	1.05	67.4 (2011)	100
Sudan	35,482,233	30.01	3.92	1.05	9 (2010)	730
Tunisia	10,937,521	16.9	2	1.07	63 (2012)	56
Western Sahara	554,795	30.71	4.07	1.04	..	..
Botswana	2,155,784	21.34	2.37	1.03	52.8 (2007-2008)	160
Lesotho	1,942,008	25.92	2.78	1.03	47 (2009-2010)	620
Namibia	2,198,406	20.28	2.25	1.03	55.1 (2006-2007)	200
South Africa	48,375,645	18.94	2.23	1.02	59.3 (2003-2004)	300
Swaziland	1,419,623	25.18	2.88	1.03	65.2 (2010)	320
Benin	10,160,556	36.51	5.04	1.05	12.9 (2012)	350
Burkina Faso	18,365,123	42.42	5.93	1.03	16.2 (2010-2011)	300
Cape Verde	538,535	20.72	2.34	1.03	61.3 (2005)	79
Cote d'Ivoire	22,848,945	29.25	3.63	1.03	18.2 (2012)	400
Gambia	1,925,527	31.75	3.85	1.03	13.3 (2010)	360
Ghana	25,758,108	31.4	4.09	1.03	23.5 (2008)	350
Guinea	11,474,383	36.02	4.93	1.03	5.6 (2012)	610
Guinea-Bissau	1,693,398	33.83	4.3	1.03	14 (2010)	790

Liberia	4,092,310	35.07	4.81	1.03	11.4 (2007)	770
Mali	16,455,903	45.53	6.16	1.03	8.2 (2006)	540
Mauritania	3,516,806	31.83	4.07	1.03	9.3 (2007)	510
Niger	17,466,172	46.12	6.89	1.03	13.9 (2012)	590
Nigeria	177,155,754	38.03	5.25	1.06	14.1 (2011)	630
Saint Helena	7,776	10.03	1.58	1.05	..	..
Senegal	13,635,927	35.09	4.52	1.03	13.1 (2010-2011)	370
Sierra Leone	5,743,725	37.4	4.83	1.03	11 (2010)	890
Togo	7,351,374	34.52	4.53	1.03	15.2 (2010)	300
<b>Total</b>	<b>1,116,930,261</b>					

\*Source: Compiled and computed based on data in the 2014 CIA World Fact book. <https://www.cia.gov/library/publications/the-world-factbook/>.

hindrance to future marriage prospects” (p.11)<sup>54-56</sup>. The issue is made more complicated also because men in Nigeria can marry more than one wife. It would be challenging for the society if there is a bride shortage and yet men can still marry more than one wife.

It has been noted that the idea of chasing a son by Nigerian women contributes to a substantial number of them having low rates of contraceptive use<sup>18</sup>. This contributes to the low use of contraception in Nigeria. It also keeps the total fertility rate in the country very high despite the stated desire of Nigerian women in surveys to have fewer children. Milazzo finds in her study of Nigerian: “...women’s desired fertility and use of contraceptives are affected by the sex of the first-born” (p.4)<sup>18</sup>. This is particularly the case for women whose first born child is a girl, according to Milazzo. They tend to be “... 2.3 percentage points more likely to report that they desire another child, and 1.1 percentage points less likely to use contraceptives” (p.4)<sup>18</sup>.

It has been noted that West Africa, especially Nigeria because it accounts for 52.4% of West Africa’s total population of 338.2 million in 2014, has one of the lowest rates of contraceptive use in Africa and the world<sup>57,58,29,59,32,27,34</sup>. (Table 2). Ugoji points out in a study that in Nigeria, “... the use of contraceptive method is low” (p.4126)<sup>34</sup>. According to Ibissomi: “Only about 15% of married women in Nigeria use any method of contraception, and about 20% of married women have an unmet need for contraception” (p.39)<sup>59</sup>. According to Sedgh et al., in Nigeria “... levels of contraceptive use remain low. In 2003, only 7% of married women used a modern contraceptive method...” (p.175)<sup>27</sup>. Table 2 in the appendix

shows rates of contraceptive use in 52 of 58 African nations in the years ranging from 2002 to 2012, with Nigeria and West African nations having the lowest rates. For example, it was 14.1% in Nigeria in 2011; it was 40% or higher in 18 nations; and in 16 West African nations, including Nigeria, it was 23.5% or higher in only two countries: Cape Verde (61.3%) and Ghana (23.5%) (Table 2).

Milazzo also claims that chasing a son, which results in a very short time to space childbirth for the mother to heal or recuperate, leads to high incidence of both maternal and child mortality, “Specifically, women with first-born daughters tend to have repeated and shortly spaced pregnancies, a behavior medically known to increase their risk of mortality and morbidity” (p.11)<sup>18</sup>. Akinyemi et al. point out that the child mortality rate in Nigeria is over 197 per every 1,000 live births, and the maternal mortality rate is over 800 deaths per every 100,000 live births. Both of these figures are among the highest in the world (p.53)<sup>60,61-66,32</sup>. Table 2 shows maternal mortality rates for 53 of 58 African nations for the year 2010 (with the exception of South Sudan, 2006). At 630 deaths per 100,000 in Nigeria, only 10 other nations have higher rates (Table 2).

Chasing a son has contributed to the high total fertility rate among Nigerian women, which also contributes to the high total fertility rates in West Africa<sup>67,7,68,32,27</sup> (Table 2). Sedgh et al. note that “... Nigerian women and couples want fewer children than they once did. Between 1990 and 2003, the mean desired number of children declined from 5.8 to 5.3” (p.175)<sup>27</sup>. Izugbara and Ezeh point out that in 2008, the total fertility rate in Nigeria was 5.7 children born per woman, but

7.3 children born per woman in Northwest Nigeria (p.193)<sup>67</sup>. According to Table 2, Nigeria's total fertility rate of 5.3 births per woman in 2014 was higher than the average for Africa (4.1 births per woman), and the world average (2.43 births per woman), according to the 2014 CIA World Fact book)<sup>1</sup>. Table 2 also shows that there are only 11 of 58 African nations with higher birth rates per 1,000 of the population than Nigeria (38.03 birth per 1,000).

## Conclusion

This paper begins by explaining that regardless of race, ethnicity or geographic location, the sex ratio at birth data show that more males are born than females. Also, regardless of geographic location, the sex ratio at birth data show that Black females give birth to fewer girls than non-Black females. The paper points out, however, that the sex ratio at birth in Nigeria has increased substantially from 1.03 boys born for every 1 girl in each year from 1996-2008 to 1.06 boys born for every 1 girl in each year from 2009-2014. The 1.06 sex ratio figure in Nigeria in 2014 was second only to Tunisia at 1.07 among all of the countries in Africa. The paper presents data showing that the vast majority of Black African nations continue to have a sex ratio at birth of 1.03 or less in 2014.

The paper presents several factors responsible for the sharp increase in Nigeria's sex ratio at birth. Among these factors are: historical fluctuations of sex ratio at birth; geography and ethnicity; male preference/chasing a son; Age of parents; high death rates of male infants and males in general; and wealth/socioeconomic status.

It is important to take into account other factors that might have contributed to the rise in sex ratio at birth favoring males in Nigeria. For example, political conditions in Nigeria could be contributing to this rise in sex ratio at birth. Specifically, wars or civil conflicts or violence could force many people in the country to stay in their homes. Writing about the ongoing violent attacks in Nigeria by the insurgency group called Boko Haram, Ogunlesi notes that the former president of Nigeria Goodluck Jonathan points out that by the fall of 2014, no less than 13,000 people have been killed in Nigeria by attacks by Boko Haram. The president was quoted as saying

that: "Over the past five years, we have been, and are still confronting threats posed by Boko Haram to peace and stability,' ... 'The costs are high: over 13,000 people have been killed, whole communities razed, and hundreds of persons kidnapped'"<sup>75</sup>. According to John Campbell, from May 29, 2011 to May 16, 2015, Boko Haram has been responsible for at least 11,911 deaths in Nigeria<sup>76</sup>. This could result in an increase in the birth rate. The study of Olusanya et al. examines children born at hospitals, herbal homes (traditional maternity homes), and in family homes in urban Nigeria. Of the 6,706 sample total, 3,403 (50.8%) deliveries took place in hospitals, 2,847 (42.5%) in herbal homes, and 456 (6.8%) in family homes (p.480)<sup>77</sup>. Future studies could examine whether the ongoing violence in Nigeria by Boko Haram has affected increase in child birth at home and also whether this has affected the sex ratio at birth data favoring males.

Finally, the paper presents some potential implications as a result of this development. Among the potential implications presented are: young and poor men in Nigeria may not be able to find brides or wives and form families as a result of the potential shortage of females in the society. This will potentially result in a substantial number of young and poor Nigerians to emigrate to West (Africa) and other parts of the world. Or there may be a need for marriage age women from West (Africa) and other parts of the world to immigrate to Nigeria to seek husbands. The fact that men in Nigeria can marry more than one wife can also make this issue more challenging at a time when there are fewer females or women in the society. Another implication cited is that chasing a son has contributed to low contraceptive use in Nigeria. This has also been linked to higher child and maternal mortality rates in Nigeria, because women who give birth to girls tend to have low contraceptive use and also tend to attempt to have another child in a very short period of time, which leads to various types of medical complications, including death. Chasing a son also leads to the relative high fertility rate in Nigeria.

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