

Trend Of Male – Female Birth Ratio In A South-South Nigerian Teaching Hospital

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Citation

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Abstract

Human sex variation has been attributed to cultural practices, seasonal variation, small-family size policy and sex selective technology. Information on secondary sex ratio in Southern Nigeria is limited. Therefore our aim for this study was analyzed human sex ratio at birth from a sample of the Niger-Delta population in a South –south Nigerian Teaching Hospital, in-order to know the trend of male/female sex ratio at birth and to compare the findings with those of previous reports.

Data were collected from Niger-Delta University Teaching hospital (NDUTH) at Yenagoa, Bayelsa state; the data consisted of 1856 single births recorded between April 2007 and March 2012. Each set of data was analyzed to determine the sex ratio by year and month. Chi-square analysis was used to determine the significance of differences between male and female birth from the average value.

The annual average male to female sex ratios were 1.24, 1.89, 1.3 and 1.34 for 2008, 2009, 2010, and 2011 respectively. When pooled together, the average ratio was 120:100. This shows some bias for male births and the difference shown to be statistically insignificant at ($\chi^2=9.13$, $p=0.10$). Data also indicates less male birth in the peak period of rainy season and the highest male to female ratio in harmattan season, suggesting a seasonal variation of sex ratio.

These findings are representative of a sample of populations in a Teaching Hospital in South- South Nigeria, and their male –female sex ratio is higher when compared to those of southwest Nigeria or other regions in Nigeria as well as other populations of African origin.

INTRODUCTION

The world population has been undergoing changes in birth; this is shown by the various world demographically patterns 1&2. However, scientific backing behind this trend have not been fully established, In economically developed countries, as well as developing countries, scientific studies have found that the human sex ratio at birth has historically varied between 0.94 to 1.15 for natural reasons.^{3,4} Human sex ratios, either at birth or in the population as a whole, might be quoted in any of four ways: the ratio of males to females, the ratio of females to males, the proportion of males, or the proportion of females. Darwin cites a sex ratio of 120 boys to 100 girls for Jewish communities in 19th century Livonia, where infanticide is not historically documented and the means for pre-natal sex determination did not exist⁵. Among European countries, the ratios ranged between 104 in Belgium and 107 in Portugal. In the aggregated results of 56 Demographic and Health Surveys⁶ in African countries, the ratio is 103, though there is also considerable country-to-country variation.⁷ Information on secondary sex ratio in Nigeria is limited. Ayeni⁸ reported a value of 107.85:100 for

Ibadan. Effiong et al.⁹ noted a sex ratio of 106:100 among 31490 live-born Yoruba children delivered in Ibadan. Boroffice¹⁰ reported sex ratios of 107:100 for Ibadan and 104:100 for the old Western states in Nigeria. Values of 107:100 and 104:100 were obtained from Hausa and Igbo population births, respectively.^{11&12} The most current report of data recorded up to 1995 noted an annual average sex ratio of 108.8:100 and 96:100 for Ibadan and Lagos, respectively.¹³ We therefore wish to discuss the sex ratio of male to female in our facility in the last 5 years which represents a major group (Ijaw) in a south-south Teaching Hospital in Nigeria, and also determine if, there is any predisposition of sex predominance in any of the months or year and compare to past and present reports.

METHODOLOGY

Data were collected from labor ward register of Niger-Delta University Teaching hospital (NDUTH) at Yenagoa, Bayelsa state; A 5 year record of birth irrespective of outcome was extracted .They were collated into tabular

presentation and analyzed with Microsoft excel 2007 . The data consisted of 1856 single births recorded between April 2007 and March 2012. Each set of data was analyzed to determine the sex ratio by year and month. Chi-square analysis was done using Preacher K.J. software to determine the significance of differences between male and female birth from their yearly average value.

RESULTS

The annual secondary sex ratios of births recorded in this University Teaching Hospital, from April 2007 to March 2012 are presented in Table 1 and 2. The average sex ratio for the 5 years study pooled together was 120:100. The highest sex ratio of 7.5 was recorded in December 2009 and the lowest sex ratio of 0.42 was recorded in January 2012. There was statistical insignificant difference between male and female birth ($\chi^2=9.13$, $p=0.10$). The Average monthly sex ratio over the years considerably varied between 0.85 ± 0.23 and 2.58 ± 1.97 Table 3, The months represented by the average ratio were January and December which stand for the lowest and highest months of the year respectively.

Table 1

Table 1 shows female birth per month and per year as well, average of 11.4-17.2 , and total of 843 birth , may seems to be the highest, and 2010 had most female birth

	January	February	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total	Average
2007													77	8.556
2008	18	6	12	12	19	11	14	14	10	23	20	17	176	19.556
2009	19	16	21	8	8	12	18	15	8	10	12	2	149	16.556
2010	17	11	16	13	30	20	29	21	20	17	7	17	218	24.222
2011	11	6	12	28	21	18	13	15	9	16	16	6	171	19.000
2012	19	18	15										52	17.333
Total	84	57	76	68	86	68	83	73	60	74	62	52	843	
Average	16.8	11.4	15.2	13.6	17.2	13.6	16.5	14.6	12	14.8	12.4	10.4		

Table 2

Table 2 shows male birth and had few similarities to the first, more male birth were seen over the five year review, the highest average in 2010 as well as total birth for the year , while the month with the highest average was June

	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total	Average
2007													89	9.889
2008	13	6	12	26	13	13	10	19	19	26	40	17	214	23.778
2009	16	14	14	16	12	31	15	14	12	17	22	15	198	16.500
2010	17	21	16	24	35	31	22	24	19	13	15	23	260	21.67
2011	14	6	19	18	32	28	16	27	12	19	14	13	218	24.222
2012	8	14	12										54	
Total	68	61	73	96	98	112	73	95	69	86	105	77	1013	
Average	13.6	12.5	14.6	19.2	19.6	22.4	14.6	19	13.8	17.4	21	15.4		

Table 3

The third table depicts statistical analysis of male to female birth , with overall ratio of 1.2 over a five year period .While a significant difference was observed between sex groups at p-value of 1.01 .The lowest monthly ratio at 0.42 and highest at 7.5. At least more than half of the months across the year had male predominance as indicated by ratios above 1.00

	January	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean	Mean dev	Stand dev	% of Mths with Mpred
2007				1.71	0.75	1.29	1.11	1.38	0.54	1.38	2.00	0.90	1.23	0.34	0.46	66.67
2008	0.72	1.00	1.00	2.17	0.68	1.18	0.71	1.36	1.90	1.13	2.00	1.00	1.24	1.41	0.52	50.00
2009	0.84	0.88	0.67	2.00	1.50	2.58	0.83	0.93	1.50	1.7	1.83	7.5	1.89	1.06	1.86	58.53
2010	1.00	1.91	1.00	1.85	1.17	1.55	0.76	1.14	0.95	0.77	2.14	1.35	1.30	0.38	0.46	58.53
2011	1.27	1.00	1.58	0.64	1.52	1.56	1.23	1.80	1.33	1.19	0.88	2.17	1.34	0.67	0.16	0.00
2012	0.42	0.78	0.80													
Mean	0.85	1.11	1.01	1.67	1.12	1.63	0.93	1.32	1.24	1.23	1.77	2.58	Total	1.20	Chi-sqr	9.13
Mean dev	0.23	0.32	0.23	0.41	0.33	0.34	0.19	0.23	0.40	0.24	0.36	1.97	M/F			0.10
Stand dev	0.32	0.45	0.35	0.60	0.40	0.55	0.23	0.32	0.52	0.34	0.51	2.79				

Connotations: Stand-standard, dev-deviation, sqr-square, Mths=months, Mpred=male predominance, %=percentage, p=level of significance

Figure 1

Figure 1 depicts that year 2010 had boom of deliveries, compared to other years ,and male birth were higher than female births.

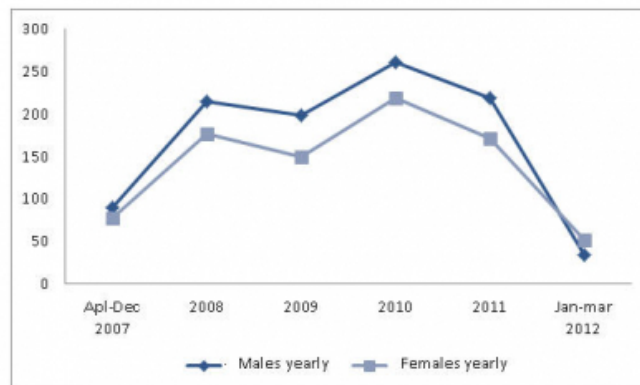


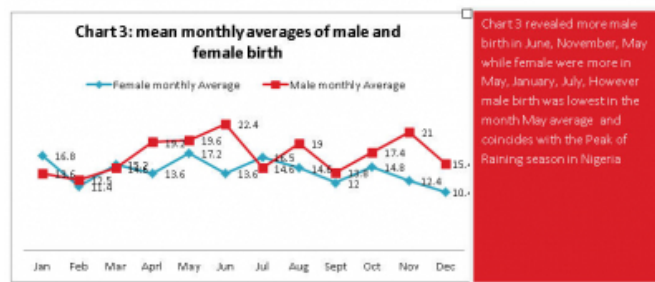
Figure 2

Mean and mean deviation monthly ratios(Jan-Dec)



Figure 3

Mean monthly averages of male and female birth



DISCUSSION

Human sex ratio at birth differs from one population to the other. This variation has been attributed to cultural practices, seasonal variation, small-family size policy and sex selective technology. 14

In humans the secondary sex ratio (i.e., at birth) is commonly assumed to be 105 boys to 100 girls, an assumption that is a subject of debate in the scientific community. The sex ratio for the entire world population is 101 males to 100 females 15 .Our study revealed more male birth to female birth chart 1 , and the estimated ratio was 120 males to 100 females (1.2)Table 3 . This difference may be as a result of natural selection among blacks race in the sampled population or as a result of seasonal variation chart 2&3 . In a study around 2002, the natural sex ratio at birth was estimated to be close to 1.06 males/female.16 However another report revealed otherwise that there have been slight decline of male birth possibly due to environmental pollution 17. Facts and figures from studies have shown that there is considerable country-to-country variation18. Some European countries have ratios between 104 in Belgium and 107 in Portugal, While from Nigeria , Ayeni8 reported a value of 107.85:100 for Ibadan. Effiong et al.9 noted a sex ratio of 106:100 among 31490 live-born Yoruba children delivered in Ibadan. Boroffice10 reported sex ratios of 107:100 for Ibadan and 104:100 for the old Western states in Nigeria. Furthermore , Values of 107:100 and 104:100 were obtained from Hausa and Igbo population births, respectively.11&12However, our result from a South-South Nigerian Teaching Hospital was high (120:100) when compared with the reports, CIA fact book stated Nigeria estimated birth sex ratio at 1.06 at 2012 15 .

Our study revealed variation of monthly averages. The month of July which is the peak of rainy season showed low male birth chart 3 while December chart 2 which is the peak of Harmattan period of Nigeria's Dry season showed high male to female ratio Table 3. Ronald Fisher in his 1930 book

argued that the 1:1 ratio is the evolutionarily stable strategy .However several factors have been implicated to militate against this balance .One of such factors include climate change, this was confirmed by Catalano and his team. They realized that a 1°C increase in annual temperature predicts one more male than expected for every 1,000 females born in a year. They find an increased excess of male births during periods of the exogenous stress (World War II) and during warm years. In the warmest period over the 138 years, the birth sex ratio peaked at about 1.08 in northern Europe19 Second factor for discuss is the theory of natural selection . In a scientific paper published in 2008,20 James stated that any variation of sex ratio at birth is due to sex selection between conception and birth. Thirdly, environmental factors have been reported to affect the male to female sex ratio. Factors such as prenatal exposure to certain environmental pollutants could be disrupting the hormone balance of both fathers and fetuses, leading to changes in the SRY gene -- a sex-determining gene on the Y chromosome that determines the sex of a fertilized egg. This accounts for the downward trend, when considered alongside findings in other smaller studies. This paints a broader picture of what pollution is doing to Human ability to reproduce as seen in Europe and America.17 Our study was incoherent with such a trend, but rather, male –female ratio, slightly increased Table 3. This may likely be due to less environmental hazard from scanty industrialization of developing countries, therefore less interaction with male sex gene. However this hypothesis is subject to further investigation. Furthermore, maternal malnutrition20 generally appears to increase fetal deaths particularly among males, 22 resulting in a lower boy to girl ratio at birth. Chemical pollutants, such as PCBs and DDT have been implicated in affecting sex ratio at birth as a result of their feminizing effect on sex determining genetic factor, leading to lower male sex ratio23. Another factor to be considered that lowers male birth is smoking by the mother24. Finally someone may say that factors intermingle to determine male/female sex ratio. However, our study may not handedly hold a specific scientific cause for the variation seen in our data.

CONCLUSION

The male /female sex ratio is above 1:1 , varies through time , season and from country to country. The highest sex ratio does not correlate to the months with the highest male nor female birth as revealed by our study but could be reflect some changes with seasons.

References

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