

## A Study to Review Sex Ratio at Birth and Analyze Preferences for the Sex of the Unborn

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### Abstract

**Objectives** (1) To study the status of sex ratio at birth with increasing birth order, (2) To ascertain the relationship of declining sex ratio with respect to socio demographic factors. (3) To study outlook of patient towards sex preference, willingness to determine sex of the fetus, wish to terminate the pregnancy in case of unwanted sex of the baby.

**Methods** This is the retrospective study done in the Department of Obstetrics and Gynaecology, Nowrosjee Wadia Maternity Hospital, Parel, Mumbai. The data was collected from the records maintained in Medical Record Department from January 2007 to December 2012 and were studied to determine the sex ratio as well as its relationship with the increasing parity. 95 % confidence interval for the sex ratios was calculated.

**Results** Average sex ratio of 6 years was 908 females per 1,000 males. Sex ratio was 972 females per 1,000 males in primi para, which decreased to 879 females per 1,000 males in second para, further reduced to 784 females per

1,000 males in third para and 864 females per 1,000 males in fourth para.

**Conclusion** The ‘sex ratio at birth’, defined as the number of girls born for every 1,000 boys born, is a more accurate and refined indicator of the extent of prenatal sex selection.

**Keywords** Sex ratio · Prenatal sex selection · PC-PNDT

### Introduction

*“It is no exaggeration to call this gendercide. Women are missing in their millions—aborted, killed neglected to death. (The Economist, Leaders, Gendercide, March 6, 2010).*

Sex ratio is the ratio of males to females in a population. The primary sex ratio is the ratio at the time of conception, secondary sex ratio is the ratio at time of birth, and tertiary sex ratio is the ratio of mature organisms. The “sex ratio at birth,” defined as the number of girls born for every 1,000 boys born, is a more accurate and refined indicator of the extent of prenatal sex selection [1].

At birth, boys outnumber girls everywhere in the world, by almost the same proportion—there are around 105 or 106 male children for every 100 female children [2]. So, why the biology of reproduction leads to this result, remains a subject of debate. However, after conception, biology seems overall to favor women.

India’s skewed sex ratio figures are indeed unfortunate and alarming. Sadly, while there is much academic discussion on the issue of “India’s missing women,” there is no

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tangible change in the mindset of our people. Education has not altered or sensitized society to the rights of women and the dismal sex ratio in the upper echelons of society. Rising sex ratio at birth (ratio favoring male child) in India has been recorded since the early 1980s, which marks the introduction of ultrasound in the field of obstetrics. Since then, it has been increasing but with no sign, so far, of reversing the course. After introduction and widespread strict implementation of Prenatal Conception and Prenatal Diagnostic Technique Act in 1994, sex ratio at birth in India has started showing improvement.

Data on sex ratio at birth is periodically collected at the national level by the Civil Registration System and the Sample Registration System (SRS). These reports are published annually by the Office of the Registrar General of India. The Civil Registration System data are not reliable due to gross under registration of births in some states. Hence, SRS estimates are the most frequently used and quoted source of sex ratio at birth data. These estimates provide results at state and national levels, but not at the district level [3].

The comparison of observed sex ratio at birth with normal sex ratio at birth gives an idea of girls missing at birth. Sex ratio at birth in India for the period (2006–2008) was 904, while the internationally observed normal sex ratio at birth is 952 or more girls born per 1,000 boys. Accordingly, it is estimated that the practice of prenatal sex selection has resulted in approximately six lakh girls being missed annually in India during the period 2001–2007. This is roughly 1,600 girls a day [3].

## Methods

This is the retrospective study conducted in the Department of Obstetrics and Gynaecology, Nowrosjee Wadia Maternity hospital, Parel, Mumbai. A total of 29,603 patients delivered in Nowrosjee Wadia Maternity from January 2007 to December 2012, and it was studied to determine the average sex ratio at birth over 6 years as well as its

relationship with the increasing parity. 95 % confidence interval for the sex ratios was calculated.

Also, a total of 200 patients, coming for antenatal registration as well as follow up over a period of 4 weeks, were interrogated in privacy, with pretested questionnaire to ascertain the relationship of declining sex ratio with respect to age and sociodemographic factors. To study the outlook of patient toward sex preference, willingness to determine sex of the fetus, wish to terminate under the roof of freedom given by law with respect to parity and sex of previous child.

## Results

The average sex ratio for 6 years was 908 females born per 1,000 live born males (0.908). As parity increases, decline in number of females per 1,000 males is observed (Table 1).

Out of 200 antenatal women interrogated to ascertain the relationship of sex ratio with various factors, details are given in (Tables 2, 3, 4). Maximum number ( $n = 92$ , 46 %) of women were in age group of 26–30 years, followed by ( $n = 62$ ) 31 % in the age group of 21–25 years (Table 5).

As per the income in rupees per month ( $n = 112$ ), 56 % women were in the families earning Rs. 5,000–10,000.

Education of women and their husbands was concentrated from secondary school to graduation.

Out of 200 antenatal women interrogated ( $n = 140$ ), 70 % were belonging to joint family, and ( $n = 60$ ) 30 % had nuclear family. Out of these, 3 % of the women had pressure from the family to produce child of preferred sex.

100 % of females were aware of the legislation regarding prenatal sex determination.

## Discussion

Nationwide, the overall sex ratio at birth in 2011, Census has improved by 7 % points to 940 against 933 in census of

**Table 1** Sex ratio in relation to parity

Years	Total birth	P1	P2	P3	P4	P5
2007	4,743	912/1,000 (0.91)	886/1,000 (0.88)	712/1,000 (0.71)	714/1,000 (0.71)	250/1,000 (0.25)
2008	5,189	1,021/1,000 (1.02)	905/1,000 (0.90)	771/1,000 (0.77)	888/1,000 (0.88)	100/1,000 (0.1)
2009	5,058	950/1,000 (0.95)	842.6/1,000 (0.84)	781/1,000 (0.78)	952/1,000 (0.95)	
2010	5,055	929/1,000 (0.92)	877/1,000 (0.87)	740/1,000 (0.74)	736.8/1,000 (0.73)	
2011	4,914	1,092/1,000 (1.09)	882/1,000 (0.88)	791/1,000 (0.79)	533/1,000 (0.53)	
2012	4,644	928/1,000 (0.92)	884/1,000 (0.88)	912/1,000 (0.91)	1,363/1,000 (0.73)	250/1,000 (4)
Total average	29,603	972/1,000 (0.97)	879.4/1,000 (0.87)	784.5/1,000 (0.78)	864.4/1,000 (0.75)	150/1,000 (0.15)

**Table 2** Distribution of antenatal women as per age

Age (years)	Percentage
<20	4
21–25	31
26–30	46
31–35	14
36–40	5
41–45	0
>45	0

**Table 3** Distribution of antenatal women as per monthly income

Monthly income	Percentage
<2,000	0
2,000–5,000	23
5,000–10,000	56
10,000–15,000	5
>15,000	16

**Table 4** Shows level of education of antenatal women and their husbands

Level of education	Husband	Wife
Uneducated	3	7
Primary school	0	0
Secondary school	32	36
Higher secondary	35	30
Graduation	28	26
Post graduation	2	1

**Table 5** Preference for the sex of the child of couples

Preference for	Husband		Wife		Nil
	Male	Female	Male	Female	
Primigravida	8	8	12	12	60
Multi gravida with previous male child	0	16	0	20	64
Multi gravida with previous female child	32	2	42	2	22

2001. This is the highest sex ratio at the national level since Census of 1971.

Nowrosjee Wadia Maternity Hospital is situated in Parel East, Mumbai, and run by the grants given by Government of India and Bombay Municipal Corporation. Patients coming in the Hospital belong to lower as well as upper economic class as the hospital provides services to all class of people, in general wards to special nursing rooms (private rooms), though the majority of population represents middle class, living in suburbs of Mumbai.

In present study, average sex ratio for 6 years was 908 females born per 1,000 live born males (0.97), which is less than the expected 952 females for every 1,000 males, were sex ratio at birth had been normal. Sex ratio was 972 females per 1,000 males in primi para, which decreased to 879 females per 1,000 males in second para, further reduced to 784 females per 1,000 males in third para. Since sex ratio at birth is the most accurate and redefined indicator of sex selection at birth, no other explanation for this decline could be reached. One important point to highlight is that, sex selection is neither done nor encouraged in any form in our center.

Out of 29,603 deliveries, only 22 women delivered were of the parity more than three. Sex ratio at birth in fourth para of 864 females per 1,000 males is unexpectedly favorable for females than in third para. This could be because, either they did not want to do sex selection or were not successful in getting it done, or because the failed contraceptive measures or just wanting to have the fourth child—the last one is hard to believe.

A similar study of sex ratio in relation to birth order was carried out in Bhopal city from August 2011 to September 2011 states; sex ratio is 946 for the first birth order, which is declining to 788, 731, and 525 as the birth order is increasing [4].

In our study, out of 200 antenatal women interviewed the majority 46 % ( $n = 92$ ) women were in the age group of 26–30 years. Five percent ( $n = 10$ ) were elderly gravida, i.e., more than 35 years. In age group 20–30 years out of 100 primigravidae, 52 % ( $n = 52$ ) were willing to take next chance and extend their family irrespective of sex of child being born in this pregnancy; 46 % ( $n = 42$ ) were not willing for the same, and remaining 2 % ( $n = 2$ ) were not sure. Out of 100 multigravidae, 98 % ( $n = 98$ ) were not willing to take next chance. Two percent ( $n = 2$ ) with previous two female children wanted to take third chance hoping for the male child. We observed that as age increases, females are in a hurry to complete the family with at least one male child. Out of ten, eight (80 %) families seem to prefer male child—all of them had previous female children.

In a study conducted to trend analysis of the sex ratio at birth in the United States, a reduced sex ratio at birth has been linked to older age at childbearing [5].

Majority 56 % ( $n = 112$ ) were earning Rs. 5,000–10,000 per month. Sixty four percent ( $n = 128$ ) of husbands and 57 % ( $n = 114$ ) of wives were educated up to higher secondary and above. Unfortunately, no correlation has been found with income and education in relation with preference of male child.

A study of sex ratio in relation to birth order in Bhopal city was carried out from August 2011 to September 2011. Literacy-wise sex ratio shows that education of women empowers them sufficiently to ensure their say in decision

making and were more engaged in this activity. Graduate and postgraduate mothers had a low sex ratio as compared to illiterate and primary school [4].

Deep-rooted preference for males is thought to be the main reason for gender bias in the sex ratio, and the sex ratio at birth, in particular. People are hardly able to attach the same value to every human life, as would be the case in an alternative context of equality. People unconsciously suppress certain potential values. Here, we tried to evaluate the person's ability to develop the same values that she would develop in a context where freedoms are fully guaranteed.

In primigravid group, 60 % had no sex preference, 8 % of husbands and 12 % of wives preferred male child, and remaining 8 % of husbands and 12 % of wives preferred female child.

In multigravidae with previous male child, 64 % families had no preference for the sex, 16 % husband and 20 % wives preferred female child. No one preferred for the second male child.

In multigravidae with previous female child, 22 % families had no preference for the sex; 32 % husbands and 42 % wives preferred male child. Two percent husbands and wives preferred for the second female child. Two percent of the families admitted that they wanted to go ahead with sex determination test, in spite of explaining them that it is being banned and in case of unwanted sex of the child, they were keen to terminate the pregnancy.

People's achievements do not fully match their preferences when they lack the instruments that would enable them to act in accordance. A couple with a preference for sons may not satisfy this preference (may have a daughter) if the technology that would enable them to ensure the sex of their future child is unavailable. Given an expansion of their freedom of choice, the couple would ensure the sex of their child.

## Conclusion

A vast amount of knowledge on sex discrimination in India has been accumulated over the past several years. The

reason for this dramatic shift stems from the introduction of methods of prenatal sex determination, such as ultrasound and other technologies in India. The combination of sex discrimination and advanced technologies for prenatal sex determination and abortion proved to be a dramatic cocktail. Ultrasound now has become an efficient sex-selection device.

In the process of selective modernization of thoughts of society, believing in double-income single-kid have unfortunately failed to understand the importance of woman and are conveniently accepting this imbalance without understanding unforeseen consequences.

The government has taken action on strengthening the Pre-Conception & Pre-Natal Diagnostic Techniques Act (PC & PNDT Act) as well as creating awareness on the issue through various mechanisms. We, as community of doctors, should participate actively in correcting this imbalance, by first, not doing sex determination, prohibiting our doctor friends from doing so, utilizing the opportunity by educating every patient coming to us about the seriousness of issue, and lastly doing surveillance of this problem at every possible step.

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