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Sex Composition of Population: An Analysis of NFHS – 5 data

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Abstract

The sex of a person is a biological character. Balanced sex composition of the Population is essential for growth of human population in any country. But, male dominance had been always recorded in India. Hence, sex ratio and sex ratios at birth trends have been worse in the past lead to a deficit of females thereby cause for many severe issues. The sex ratio in rural India has remained consistently above 900 women for every 1,000 men since 1901. But the ratio in urban areas fell from 910 women in 1901 to about 858 on average over the next nine decades. It was only in 2001 that a turnaround was seen, with the ratio returning to 901. In 2011, the ratio was at a century high of 929 women for every 1,000 men. The natural sex ratio at birth usually has higher male births. It ranges between 943 and 954. But the advantage of higher sex ratio at birth (SRB) is neutralized due to higher male infant mortality in the normal population. In recent period, the sex ratio and sex ratio at birth has been increased significantly. This paper is aimed at examining the increase in sex ratios and sex ratio at birth in India based on secondary data collected from National Family Health Survey-5 (NFHS-5 of 2019-20) and civil registration system, 2018. However, NFHS-5 reveals that these two ratios had increased in recent period results in more female than males.

Keywords: Sex ratio; Sex ratio at birth; sex selective abortion and female mortality rate; mortality; demographic characteristics

Introduction

“When women thrive, all of society benefits, and succeeding generations are given a better start in life” - **Kofi Annan**

Sex composition is one of the significant demographic characteristics of population. In any population, distribution by sexes is generally unequal. The existing sex ratio in any area is determined by three basic factors. These are sex ratio at the time of birth, differences in the mortality rates of the two sexes, at different ages and differences in the migratory ethos of the two sexes. In all the demo-

graphic narratives the low sex ratios are taken as a stark indicator of the inferior position of women in India. In this paper, sex composition of population is considered as sex ratio and treating as one of the crucial determinant (Sex ratio at birth).

Human sex ratio and sex ratio at birth are the two crucial aspects that mirror the status of females in a country. These two aspects are the significant demographic characteristics that determine the sex composition of the population. Indian Census has the tradition of bringing out disaggregated information

by sex on various aspects of population. The separate data for male and females are important for various types of planning and for the analysis of other demographic characteristics such as natality, mortality, migration, marital status, population growth, economic characteristics, etc of a nation. Two major factors play a crucial role in shaping the population composition, one attributes to biological or natural causes (fertility/mortality) and the other one attributes to human behaviour (migration). Thus, the present sex ratio is primarily determined by past fertility, mortality and migration rates. The gender composition reflects natality, mortality and migration characteristics of a given population. In past decades, the sex composition of human population has been imbalance due to various reasons. Thus, changes in the sex composition largely reflect the underlying socio-economic and cultural patterns of society in different ways. However, the balance of sexes affects the social and economic relationship within a community. Therefore, sex ratio and sex ratio at birth are an important phenomenon for demographers, anthropologists, sociologists, geographers, planners, medical and public health worker. The present sex ratio is primarily determined by the past rate of fertility, mortality and migration, whereas the sex ratio at birth is decided by the rate of sex selective abortions that happened. However, these two key rates at present govern the future vital events like the rate of fertility, mortality, migration, marriage, workforce and age & sex structure of a nation. Hence, it received major attention by planners, policy-makers, social activities and others.

Sex Ratio

The sex ratio is a broad social indicator, which reveals the ground realities that exist in the fabric of the society and also one of the tools to measure gender equity in a population. It is a key indicator to monitor the development pulse of a country. It is commonly understood that males and females in the population balance each other in number. Little do they know sexes are imbalanced in different population across the worlds. According to United Nation estimates, the world had 986 females against 1000 males in 2000. Except Indonesia and Japan, all other Asian countries have low sex ratios. However, most of the developed European countries have high sex ratio. Interestingly the sheer weight of the population of the four Asian countries, particularly China (944) and India (933) with low sex ratio contributes to the preponderance of males over female in world. In developing countries such as India, sex ratio is generally skewed in favour of the males. In the past decades, Indian patriarchal society creates a gender imbalance by viewing the male as an asset and the female as a liability for the family.

Moreover, in agrarian societies, sons are desirable as hands to work the field, and small towns value sons as an asset in the fight against the "encroaching urban society". In addition, many couples depend on a son to care for them in their old age

and assist in the financial stability of the family. Thus, sons are sought after because Indian culture dictates that a son remains in the family after marriage while a daughter leaves to join her husband's family.

Population enumeration in terms of gender composition is a key indicator to monitor the development pulse of a country. The sex ratio is defined as 'number of females per 1000 males' in a reference period. As per the population of Census 2011, the sex ratio of India is 940, which recorded as 933 in 2001. Thus, the sex ratio at the National level has risen by seven points. In rural area, it gained one point from 946 in 2001 to 947 in 2011, whereas in urban area gained twenty-six points from 920 in 2001 to 296 in 2011 even though sex ratio was much lower. In India, National Family Health Survey (NFHS) of various phases provides data on socio-economic, demographic, cultural, health aspects etc. Recent survey revealed that improvement in the sex ratio of the total population (females per 1,000 males) from NFHS-4 (2015-16) to the first phase of NFHS-5 (2019-20) in 16 states and 4 Union Territories had recorded.

Sex ratio at birth

Sex Ratio at Birth (SRB) reflects the level of sex bias of children by the parents. It reveals the preference of male than female children and an indicator of status of girls in the society. An adverse sex ratio at birth is also reflected in the distorted gender makeup of the entire population. In general, sex ratio at birth defined as 'the ratio of male births to female births'. However, because reliable statistics on sex selective abortions do not exist, sex ratio at birth of children in the last five years (females per 1000 males) had been collected by NFHS-4 (2015-16) and NFHS-5 (2019-20) treating as an indirect indicator of sex selective abortion. The natural "Sex Ratio at Birth" is often considered to be around 105. This means that at birth on average, there are 105 males for every 100 females. In a study around 2002, the natural sex ratio at birth was estimated to be close to 1.06 males per female (Grech. V, et al; 2002).

A normal gender ratio at birth is between 102-106 boys per 100 girls, which would be equivalent to 943-980 girls per 1,000 boys, according to a report by organizations working on gender issues. This ratio is not 1,000 boys for every 1,000 girls because it is nature's way of balancing a higher risk of death for boys as they grow older, according to the World Health Organization.

In anthropology and demography, the human sex ratio is the ratio of males to females in a population. In uninterrupted conditions, the sex ratio in humans is approximately 1:1. But, due to high rate of sex selective abortions, female fetal mortality has been higher (Orzack, S. H et al, 2015); thereby the Sex Ratio at Birth (SRB) worldwide is commonly thought to be 107 boys to 100 girls (The Central Intelligence Agency of the United States, 2013).



National Family Health Survey (2005-06 and 2015-16) data show an increase in the SRB in north-western states (Haryana, Punjab and Rajasthan) and a decline in the SRB in the eastern states (Assam, Odisha and West Bengal). The Sex Ratio at Birth for the country has gone up by three points to 899 in 2016-18 from 896 in 2015-2017. At National level, it is 900 in rural areas and 897 in urban areas. Chhattisgarh has reported the highest Sex Ratio at Birth (958) while Uttarakhand, the lowest as 840 (Sample Registration System Statistical Report, 2018).

Review of literature

The sex ratio and sex ratio at birth in the country had always remained unfavorable to females in the past. It has been highlighted by respective census reports and also studied by several authors' in different perspectives viz., sex selective abortions and female feticides (Amartya, Sen, 1990), sex ratio at birth (Irudaya Rajan. S, et al, 2017), sex differentials in infant and child mortality (Sample Registration System, 1990 and Coale, Ansley. J, 1991), missing women (Stephen Dale, 2010), female children trafficking and sex differential in population enumeration (Census of India, 2011) declining sex ratio in India, causes and consequences (Chandrasekarayya. T and Sai Sujatha. D, 2009) Squeezed Sex Ratio in Post Independent India and its Causes (Chenrayudu. N and Chandrasekarayya. T, 2020) and Rise in Sex Ratio at Birth in India (Chandrasekarayya. T, 2020).

Importance of the study

The sex ratio and sex ratio at birth of human population is a major concern in recent decades, because it has been changing (especially the sex composition of the population) over a period of time and determines many socio-economic, cultural and demographic aspects of the future. However, improvement in sex ratio and sex ratio at birth had recorded in the recent period. Hence, these two demographic aspects always received prominence.

Objective

The paper is aimed at examining the increase in sex ratio and sex ratio at birth of States/Union Territories (UTs) comes under sex composition based on secondary collected from NFHS-5 (2019-20) and Sample registration system report-2018.

Method and material

The paper is based on descriptive type and data collected from the Fifth Round of the National Family Health Survey (NFHS-5), 2019-20 for 22 (containing 17 States/ 5 UTs of India) included in Phase-I of the Survey of besides Sample

Registration System (SRS)-Statistical Report, 2018 for India and bigger States/UTs (with population 10 million and above) separately for rural and urban areas.

The National Family Health Surveys (NFHS) conducted under the aegis of the Ministry of Health & Family Welfare has played a crucial role in providing the Government of India and the stakeholders with reliable inputs to monitor the progress of various flagship programmes as well as achieve the vision of the National Health Policy. It provides a useful demographic and health database which will facilitate a stock taking of government programmes, and the progress made towards achieving the Sustainable Development Goals (SDG) by 2030. The crucial information will be effectively utilized for right policy decisions.

The Sample Registration System (SRS) in India is carried out by the Office of Registrar General & Census Commissioner, India with an objective of providing reliable annual estimates of birth rate, death rate, infant mortality rate and various other fertility and mortality indicators. SRS is one of the largest demographic surveys in the world covering about 8.1 million population. It serves as the main source of information on fertility and mortality both at the State and National levels.

Results and discussion

The results of NFHS-5 for sex ratio and sex ratio at birth along with S.R.S report, 2018 for mortality rates by age, sex and residence are briefly discussed hereunder.

Table 1 also reveals that, except in Bihar, Kerala, Meghalaya, Nagaland, Dadra & Nagar Haveli and Daman & Diu; the sex ratio at birth for children born in the last five years (females per 1,000 males) improved from NFHS-4 (2015-16) to NFHS-5 (2019-20). Moreover, outer number female children born are recorded in Tripura, Ladakh and Lakshadweep. In rural areas, sex ratio at birth of children is higher than urban except in Bihar, Karnataka, Kerala, Nagaland, Sikkim and Jammu & Kashmir.

Though numbers of female children are lower in the sex ratio at birth for children born in the last five years, clearly reveals still existence of sex-selective abortions for male children. However, improvement in the sex ratio at birth for children born in the last five years is recorded from NFHS-4 (2015-16) to NFHS-5 (2019-20). ratio of the total population is higher in rural than urban. Thus, NFHS-5 of phase-I revealed that increase in of the sex ratio of the total population from 991 in NFHS-4 to 1020 in NFHS-5.

Table 2 reveals that the estimated death rate for females is higher than males by residence at earlier ages like below one year (Infant mortality rate), Children aged 0-4 years and Under-Five Mortality Rates (U5MR) than working (15-59 years) and older ages Persons aged 60 years and above. It can be due neglect of female children in all aspects. Therefore, higher mortality for females at children ages is the causes



Table 1. Sex ratio of the total population and Sex ratio at birth in States/UTs/India

| S.No | States/UTs/India | Sex ratio of the total population (females per 1,000 males) | | | Sex ratio at birth for children born in the last five years (females per 1,000 males) | | | | |
|------|--------------------------------------|--|-------|---------------------|---|-------|---------------------|-------|-------|
| | | NFHS-5 (2019-20) | | NFHS-4 (2015-16) | NFHS-5 (2019-20) | | NFHS-4 (2015-16) | | |
| | | Rural | Urban | Total | Total | Rural | Urban | Total | Total |
| 1. | Andhra Pradesh | 1,055 | 1,024 | 1,045 | 1,021 | 957 | 877 | 934 | 914 |
| 2. | Assam | 1,017 | 982 | 1,012 | 993 | 970 | 916 | 964 | 929 |
| 3. | Bihar | 1,111 | 982 | 1,090 | 1,062 | 903 | 940 | 908 | 934 |
| 4. | Goa | 1,092 | 985 | 1,027 | 1,018 | 864 | 822 | 838 | 966 |
| 5. | Gujarat | 991 | 929 | 965 | 950 | 969 | 931 | 955 | 906 |
| 6. | Himachal Pradesh | 1,057 | 936 | 1,040 | 1,078 | 880 | 843 | 875 | 937 |
| 7. | Karnataka | 1,035 | 1,034 | 1,034 | 979 | 931 | 1,063 | 978 | 910 |
| 8. | Kerala | 1,105 | 1,138 | 1,121 | 1,049 | 922 | 983 | 951 | 1,047 |
| 9. | Maharashtra | 977 | 954 | 966 | 952 | 941 | 878 | 913 | 924 |
| 10. | Manipur | 1,060 | 1,077 | 1,066 | 1,049 | 947 | 1,010 | 967 | 962 |
| 11. | Meghalaya | 1,020 | 1,118 | 1,039 | 1,005 | 1,001 | 915 | 989 | 1,009 |
| 12. | Mizoram | 988 | 1,043 | 1,018 | 1,012 | 1,038 | 907 | 969 | 949 |
| 13. | Nagaland | 1,020 | 980 | 1,007 | 968 | 943 | 949 | 945 | 953 |
| 14. | Sikkim | 964 | 1,033 | 990 | 942 | 746 | 1,520 | 969 | 809 |
| 15. | Telangana | 1,070 | 1,015 | 1,049 | 1,007 | 907 | 873 | 894 | 872 |
| 16. | Tripura | 1,033 | 956 | 1,011 | 998 | 1,029 | 1,024 | 1,028 | 969 |
| 17. | West Bengal | 1,065 | 1,016 | 1,049 | 1,011 | 993 | 921 | 973 | 960 |
| 18. | Andaman & Nicobar Islands | 929 | 1,023 | 963 | 977 | 891 | 941 | 914 | 859 |
| 19. | Dadra & Nagar Haveli and Daman & Diu | 875 | 775 | 827 | 813 | 940 | 705 | 817 | 983 |
| 20. | Jammu & Kashmir | 944 | 961 | 948 | 971 | 976 | 978 | 976 | 923 |
| 21. | Ladakh | 966 | 994 | 971 | 1,000 | 1,193 | 897 | 1,125 | 823 |
| 22. | Lakshadweep | 1,166 | 1,193 | 1,187 | 1,022 | 1,361 | 964 | 1,051 | 905 |
| - | India | 1,037 | 985 | 1,020 | 991 | 931 | 924 | 929 | 919 |

Source: National Family Health Survey (NFHS-5)-2019-20, Ministry of Health and Family Welfare, New Delhi and International Institute for Population Sciences, Mumbai.

for lower child sex ratio of 0-6 years (number of females per 1,000 males) and lower mortality rates in older ages lead to higher in sex ratio of total population in India. In general, higher the female mortality rates (Infant as well as Under-Five mortality rate and crude death rate) lower will be the sex ratio of a nation. Table-3 furnishes data on Sex ratio of the total population and mortality rates of some Indian states.

Table 3 reveals that the effect of mortality rates on sex ratio of the total population. It is observed that male death rate exceeds female death rate in all bigger States/UTs except Bihar and Jharkhand. In general, the states like Andhra Pradesh, Kerala and Telangana that recorded lower female death rates (Infant, Under-Five and Crude death rate) had a higher sex ratio of the total population and vice versa among the states with higher female mortality rates.

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Conclusion

Rise in the sex ratio of the total population (females per 1,000 males) and sex ratio at birth from NFHS-4 (2015-16) to NFHS-5 (2019-20) in 16 states and 4 UTs had recorded. Except in Bihar, Kerala, Meghalaya, Nagaland, Dadra & Nagar Haveli and Daman & Diu, the sex ratio at birth for children born in the last five years (females per 1,000 males) improved from NFHS-4 (2015-16) to NFHS-5 (2019-20). In general, sex ratio of the total population and sex ratio at birth is higher in rural areas than urban. Lower mortality



Table 2. Estimated Death Rates by age, sex and residence in India, 2018

| S.No | Category | Total | | | Rural | | | Urban | | |
|------|--------------------------------------|-------|------|--------|-------|------|--------|-------|------|--------|
| | | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| 1. | Below 1 year (Infant mortality rate) | 37.5 | 36.9 | 38.1 | 42.3 | 41.9 | 42.6 | 25.3 | 23.9 | 26.8 |
| 2. | Children aged 0-4 years | 8.9 | 8.7 | 9.0 | 9.9 | 9.8 | 10.0 | 6.1 | 5.8 | 6.6 |
| 3. | Under-Five Mortality Rates (U5MR) | 36 | 36 | 37 | 40 | 40 | 41 | 26 | 24 | 27 |
| 4. | Children aged 5-14 years | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.4 | 0.4 | 0.4 |
| 5. | Persons aged 15-59 years | 2.9 | 3.4 | 2.4 | 3.2 | 3.7 | 2.6 | 2.3 | 2.8 | 1.9 |
| 6. | Persons aged 60 years and above | 42.6 | 45.9 | 39.5 | 45.9 | 49.9 | 42.1 | 36.1 | 38.0 | 34.0 |
| 7. | All ages (Crude death rate) | 6.2 | 6.6 | 5.7 | 6.7 | 7.2 | 6.2 | 5.1 | 5.5 | 4.7 |

Source: Registrar General & Census Commissioner: Sample Registration System Statistical Report, 2018; Ministry of Home Affairs, Government of India, New Delhi, pp.160-179 and 268.

Table 3. Sex ratio of the total population and mortality rates

| S.no | States/UTs | Sex ratio of the total population (females per 1,000 males) | | | Mortality rates (Number of deaths per 1000 population), SRS report, 2018 | | | | | | | | | | | |
|------|-------------------|---|-------|-------|--|-------|-------|------------------------|-------|-------|-----------------------------------|-------|-------|------------------|--|--|
| | | NFHS-5 (2019-20) | | | NFHS-4 (2015-16) | | | Infant Mortality Rates | | | Under-Five Mortality Rates (U5MR) | | | Crude Death Rate | | |
| | | Rural | Urban | Total | Total | Total | Males | Females | Total | Males | Females | Total | Males | Females | | |
| 1. | Andhra Pradesh | 1,055 | 1,024 | 1,045 | 1,021 | 29 | 30 | 29 | 33 | 34 | 32 | 6.7 | 7.4 | 5.9 | | |
| 2. | Assam | 1,017 | 982 | 1,012 | 993 | 41 | 40 | 44 | 47 | 44 | 51 | 6.4 | 6.9 | 5.8 | | |
| 3. | Bihar | 1,111 | 982 | 1,090 | 1,062 | 32 | 30 | 35 | 37 | 34 | 39 | 5.8 | 5.7 | 6.0 | | |
| 4. | Gujarat | 991 | 929 | 965 | 950 | 28 | 29 | 27 | 31 | 32 | 29 | 5.9 | 6.6 | 5.1 | | |
| 5. | Himachal Pradesh* | 1,057 | 936 | 1,040 | 1,078 | 19 | 19 | 20 | 23 | 22 | 25 | 6.9 | 8.3 | 5.5 | | |
| 6. | Karnataka | 1,035 | 1,034 | 1,034 | 979 | 23 | 21 | 25 | 28 | 26 | 30 | 6.3 | 6.8 | 5.8 | | |
| 7. | Kerala | 1,105 | 1,138 | 1,121 | 1,049 | 7 | 9 | 5 | 10 | 11 | 9 | 6.9 | 7.9 | 5.9 | | |
| 8. | Maharashtra | 977 | 954 | 966 | 952 | 19 | 19 | 19 | 22 | 21 | 23 | 5.5 | 6.0 | 4.9 | | |
| 9. | Telangana | 1,070 | 1,015 | 1,049 | 1,007 | 27 | 27 | 26 | 30 | 29 | 30 | 6.3 | 6.9 | 5.6 | | |
| 11. | Jammu & Kashmir | 944 | 961 | 948 | 971 | 22 | 22 | 23 | 23 | 23 | 23 | 4.9 | 5.6 | 4.1 | | |
| - | India | 1,037 | 985 | 1,020 | 991 | 32 | 32 | 33 | 36 | 36 | 37 | 6.2 | 6.6 | 5.7 | | |

Source: 1. National Family Health Survey (NFHS-5)-2019-20, Ministry of Health and Family Welfare, New Delhi and International Institute for Population Sciences, Mumbai. 2. Sample Registration System Statistical Report-2018, Office of the Registrar General & Census Commissioner, India, Ministry of Home Affairs, Government of India, New Delhi. *Based on three-year period 2016-18 for mortality rates.

rates for females (especially in older ages) are the one of cause for improved sex ratio in India in the recent period. Increase in literacy rates especially among female could be the reason for decrease in sex bias of children among the parents thereby rise in sex ratio at birth in periods. Moreover, in additions to existing women welfare schemes and anti-abortions, women empowerment initiatives in education and employment are to be implemented in the states/UTs that had a lower sex ratio of total population. Moreover, behaviour modification approach is to be adopted for avoiding sex preference children, thereby to improve further in sex ratio at birth, especially states/UTs that registered lower sex ratio at birth. Moreover, at societal level, males should change their

mindset against discrimination of females and provide equal chance for females every aspect of life to overcome deficit of female population especially girls in India. Indian patriarchal society that contain the traditional values and perceptions on status and roles of females especially girl child causes to discrimination. These can be narrowed by religious as well public meetings through explaining severe consequences of imbalance sex ratio and need to enhance their socio-economic and cultural status. Moreover, gender issues must be given due consideration so as to make effective policy frameworks, which might reduce gap in sex ratio and sex ratio at birth thereby much better sex composition of human population. (1-14)

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