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Review on Changing Trends of Sex Ratio and Consequences

Dr. Bala Krishna Chadaram[1], Dr. Ram Prasad M[2], Dr. Vijay Kiran Mentey[3]

[1]Professor, Department of Community Medicine,
Malla Reddy Medical College for Women, Suraram, Hyderabad

[2]Professor, Department of Community Medicine,
Malla Reddy Medical College for Women, Suraram, Hyderabad

[3]Professor & HOD, Department of Community Medicine,
Malla Reddy Medical College for Women, Suraram, Hyderabad

Abstract: ***Sex ratio is an important indicator for assessment of the development of a nation. Nature provided equal opportunity to both the sexes but human intervention and changing environmental conditions making change in the sex ratio. In several countries a male preponderance over females is observed at birth but in Asian countries till 2005 number in females was more. Sex ratio is expressed in different ways but most commonly used method of expression is number of males to females.***

The survival rate of male is less compared to female as the age advances. Gross variations are observed in sex ratio in different parts of the country. In both eastern part and southern parts of the country more number of females is observed but increased sex ratio is observed in north and North West of the country. A close monitoring of changing trends of sex ratio is essential to stabilize the changes in population composition and to avoid social evils and to do social justice.

Keywords: Sex ratio, Indicator, Trend, Monitoring

1. Introduction

Sex ratio is defined as the number of females per thousand males. It is an important and useful indicator to assess relative excess or deficit of men or women in a given population at a point of time. Gender balance is essential for the existence of any living creature and even humans are not exceptional to this. Nature gave an equal opportunity to both the sexes. Human sex ratio (SR) is studied in depth more than any other species. Human sex ratio is expressed in four different ways.

1. Ratio of males to females
2. Ratio of females to males
3. Proportion of males
4. Proportion of females.

In most of the scientific literature, proportion of males is the commonly used method. Sex ratio is different at different ages of life. Similar to other species, the sex ratio is 1:1 in humans approximately. The composition of population by gender is not uniform across globe. Most of the countries around the world are showing slight preponderance of males at birth. The SR for the entire world population is 101 males to 100 females at birth[1]. In most populations, the natural SR at birth was around 1.06 males/females.

The frequency of female foeticide is indirectly estimated from the observed high birth sex ratio that is the ratio of boys to girls at birth. The natural ratio is assumed to be between 103 to 107, and any number above it is considered as suggestive of female foeticide. According to the decennial Indian census, the sex ratio in the 0 to 6 age group in India has risen from 102.4 males per 100 females in 1961,[2] to 104.1 in 1981, to 107.8 in 2001, to 108.8 in 2011[3] The child sex ratio is within the normal natural range in all eastern and southern states of India, but significantly higher in certain western and particularly northwestern states such as Punjab, Haryana and Jammu & Kashmir (120, 118 and 116, as of 2011, respectively)[4] High birth sex ratio and implied female foeticide is an issue that is not unique to India. Even higher sex ratios than in India have been reported for the last 20 years in China, Pakistan, Vietnam, Azerbaijan, Armenia, Georgia and some Southeast European countries.[5] There is an ongoing debate as to whether these high sex ratios are only caused by female foeticide or some of the higher ratio is explained by natural causes.[6]

India is one of the several countries with high sex ratio. High sex ratio implies female foeticide. The natural human sex ratio is 106 males to 100 females. SR is constant at birth and population. High SR is in Asian countries compared to Europe[7].

The following are certain consequences of increased sex ratio:
"There's a shortage of men, so [the men] think, 'I can have more than one woman. I'm gonna go around to this one or that one, and I'm gonna have two or three of them."
(A single Philadelphia mother describes her local marriage market; quoted in Edin, 2000).
"Every day I meet someone better. I am waiting for the best."
(A female Moroccan immigrant describes her local marriage market; quoted in Rodriguez, 2000).

Marriage is widely seen as the key to economic success and social welfare for both individuals and communities.

In African countries sex ratio is different from other regions. More number of females are seen.

Availability

Ultrasound technology arrived in China and India in 1979, but its expansion was slower in India. Ultrasound sex discernment technologies were first introduced in major cities of India in 1980s, its use expanded in India's urban regions in 1990s, and became widespread in 2000s.8

] Klasen and Wink suggest India and China's high sex ratios are primarily the result of sex-selective abortion.9

India passed its first abortion-related law, the so-called Medical Termination of Pregnancy Act of 1971, making abortion legal in most states, but specified legally acceptable reasons for abortion such as medical risk to mother and rape. The law also established physicians who can legally provide the procedure and the facilities where abortions can be performed, but did not anticipate female foeticide based on technology advances.10 With increasing availability of sex screening technologies in India through the 1980s in urban India, and claims of its misuse, the Government of India passed the Pre-natal Diagnostic Techniques Act (PNDT) in 1994. This law was further amended into the Pre-Conception and Pre-natal Diagnostic Techniques (Regulation and Prevention of Misuse) (PCPNDT) Act in 2004 to deter and punish prenatal sex screening and female foeticide. However, there are concerns that PCPNDT Act has been poorly enforced by authorities.11

Other recent policy initiatives adopted by many states of India, claims Guilmoto12attempt to address the assumed economic disadvantage of girls by offering support to girls and their parents. These policies provide conditional cash transfer and scholarships only available to girls, where payments to a girl and her parents are linked to each stage of her life, such as when she is born, completion of her childhood immunization, her joining school at grade 1, her completing school grades 6, 9 and 12, her marriage past age 21. Some states are offering higher pension benefits to parents who raise one or two girls. Different states of India have been experimenting with various innovations in their girl-driven welfare policies. For example, the state of Delhi adopted a pro-girl policy initiative (locally called Laadli scheme), which initial data suggests may be lowering the birth sex ratio in the state.12,13

Increasing awareness of the problem has led to multiple campaigns by celebrities and journalists to combat sex-selective abortions. Aamir Khan devoted the first episode "Daughters Are Precious" of his show Satyamev Jayate to raise awareness of this widespread practice, focusing primarily on Western Rajastan, which is known to be one of the areas where this practice is common. Its sex ratio dropped to 883 girls per 1,000 boys in 2011 from 901 girls to 1000 boys in 2001. Rapid response was shown by local government in Rajastan after the airing of this show, showing the effect of media and nationwide awareness on the issue. A vow was made by officials to set up fast-track courts to punish those who practice sex-based abortion. They cancelled the licences of six sonography centres and issued notices to over 20 others.14

This has been done on the smaller scale. Cultural intervention has been addressed through theatre. Plays such as 'Pacha Mannu', which is about female infanticide/foeticide, has been produced by a women's theatre group in Tamil Nadu. This play was showing mostly in communities that practice female infanticide/foeticide and has led to a redefinition of a methodology of consciousness raising, opening up varied ways of understanding and subverting cultural expressions.15

The Mumbai High Court ruled that prenatal sex determination implied female foeticide. Sex determination violated a woman's right to live and was against India's Constitution.

The Beti Bachao, or Save girls campaign, has been underway in many Indian communities since the early 2000s. The campaign uses the media to raise awareness of the gender disparities creating, and resulting from, sex-selective abortion. Beti Bachao activities include rallies, posters, short videos and television commercials, some of which are sponsored by state and local governments and other organisations. Many celebrities in India have publicly supported the Beti Bachao campaign.[

Increasing sex ratio is a complex problem with several reasons. They may be natural causes, social issues like dowry system, lack of security to female child, better employment opportunities to the male child cultural factors, policies of the government are operating in increase of sex ratio. Table 1 shows complex reasons for sex determination and increase of sex ratio.

Table-1, Sex Ratio of Different Countries in the World[16,17,18]

S.NO	NAME OF THE COUNTRY	SEX RATIO(MALE/FEMALE) AT BIRTH TO OLD AGE
1	Germany	1.05-0.70
2	USA	1 to 0.72
3	China	1.06-0.91
4	India	1.07-1.02
5	Belgium	1.04
6	Switzerland	1.07
7	Italy	1.07
8	Ireland	1.07
9	Portugal	1.07
10	African countries	1.03

As the age advances males tend to have more mortality rates compared to the same age of females[2]due to exposure more of outside threats. 2.5 to 3.5 times of risk in males compared to females. Geographical variations have been observed in sex ratio. As per Fiesher evolutionary principle, for the stabilization of population equal chance has been accorded to both sexes but the SR determination is a complex mechanism with several influencing factors as mentioned in table-2

TABLE-2.FACTORS INFLUENCING SEX RATIO

S.NO.	FACTORS INFLENCE SEX RATIO
1	Paternal age (Young age)
2	Maternal age
3	Multiple births
4	Birth order
5	Gestational weeks
6	Race

7	Parents health history
8	Parents psychological stress
9	Distance from equator of earth
10	Environmental pollution
11	Heat stress
12	Exogenous stress like war, invasions
13	Prevalence of Hepatitis B
14	Endocrine disruptors
15	hormones
16	Habit of smoking of mother
17	Partner/support newwork to mother
18	Environmental chemicals
19	Age of the parents
20	Age difference of parents
21	Industrialization
22	Social causes-introducing of US techniques
23	Social composition
24	Early and late marriages
25	Cultural preferences
26	Inadequate reporting of early deaths & late deaths, misreporting & misrecording
27	One child policy
28	Sex selective abortions
29	Length of gestation

2. SEX RATIO IN ASIAN COUNTRIES[19]:

A distinctive dimension of Asia's recent population dynamics has been its unexpected "masculinisation" – the increasing proportion of males in its population. While the sex ratio of almost all other populations in the world tends to gradually diminish, as a result of increased life expectancy favourable to women, the proportion of boys in Asia's population of children started to rise during the late 1970s, a trend that was not identified immediately for lack of proper data. Initially, the huge gap observed between the number of men and women represented, to a large extent, the legacy of mortality conditions that had been unfavourable to women during the past century. But it emerged that a new, unexpected phenomenon was also underway: sex ratio at birth was tilting towards boys, in a way that had never before been recorded in demographic history.

In 2005, six Asian countries reported a severe sex-ratio imbalance, with levels for children above 108: India, South Korea, Georgia, Azerbaijan, China and Armenia. Detailed figures for China and India show that the child sex ratio in these countries has long been above normal values, as seen in the data from the 1950s and 1960s. But in addition to this legacy, the situation worsened in these countries from the early 1980s onwards. This was the case especially for Azerbaijan and China, where, by 1990, the sex ratio among children had already reached the record value of 110. Along with China, several Caucasian countries had a child sex ratio above 115 in 2005, while countries outside of Asia usually record values of 101-105.

3. INDIAN SCENIRIO OF SEX RATIO:

TABLE3: SEX RATIO OF DATA COLLECTED FROM SAMPLE POPULATION OF STATES & UNION TERRITORIES OF INDIA (NO OF FEMALES/1000 MALES)

Sex Ratio - India/States/UTs - 2001-2011

State/ UT Code	India/State/ Union Territory #	Sex Ratio	
		2001	2011
1	2	3	4
	INDIA	**933**	**940**
01	JAMMU & KASHMIR	892	883
02	HIMACHAL PRADESH	968	974
03	PUNJAB	876	893
04	CHANDIGARH #	777	818
05	UTTARAKHAND	962	963
06	HARYANA	861	877
07	NCT OF DELHI #	821	866
08	RAJASTHAN	921	926
09	UTTAR PRADESH	898	908
10	BIHAR	919	916
11	SIKKIM	875	889
12	ARUNACHAL PRADESH	893	920
13	NAGALAND	900	931
14	MANIPUR	974	987
15	MIZORAM	935	975
16	TRIPURA	948	961
17	MEGHALAYA	972	986
18	ASSAM	935	954
19	WEST BENGAL	934	947
20	JHARKHAND	941	947
21	ORISSA	972	978
22	CHHATTISGARH	989	991
23	MADHYA PRADESH	919	930
24	GUJARAT	920	918
25	DAMAN & DIU #	710	618
26	DADRA & NAGAR HAVELI #	812	775
27	MAHARASHTRA	922	925
28	ANDHRA PRADESH	978	992
29	KARNATAKA	965	968
30	GOA	961	968
31	LAKSHADWEEP #	948	946
32	KERALA	1058	1084
33	TAMIL NADU	987	995
34	PUDUCHERRY #	1001	1038
35	A & N ISLANDS #	846	878

As per the census data of India, sex ratio in different states & Union Territories were given in table no.3. In 2001 & 2011 census data, females are less in all the states and Union Territories except Kerala and Puducherry. In DLHS 3 & 4, female number increased in southern states and Eastern part of the country except Tripura.

4. SITUATION OF SEX RATIO IN ANDHRA PRADESH:

TABLE-4.SEX RATIO IN DISTRICTS OF ANDHRA PRADESH AS PER CENSUS DATA OF 2001 & 2011

District-wise sex ratio of population by residence - Andhra Pradesh - 2001 & 2011

State/ UT Code	State/District	Sex Ratio (No. of Females per 1000 Males) 2001			Sex Ratio (No. of Females per 1000 Males) 2011		
		Total	Rural	Urban	Total	Rural	Urban
1	2	3	4	5	6	7	8
28	**ANDHRA PRADESH**	**978**	**983**	**965**	**992**	**995**	**984**
01	Adilabad	989	998	965	1003	1013	977
02	Nizamabad	1017	1027	974	1038	1047	1010
03	Karimnagar	998	1006	964	1009	1017	987
04	Medak	974	979	947	989	997	964
05	Hyderabad	933	-	933	943	-	943
06	Rangareddy	944	962	929	955	968	950
07	Mahbubnagar	972	974	954	975	976	973
08	Nalgonda	966	969	944	982	979	994
09	Warangal	973	974	970	994	996	991
10	Khammam	975	975	978	1010	1007	1021
11	Srikakulam	1014	1014	1011	1014	1010	1032
12	Vizianagaram	1009	1008	1015	1016	1011	1037
13	Visakhapatnam	985	1001	962	1003	1021	983
14	East Godavari	993	989	1005	1005	998	1027
15	West Godavari	991	985	1017	1004	997	1033
16	Krishna	978	976	981	997	998	995
17	Guntur	984	981	992	1003	995	1018
18	Prakasam	971	969	982	981	976	1001
19	Sri Potti Sriramulu Nellore	984	984	986	986	986	987
20	Y.S.R.	974	972	980	984	981	990
21	Kurnool	965	964	967	984	979	994
22	Anantapur	958	955	966	977	972	992
23	Chittoor	982	986	970	1002	1002	1001

DIFFERENCES IN SEX RATIO BY RESIDENCE:

Table-6. Sex Ratio of Top and bottom five districts by residence-2011 (Rural)(Top)

Rural

Top 5

Code	Name	Sex Ratio	Rank
02	Nizamabad	1047	1
13	Visakhapatnam	1021	2
03	Karimnagar	1017	3
01	Adilabad	1013	4
12	Vizianagaram	1011	5

Rural –Bottom Districts

Bottom 5

Code	Name	Sex Ratio	Rank
06	Rangareddy	968	1
22	Anantapur	972	2
18	Prakasam	976	3
07	Mahbubnagar	976	4
21	Kurnool	979	5

Table 7. Sex Ratio of Top and bottom five districts by residence-2011 (Urban)(Top)

Urban

Top 5

Code	Name	Sex Ratio	Rank
12	Vizianagaram	1037	1
15	West Godavari	1033	2
11	Srikakulam	1032	3
14	East Godavari	1027	4
10	Khammam	1021	5

Bottom 5

Code	Name	Sex Ratio	Rank
05	Hyderabad	943	1
06	Rangareddy	950	2
04	Medak	964	3
07	Mahbubnagar	973	4
01	Adilabad	977	5

CLASSIFICATION OF MANDALS BASED ON SEX RATIO FROM DATA COLLECTED DURING 2001 & 2011 CENSUS :

Table 8. Sex Ratio range by residence in 2001 & 2011 census of AP (Mandals)

Sex Ratio Range	2001			2011		
	Total	Rural	Urban	Total	Rural	Urban
1	2	3	4	5	6	7
< OR = 800	0	1	3	0	0	2
801-850	0	0	1	1	0	2
851-900	2	1	5	4	2	8
901-950	113	115	39	74	69	27
951-1000	763	750	96	585	582	110
1001-1050	198	198	36	402	377	113
1051-1100	30	31	4	55	58	23
1101-1150	3	3	0	7	10	2
1151-1200	0	1	0	0	0	3
> OR = 1200	0	0	0	0	0	2

The total number of mandals in Andhra Pradesh is 1403. Female number is more than males in 588 mandals. State average of females is 992/1000 males in 2011.

5. CONSEQUENCES OF INCREASED SEX RATIO:

It causes natural imbalance, low social justice, maldistribution of natural resources, poor quality of life, cropping up of social evils, feeling of insecurity among the opposite sex and other social & political problems.

CONCLUSION:

Sex ratio is an important indicator of nation's outlook on its population. Women are not only important producers of goods and services, but also constitute the influential group of consumers and the wheels of economic activity are driven by women and girls. A failing natural balance between the sexes, will not only damage the social system, but also entire economic system beyond repair. It causes social unrest in the public and it is threat to political system and instability of the country. Thus it will be the duty of political system to provide natural & social justice to its public by maintaining the sex ratios. Close monitoring of sex ratio is an important tool of changing composition of the population and everyone is to be involved in restoring sex ratio to base level. It needs education, motivational efforts through various leaders, close watch on

misuse of technology and creating assurance to the under privileged sex are the immediate necessities.

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Trends, consequences and policy responses
Christophe Z Guilmoto
LPED/IRD, Paris

Author's Profile:

First Author:

- Working as Professor in Dept. of Social and Preventive Medicine in Malla Reddy Medical College for Women, Hyderabad.
- Completed 20 years of teaching experience in Govt Medical Colleges
- Acquired Diploma in Community Eye Health from London School of tropical medicine and hygiene, London, UK
- President of Community Ophthalmogist Association, India
- Member of All India association of SPM
- Participated in many community surveys as Principal investigator
- Participated in Rapid Assessment of Avoidable Blindness survey conducted by Govt. of India
- Conducted health camps in 108 villages as part of study conducted to collect baseline data around Uraium Project located at Tummalapalli Village of Kadapa district of AP with financial assistant of GOI
- A Demographic study conducted among the population of villages surrounding Uranium Project located at Tummalapalli village of Kadapa, AP with financial assistance from BARC, Mumbai & GOI.
- Two Scientific papers were presented for the 18th National Symposium on Environment conducted in December 2013 organized by JNTUA, Anantapur, AP & BARC, Mumbai
- Involved in academic activities for UG and PG students
- Assisting in PG dissertation work
- Presented papers in State, Zonal CME programmes, state, national and international conferences

Second Author:

- Working as Professor in Dept. of Social and Preventive Medicine in Malla Reddy Medical College for Women ,Hyderabad
- Experience of 37 years of teaching for both UG and PG students
- Is a internal and External examiner for PG and UG students
- Participated in public health projects in HIV /AIDS, Safe Injection practices and UIP

Third Author

- Working as a Professor and Head, Department of Community Medicine, Malla Reddy Medical College for Women, Suraram Hyderabad.
- Worked in the Public health field for more than 38 years
- Has more than 20 years of teaching experience
- Worked with WHO India in Polio eradication program
- Acquired a Diploma in Advanced Vaccinology from Annecy France.
- Participated and contributed to many community based surveys.
- Participated in five Maternal and Neonatal elimination validation programs (4 in India and one in Indonesia as a Global Associate from WHO)
- Participated in American Public Health Association conference in Boston in 2007 and presented a paper on Supportive Supervision

Presented papers in National and International conferences