Volume 7 Number 1 July 2021

Prof. Jyoti S. Hallad, Professor & Director, attended PRC Review meeting organized by Director General and DDG, Statistics Division, MoHFW, GoI, New Delhi on 23.04.2021 and 04.05.2021.

Publications

1. Pradeep S. Salve, Mahadevi N. Korkoppa, Channabasappa Noolvi, H. R. Channakki and Jyoti S. Hallad (2020), "Low Birth Weight and Infant Deaths in India: A District-Level Analysis Using the Health Management Information System Data" Demography India, Vol. 49 No. 2 (2020) pp 67-75, ISSN 0970-454X
2. Pradeep S. Salve, Shrikanta R. Vatavati and Jyoti S. Hallad, May, 2021 "The hub-and-spoke model of national STEMI programme of India: An investigation of STEMI-Goa project" in International Journal of 'Indian Heart Journal – Elsevier' on 26th May 2021.
3. Golandaj JA. Naikar SK. and Hallad JS. (2021) "Trends and sub-national disparities in TB notifications in India: Insights from HMIS Data" *Indian Journal of Tuberculosis.*
4. Golandaj JA. (2021) "Pediatric TB detection in the era of COVID-19" *Indian Journal of Tuberculosis,*
5. Shriprasad and K.G. Kallihal 'Tobacco Use and Alcohol Consumption Among College Students: A Behavioural Study in Belagavi City', Karnataka in '*Journal of Health Management*' Volume 23 Issue 2, June 2021

Workshop Conducted:

Centre organized a Three-Day Regional Level Workshop on 'Core Elements of Social Science Research Methodology' during 15-17 February, 2021 under Padmavibhushana Dr. D. Veerendra Heggade Chair for Studies on Health & Demography (DVH Chair) in collaboration with ICSSR, Hyderabad. Dr. Shriprasad H. was the Coordinator

Papers presented at Seminars / Workshops attended

Following papers are presented in 5th Knowledge Dissemination Workshop of PRCs organized by PRC, Lucknow on 1 & 2 March, 2021.

1. Prof. Jyoti S. Hallad, "Assessment of Implementation of C-PHC through Ayushman Bharat Health & Wellness Centers in Karnataka".
2. Dr. Shriprasad H., "The Knowledge of Accredited Social Health Activists' (ASHAs) and Mothers' on Home Based Neonatal Care- A Cross sectional Study
3. Dr. Pradeep S. Salve, presented a paper on "The Assessment of Implementation of National STEMI Programme in Goa" received **Best Research Paper Award** ***(Second prize)***
4. All staff attended short term training programme conducted by IIPS, Mumbai, during 18th may to 18th June, 2021.

Published by

Padma Vibhushana Dr. D. Veerendra Heggade
Chair for Studies on Health & Demography
JSS INSTITUTE OF ECONOMIC RESEARCH
VIDYAGIRI, DHARWAD-580 004, KARNATAKA, INDIA

ISSN : 2454-9207

IER JOURNAL OF HEALTH AND DEMOGRAPHY

RESEARCH ARTICLES

Published by

Padma Vibhushana Dr. D. Veerendra Heggade
Chair for Studies on Health & Demography

JSS INSTITUTE OF ECONOMIC RESEARCH
VIDYAGIRI, DHARWAD-580 004, KARNATAKA, INDIA

ISSN : 2454-9207 Volume 7 Number 1 July 2021

IER Journal of Health and Demography

ARTICLES

Prevalence and Determinants of Hysterectomy in Puducherry Union Territory: An Analysis of NFHS-4 Data

P. Sarala Devi[1] and N. Audinarayana[2]*

Abstract

In India, among women in reproductive ages, undergoing hysterectomy appears to be reasonably increasing during the recent past. However, community-based studies are scanty to understand its prevalence as well as major determinants. Hence, this paper aims in this direction making use of the 4th round of National Family Health Survey of Puducherry Union Territory in which 4012 ever married women aged 15-49 are covered. Overall, 2.4 per cent of sample women had reported to be undergone hysterectomy surgery. Majority of them had hysterectomy a bit recently viz., ≤5 years (42%) and 6-10 years (28.5%) before 2015-16, largely in private hospitals / clinics (60%) and the major reason stated for such surgery is 'excessive menstrual bleeding / pain' (59%) closely followed by 'fibroids / cysts' (31%). Cross-tabular analysis with Chi-square test results showed that the differentials in the prevalence of hysterectomy across their selected background characteristics are mostly on the expected lines and also found to be statistically significant (at different levels of significance), except for wealth index of the households. Results based on multivariate logistic regression analysis highlighted that the odds of women experienced hysterectomy are higher among those who are in the age group of 35-49 years, working for wages / salary outside home, had 2 and 3 or more number of children ever born, belonged to non-SC/ST communities and 'rich' households on wealth index ($p<0.05$ in all cases, except for current age, $p<0.001$) than their respective counterparts. Conversely, such likelihood is pertinently lower among those who had 8-12 and 13 or more years of schooling ($p<0.001$ in both the cases) and also among those residing in urban areas ($p<0.01$) as compared to those who are illiterates / had 7 or less years of schooling and living in rural areas. Plausible reasons for such associations and policy implications are proposed.

Keywords: Hysterectomy, Determinants, Multivariate Logistic Regression, Puducherry

[1] Research Scholar (Part-time), The IIHMR University, JAIPUR – 302 029
[2] Former Professor, Dept. of Sociology & Population Studies, Bharathiar University, Coimbatore – 641 046.
*e-mail: audinarayana.bu@gmail.com

Introduction

In the recent past, removal of uterus among women with surgical operation, commonly known as hysterectomy, has become the major attention among the medical, public health and demographic researchers, especially in the developing countries like India. Generally, it used to be done among women to reduce the future risk of ovarian cancer and in most cases, it also involves removal of ovaries (prophylactic oophorectomy). Some of the other medical indications of hysterectomy include gynecological ailments such as fibroids, dysfunctional uterine bleeding, uterine prolapse, etc. (Shekhar et al., 2019). However, there is wide discussion and support that the surgical removal of uterus and ovaries would affect women's physical and mental health both positively and negatively. On the positive side, women would be relieved from anxiety and depression, if it is done for critical and chronic gynecological problems such as abnormal bleeding and pelvic pain, and thereby, improve their quality of life for short period (say about 6-12 months) after surgery. On the other hand, evidence-based research also shows that there are several adverse / side effects of hysterectomy such as urinary inconsistence, sexual dysfunction, backache and weakness, and early onset of menopause (Prusty et al., 2018).

With regard to the prevalence of hysterectomy, there is evident that for a long time, it used to be done in women of more developed countries comparatively at higher extent. For instance, the prevalence of hysterectomy is estimated to be much higher in the countries like the United States (54% during 200-2004), Australia (30% in 2004-2005) and Germany (12% in 2005), and there are indications that such prevalence has come down in most of these higher income countries (Hammer et al., 2015). On the other hand, such prevalence rates are comparatively much lower in less developed countries ranging between 1.7 and 9.8% (Desai et al., 2017). In Indian context, according to DLHS-4 (2012-13) the prevalence of hysterectomy is 1.7 per cent (Prusty et al., 2018). But, similar figure according to the NFHS-4 (2015-16) is 3.2 per cent among women aged 15-49 years (IIPS and ICF, 2017), 4.1% among ever-married women (Singh et al., 2020) and 6.0% among women aged 30-49 years (Shekhar et al., 2019). However, such rates varied significantly across the states of India; for instance according to the NFHS-4, among the major states, the rates are fairly higher side in Andhra

Pradesh, Telangana, Bihar and Gujarat (ranging between 8% - 4.2%) as compared to the states like Kerala, Haryana and Chattisgarh (1.9% - 1.8%) and in most of the other major states the corresponding figures fall in the range of 2.0% - 2.6% (IIPS and ICF, 2017). But few micro-levels studies, though limitations exist, showed that the prevalence rates of hysterectomy are reasonably higher side – 7% among married women of aged 15 years and above in Haryana state (Singh and Arora, 2008), 6.9% among women belonged to rural and urban Self Employed Women's Associations (SEWA) in Ahmedabad district, Gujarat state (Desai et al., 2011) and 32.5% among the pilgrims visited to Lord Balaji temple in Tirumala, Andhra Pradesh state (Radha et al., 2015).

Some of the earlier research studies also noted a number of factors that are likely to determine and/or affect the women undergone hysterectomy. Desai et al. (2017) in their cross-sectional household survey carried out in Gujarat (during 2010-12) noted that the number of surviving children and income level are the major predictors of hysterectomy, whereas marital status and sterilization history didn't turn out as significant ones. Further, bivariate analysis results showed that the percentage of women who had hysterectomy is higher among women residing in rural areas, who have a community-based health insurance and who are in the age group of 35-44 years than their respective counterparts. An analysis of the DLHS-4 data for non-EAG states of India by Prusty et al. (2018) highlighted that current age of women, number of children ever born, caste hierarchy and wealth index are positively (and significantly) related with hysterectomy, whereas level of education is negatively correlated with hysterectomy in a pertinent manner. Further, the tendency to go for hysterectomy is found to be higher among those women working, have household insurance and underwent sterilization than their respective counterparts. While analyzing the NFHS-4 data for all India as well as selected states (Gujarat, Bihar, Andhra Pradesh and Telangana), Desai et al. (2019) observed that women's higher age, parity (at least two children), household wealth index and rural residence are positively associated with undergoing hysterectomy, whereas women with more than 10 years of schooling is negatively associated with hysterectomy. Further, at all India level, the magnitude of hysterectomy among women is found to be lower among those who belonged to SC/ST communities, non-Hindu and adopted sterilization than their respective counterparts (all these associations are highly

significant). Most of these predictors of hysterectomy have demonstrated uniform net effects on hysterectomy in the four states under study (significant levels vary), except in the case of sterilization for Andhra Pradesh, wherein women who got sterilized have had higher tendency to go for hysterectomy. With a few exceptions, findings from the analysis of NFHS-4 data for ever-married (15-49 years) and 30-49 aged women have also displayed almost similar findings (Shekhar et al., 2019; Singh et al., 2020).

The evidences shown in the aforesaid lines suggest that the studies related to hysterectomy are limited in nature, especially in the case of large-scale cross-sectional community-based surveys like the DLHS-4 and NFHS-4. Hence, this paper attempted with three specific objectives: i) to know the prevalence of hysterectomy among women aged 15-49 years, ii) to examine the associations of hysterectomy with selected background factors of women / household and iii) to find out the principal determinants of women undergone hysterectomy.

Methods

Data for the present paper has been drawn from the National Family Health Survey, 4 (NFHS-4) conducted during June – July 2015 in Puducherry Union Territory (UT). In this survey, 4012 women (aged 15-49) have been interviewed from 3205 sample households. The sample households have been selected following two-stage stratified sampling (for details see IIPS and ICF, 2017). From this data set, details related to 'whether the woman had undergone operation (surgery for hysterectomy) to remove the uterus'; if yes, 'how many years ago?', 'where (type of health facility) was it performed and 'why (reason) was the operation performed' are considered for analysis in this paper.

Dependent Variable: The dependent variable considered here is 'whether the women have had undergone hysterectomy or not'. All those women who answered as 'yes' are grouped into one category and assigned a score of '1' and those who responded as 'no' have been grouped into another category and assigned a score of '0'. Thus, the dependent variable is dichotomous in nature.

Independent (Explanatory) Variables: Selected background and household characteristics of the sample women (depending upon the availability of data in the NFHS-4), which are likely

to affect (based on the theoretical background and earlier research) the chances of undergoing hysterectomy have been considered as independent variables for this study. Most of these variables are self-explanatory, except wealth index of the households (Table 2). In NFHS-4, wealth index of household has been computed based on the 33 household assets and housing characteristics. For this purpose, each household asset is assigned a weight (factor score) generated through principal components analysis, and the resulting asset scores are standardized in relation to a normal distribution with a mean of zero and standard deviation of one. Each household is then assigned a score for each asset, and the scores were summed for each household; individuals are ranked according to the score of the household in which they reside. The sample is then divided into quintiles i.e., five groups with an equal number of individuals (20 percent) in each at national level, though this is not necessarily true in the state level. For the present analysis, this variable is modified into three categories, merging the 1st and 2nd quintiles as one category 'Poor' (Poorest and Poorer), 3rd quintile as 'Middle', and 4th and 5th quintiles as another category 'Rich'.

The analysis is carried out in three stages. Firstly, whether women have undergone hysterectomy (operation) and the (selected) background and household characteristics of the women are analysed with simple frequency tables. Then the differentials in the percentage of women undergone hysterectomy have been analysed across their background / household characteristics with cross-tabular analysis and Chi-square test of significance. Finally, multivariate logistic regression is carried out so as to find out the major factors that determine to undergo hysterectomy among women. All these analyses are carried out with help of IBM-SPSS software (version 20.0).

Results

Magnitude of Hysterectomy among Women and Related Aspects

Among the sample women of Puducherry UT, overall, 2.4 per cent of them have had hysterectomy (Table 1), which is fairly lower than the average figure of all India (stated earlier). When all those who had undergone hysterectomy (n=98) enquired about 'how many years ago, it was performed?', 41 of them stated that it is performed during the recent last 5 years or before and 23 of them during 6-10 years and the remaining 16 and 18 of them have underwent the same during 11-15 years and 16 years & above, respectively. With regard to

place of hysterectomy performed, majority of them performed it in private hospital / clinic (59 / 98) and the rest in public health facilities such as Government hospital / CHC / PHC, etc. 'Excessive bleeding' is the most mentioned reason for women undergoing for hysterectomy followed by 'fibroids / cysts'.

Table 1: Magnitude of Hysterectomy among Women (15-49 years) and Related Aspects in Puducherry UT

Hysterectomy and Related Aspects	Percentage	Frequency
Prevalence of Hysterectomy		
No	97.6	3914
Yes	2.4	98
Total	**100.0**	**4012**
Years ago Hysterectomy performed		
≤ 5	41.8	41
6 – 10	23.5	23
11 – 15	16.3	16
16 +	18.4	18
Place Hysterectomy performed		
Govt. Hospital / CHC / PHC	39.8	39
Private Hospital / Clinic	60.2	59
Reasons for Hysterectomy performed@		
Excessive Menstrual Bleeding / Pain	59.2	58
Fibroids / Cysts	30.6	30
Uterine Disorder (Rupture)	8.2	8
Others	11.2	11
Total	**100.0**	**98**

Note: @ = Multiple Responses

Background Characteristics of the Women / Households

Among the sample women of Puducherry UT (Table 2), slightly more than three-fourths of them (76%) are residing in rural areas and the remaining of them are living in urban areas. A little less than one-fifth of them (19.3%) belonged to Scheduled Castes / Tribes (SC/ST) and the remaining are from non-SC/ST communities, viz., Most Backward, Backward and Forward (General) Castes. Majority of them (59%) are little younger in age (15-34 years) and the rest of them are in the age group of 35-49 years. While 23.5 per cent sample women have schooling up to 7 years (including a few Illiterates / no schooling), 51 per cent of them have studied 8-12 years in school and one-fourth of them (25%) have collegiate education. An overwhelming percentage of them (96.3%) are not-working for wages (homemakers) and the remaining few of them reported to be engaged in one or the other economic activities

(working). About 37 per cent of them have two children ever born followed by one child and three or more children (17% and 15%, respectively), whereas 30 per cent of them didn't have a child (ever born) at the time of survey. A large percentage of them (78%) reported to be living in household of 'rich' category (based on wealth index), whereas 15% and 8.7% of them, respectively belonged to households of 'middle' and 'poor' categories of wealth index.

Table 2: Background Characteristics and Differentials in the Magnitude of Hysterectomy had / not among Women (15-49 years) in Puducherry UT

Background Characteristics of the Sample Women	%	N	Had Hysterectomy		Not Had Hysterectomy		χ^2 – Value; Sig. Level
			%	Fre.	%	Fre.	
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
1. Place of Residence							
Rural	76.0	3049	2.8	85	97.2	2964	6.349;
Urban	24.0	963	1.3	13	98.7	950	0.01
2. Caste							
Scheduled Castes / Tribes	19.1	765	1.2	9	98.8	756	6.589;
Non-SC/ST	80.9	3247	2.7	89	97.3	3152	0.01
3. Current Age (in Years)							
15 – 34	59.3	2381	0.4	10	99.6	2371	100.553;
35 – 49	40.7	1631	5.4	88	94.6	1543	0.001
4. Women's Years of Schooling							
Illiterate & Up to 7 Years	23.5	943	6.9	65	63.3	878	
8 – 12 Years	51.1	2052	1.3	26	86.0	2060	103.406;
13 + Years	25.4	1017	0.7	7	89.2	1010	0.001
5. Women's Work Status							
Not Working / Homemakers	96.3	3863	2.3	90	97.7	3773	5.561;
Working	3.7	149	5.4	8	94.6	141	0.05
6. Children Ever Born							
0	30.3	1218	0.2	3	99.8	1215	
1	17.1	685	1.6	11	98.4	674	
2	37.3	1496	3.4	51	96.6	1445	54.778;
3 +	15.3	613	5.4	33	94.6	580	0.001
7. Households' Wealth Index							
Poorer / Poor	8.7	348	1.1	4	98.9	344	
Middle	15.3	616	2.4	15	97.6	601	2.727;
Richer / Richest	76.0	3048	2.6	79	97.4	2969	NS
8. Had Sterilization							
No	60.0	2409	1.2	28	98.8	23811	41.477;
Yes	40.0	1603	4.4	70	95.6	533	0.001
Total	**100.0**	**4012**	**2.4**	**98**	**77.1**	**3914**	--

Note: %s & Frequencies for those who had or not Hysterectomy computed horizontally for each category of the Background Characteristics.

Differentials in Magnitude of Hysterectomy across Selected Background Characteristics

Data presented in Table 2, by and large, shows that the magnitude of women who had hysterectomy varied noticeably across the selected background characteristics of the respondents. From panel 1, it is evident that the percentage of women who had hysterectomy is noted as lower among those who are residing in urban areas as against in rural areas (1.3% *vs.* 2.8%). Data provided in panels 2-3 suggest that the magnitude of women who had undergone hysterectomy is higher among those who belonged to non-SC/ST Castes and the age group of 35-49 years as against those who belonged to SC/ST communities (2.7% *vs.* 1.2%) and younger in age – 15-34 years (2.7% and 5.4% *vs.* 1.2% and 0.4%, respectively). Conversely, the percentage of women who had hysterectomy is pertinently lower (panel 4) among those who had collegiate education (0.7%) followed by 8-12 years (1.3%) as against to those who had little schooling (7 years or less) / no schooling (6.9%). The magnitude of women who had undergone hysterectomy is much higher among those who are working for wages outside home (panel 5) as against homemakers (5.4% *vs.* 2.3%) and similar pattern (panel 8) is also noted in the case of sterilized as against not sterilized (4.4% *vs.* 1.2%). There appears to be (panels 6 and 7) a consistent increase in the magnitude of women who had undergone hysterectomy with an increase in the number of children ever born they had (from 0.2% who didn't have a child ever born to 5.4% for those who have had 3 or more number of children ever born) as well as wealth index of households (from 1.1% for those who belonged to households of 'poor' wealth quintile to 2.6% for those who belonged to households of 'rich' wealth quintile). The Chi-square test results in all these regard, except in the case of households' wealth index, have turned out as highly significant ($p<0.01$ or $p<0.001$; $p<0.05$ for women' work status).

Multivariate Binary Logistic Regression Results on Women who had Hysterectomy

Results of multivariate binary logistic regression analysis (Table 3) reiterate that, controlling for the other background characteristics under consideration, the odds of women who had hysterectomy are pertinently higher among those who are in the age group of 35-49 years as against to those who are relatively younger in age, 15-34 years (Odds Ratio [OR]=6.052;

p<0.001). Similar higher odds are also noticed among those who have 1, 2 and 3 or more children ever born (OR=3.001, 3.853 and 3.810; p<0.10; p<0.05 and p<0.05, respectively), who are working outside home for wages (OR=2.563; p<0.05), and belonged 'rich' households on wealth index (OR=2.761; p<0.05) than their respective counterparts. As expected, the odds of undergoing hysterectomy are higher among women belonged to non-SC/ST communities (OR=1.199), but this finding is statistically significant to a little extent (p<0.10). Conversely, it is striking to note that the likelihood of women undergone hysterectomy is lower among those who are fairly higher educated (13+ years of schooling) and also who have had 8-12 years of schooling (OR=0.189 & p<0.001 and OR=0.253 & p<0.001, respectively) than those who are having little education or no schooling. Such lower tendency of undergoing hysterectomy is also noted among those who are living in urban areas to a moderate extent (OR=0.529; p<0.05) as against their rural counterparts. On the other hand, as expected the odds of women ever had hysterectomy are observed to be relatively higher among those who underwent female sterilization than those who didn't, but the Wald-test results in this regard didn't turn out as statistically significant.

Table 3: Multivariate Logistic Regression Analysis Results on Women (aged 15-49) who had Hysterectomy in Puducherry UT

Explanatory Variables	β Co-efficent	Odds Ratio	p-Level
Place of Residence *(Ref: Rural)*			
Urban	-0.637	0.529	0.05
Caste *(Ref: SC/ST)*			
Non-SC/ST	0.618	1.9867	0.10
Current Age *(Ref: 15– 34 Years)*			
35–49	1.800	6.052	0.001
Women's Years of Schooling *(Ref: Up to 7 Years)*			
8 – 12 Years	-1.373	0.253	0.001
13 + Years	-1.667	0.189	0.001
Women's Work Status *(Ref: Not Working)*			
Working	0.937	2.563	0.05
Children Ever Born (*Ref: 0)*			
1	1.099	3.001	0.10
2	1.349	3.853	0.05
3 +	1.338	3.810	0.05

Households' Wealth Index (*Ref: Poorer / Poor)*			
Middle	0.755	2.127	NS
Richer / Richest	1.016	2.761	0.05
Had Sterilization *(Ref: No)*			
Yes	0.182	1.199	NS
-2 Log Likelihood	**743.283**		
Chi-square; df; Sig.; N	**177.574; 12; 0.001; 4012**		
Cox & Snell R Square (in %)	**4.3**		
Nagelkere R Square (in %)	**21.1**		

Note: NS = p-value for the respective Beta Coefficient is Not Significant.

Discussion

The prevalence of hysterectomy among women of Puducherry UT is found to be 2.4, which is almost nearer to the figure as per DLHS-4 (2.9; Prusty et al., 2018). As noted by few aforesaid studies, age of women appears to be the key predictor of hysterectomy. The major reasons for such finding could be increasing occurrence of reproductive tract infections / gynecological problems with age and thereby, doctors / medical personnel generally suggest undergoing of hysterectomy and/or women themselves would prefer to go for the same to get rid of such health problems. Added to these, women in their later part of reproductive ages would prefer for surgery as they might have achieved their desired family size and thereby, perceive that there is no need for reproductive organs any more. This has been further supported by the finding that women with higher number of children born have exhibited higher tendency to go for hysterectomy who might have got the required number of surviving children, mostly adopting tubectomy and also likely to be in their later part of reproductive age. Among the other findings, it is conspicuous to note that women working and belonged to households of 'rich' wealth quintile are more likely to uptake hysterectomy. The plausible reasons for such associations could be such women have better access to monetary resources and thereby, able to bear the fairly large expenses incurred for hysterectomy surgery and related procedures as majority of women use to seek such services from private health facilities, which are mostly costlier.

Next to these, women belonged to non-SC/ST communities have showed a higher inclination to go for hysterectomy (surgery) as majority of them are likely to be part of 'rich' households and also might have completed their desired family size sooner than later. Another pertinent finding noted in this study is that women who are higher educated have lesser chances of

undergoing hysterectomy. Such tendency is possible due to the fact that educated women have higher awareness about preventive as well as curative health care aspects. Due to better awareness, on the one side, such women are more likely to take preventive steps for non-occurrence of RTIs and on the other side, they may seek medical and health treatment for such infections at the earliest so as to keep up their reproductive and sexual health much better. On the other hand, educated women are also likely to take other options of treatment for gynaecological problems / RTIs (including taking up treatment from other systems of medicine) instead of resorting to (allopathic) hysterectomy and also think in advance about the after effects and/or adverse effects of hysterectomy. Most of the findings of this study are corroborated with those findings observed in a few studies carried out in India (Desia et al., 2017; 2019; Prusty et al., 2018; Shekhar et al., 2019; Singh et al., 2020).

Conclusions and Implications

The NFHS-4 (2015-16) data for Puducherry UT highlights that 2.4 per cent of women (aged 15-49) have underwent hysterectomy. Of those who had hysterectomy, a simple majority had it during the recent past (5 years preceding the survey), in private hospitals and the leading causes mentioned are ‘excessive menstrual bleeding / pain’ and ‘fibroids / cysts’. By and large, women in higher age (35-49 years), having more number of children (2 and 3+), working outside home for wages, belonged to households of ‘rich’ wealth quintile and non-SC/ST communities have higher odds of hysterectomy, and to some extent who have had female sterilization undergone hysterectomy to a higher extent. In contrast, women who have schooling for about 8-12 and collegiate education as well as residing in urban areas have demonstrated less inclination of undergoing hysterectomy.

At the policy front, efforts may be made to provide suitable / appropriate services to prevent and treat the women’s gynecological morbidities through public health facilities, which would be more beneficial to those women residing in rural areas, illiterates / less educated and belonged to poor families. Steps may also be taken to collect data at micro- level with qualitative methods so as to understand the intricacies behind undergoing hysterectomy and to study the problem of hysterectomy in a holistic manner.

References

Desai, S., Campbell, O.M.R., Sinha, T., Mahal, A. and Cousens, S. (2017), "Incidence and determinants of hysterectomy in a low-income setting in Gujarat, India", *Health Policy and Planning,* Vol. 32, No. 1, pp. 68-78.

Desai, S., Shuka, A., Nambiar, D. and Ved, R. (2019), "Patterns of hysterectomy in India; A national and state-level analysis of the fourth National Family Planning Health Survey (2015-16)", BJOG: *An International Journal of Obstetrics and Gynaecology,* Vol. 126, No. S4, pp. 72-80.

Desai, S., Sinha, T. and Mahal, A. (2011), "Prevalence of hysterectomy among rural and urban women with and without health insurance in Gujarat, India", *Reproductive Health Matters,* Vol. 19, No. 37, pp. 42-51.

Hammer, A., Rositch, A.F., Kahlert, J., Gravitt, P.E., Blaakaer, J. and Sogaard, M. (2015), "Global epidemiology of hysterectomy: Possible impact on gynecological cancer rates", *Am J Obstet Gynecol.,* Vol. 213, No. 1, pp. 23-29.

International Institute for Population Sciences (IIPS) and ICF. (2017), National Family Health Survey (NFHS-4), 2015-16: India, IIPS, Mumbai.

Prusty, R.K., Choithani, C. and Gupta, S.D. (2018), "Predictors of hysterectomy among married women 15–49 years in India", *BMC Reproductive Health,* Vol. 15, No. 3, DOI: 10.1186/s12978-017-0445-8.

Radha, K., Devi, G.P., Chandrasekharan, P.A., Swathi, P. and Radha, G. (2015), "Epidemiology of hysterectomy: A cross-sectional study among pilgrims of Tirumala", *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS),* Vol. 1, No. 14, pp. 1-5.

Shekhar, C., Paswan, B. and Singh, A. (2019), "Prevalence, sociodemographic determinants and self-reported reasons for hysterectomy in India", *Reproductive Health,* Vol. 16, No. 118. https://doi.org/10.1186/s12978-019-0780-z.

Singh, A. and Arora, A.K. (2008), "Why hysterectomy rates are lower in India", Indian *Journal of Community Medicine,* Vol. 33, No. 3, pp. 196-197.

Singh, S.K., Sharma, S.K. and Siddhanta, A. (2020), "Major correlates and socioeconomic inequalities in hysterectomy among ever-married women in India", *Indian J Community Med.,* Vol. 45, No. 1, pp. 12-17.

Regional Disparity in Sex Ratio at Birth in Karnataka: Current Scenario

Rajarama K E T[1]* and M. S. Kampli[2]

Abstract

Aim of this paper is to understand the regional disparities in Sex Ratio at Birth (SRB) and to assess the trends in the same over the years. Health Management Information System's data has been used. The study reveals that two-thirds of the districts in Karnataka have skewed sex ratio. Among the four revenue divisions, districts of Gulbarga division are having balanced sex ratio and districts of Bangalore division have male biased sex ratio. Around 19,000 female babies have gone missing before they come in to this earth in the state during last 3 years. Bangalore division alone accounts for more than 50 percent of total missing daughters. The trend value predicts that the SRB will continue in declining trend in the state and in the divisions except in Gulbarga where it will move in increasing trend. The important message is that balanced SRB to be achieved in all the districts as early as possible. The Government needs to redesign its programmes to change the mindset of people on baby girls which is very crucial.

Introduction

Sex Ratio at birth (SRB) has been the priority area of demographic research in India ever since 1980s as there was a deep imbalance in the primary, secondary and tertiary sex ratio of the country's population. The sex ratio in India was 939 in 1991 census and it decreased to 915 in 2001 and further decreased to 910 during 2011 census period. The latest statistics reveals that sex ratio problem is still alive even after taking some measures by the government. The Sex Ratio at Birth in India was 909, 906, 900 and 898 in 2013, 2014, 2015 and 2016 respectively. The number is quite high as 13 states in India have recorded decline in SRB. Apart from Census, the demographic studies which were conducted at different parts of the country at different points of time also revealed the same truth. The study conducted during 2007-2012 in a Mumbai maternity hospital found that the mean SRB was 908 female live births per 1000 male live birth (Warade et. al., 2014). The problem is

[1] Senior Assistant Professor (Retired), Population Research Centre, JSS Institute of Economic Research, Dharwad
[2] Data Analyst, Population Research Centre, JSS Institute of Economic Research, Dharwad
*Email: rajaramaket@gmail.com

not that serious in Karnataka as in the case of country according to the decennial Census data. It was 959 in 1991 census and increased to 973 in 2001 and declined to 952 in 2011 census. This new phenomena has caused a serious concern among the policy makers, social scientists and social thinkers. They have conducted several studies at the ground level in order to identify the causes for skewed sex ratio at birth and imbalance in child sex ratio. Their findings revealed that the practice of female foeticide and female infanticide are the root causes which exists due to strong son preference (Gupta & Bhat, 1997). In India, the sons are more preferred to the daughters for cultural and old age security reasons such as to continue family lineage, to perform last ritual of the parents after death and to look after the aged parents. The sex selection practice was limited to the socio-economically well-off groups and among the metropolitans in 1980s but this practice had spread across all castes, creeds and classes in 1990s leading to deep imbalance in sex ratio of newborns (Agnihotri, 2000, Murthy et. al., 1995, John et. al., 2008).

Declining sex ratio is not only the problem of India, but also in other Asian countries. For instance, Sex ratio of China was 944 in 2001 and it declined to 926 in 2011. (Barakade, 2012). Among SAARC countries, Bangladesh (109 boys for every 100 girls) and Nepal (106 boys for 100 girls) have skewed sex ratio and Pakistan has a balance SRB (Puri, 2015).

Low sex ratio at birth leads to deficit of females in the society. The demographers have estimated loss of female children in India and in some states during different census periods. Some estimates say that around 1.58 crore girls have gone missing from India since 1990. The extent of loss of females in 2001 and 2011 were to the tune of 4.04 lakh and 2.60 lakh respectively. Another study has estimated that loss of girl child due to sex selective abortion is around 6 lakh from 2001 to 2007 (UNFPA, 2011). Although declining sex ratio is very high in certain pockets of the country like Panjab, Haryana, Uttar Pradesh, Bihar and Rajasthan (Bhattacharya, 2012), but it is prevailing right across the country and prevailing with all social and ethnic groups with minor variations.

The declining sex ratio for any country has wider socio-economic and demographic implications. The skewed sex ratio leads to deficit in female population in the society and that leads to the shortage of brides in the marriage market. This will lead to more number of

potential bridegrooms to remain unmarried. According to Christophe Guilmoto by 2060 more than 10 percent of men will still be single when they turn 50 years old. The estimates done in 1990s cautioned that 30 to 40 million of grooms in China and in India will remain unmarried because of shortage of brides as a result of sex selective abortion (Guilmoto, 2007). Further, imbalance in the sex ratio contributes to increase in social problems such as increase in rapes, polyandry, change in family structure, rise in demand for sex work etc. (Sarabu, 2012).

Government Initiative to maintain balanced sex ratio

Legal measures

Pre-conception and Pre-natal Diagnostic Techniques Act

People had started misusing the modern diagnostic technology such as ultrasonography, feotoscopy and amniocentesis etc. for detecting sex of the foetus and going for abortion if sex of the foetus is female. Realising the imbalance in sex composition in the community, government of India had brought a legislation called Pre-conception and Pre-natal Diagnostic Techniques Act (PC-PNDT) in 1994 amended in 2002 in order to check the sex selective abortion. Opting the sex determination test or conducting such tests for non-medical reason is a criminal offence according to the law. In this regard, wide publicity has been given to bringing awareness among public about the law. Strict implementation of the law in the society is highly doubtful as no case against the law breakers has been booked so far.

Social welfare schemes

The central and the state governments have launched some girl child welfare programmes in order to stop sex selective abortion and encourage and support the parents to have girl children. For instance the government of Karnataka has introduced the *Bhagyalaxmi* scheme and the government of India has implemented the *Sukanya Samruddhi* yojana a special saving schemes for daughters. Recently, Government of India has introduced *Beti Bachao and Beti Padhao* scheme to promote the birth of girl children and to encourage the education of daughters.

Beti Bacho and Beti Padhao

This scheme is launched by the government of India to address the issue of declining child sex ratio. This is a comprehensive girl child welfare scheme aiming to celebrate the birth of the girl child by ensuring her survival through stopping sex selective abortion and to monitor the improvement in the sex ratio at birth thereby ensuring protection of adolescent girl's rights related to health, nutrition, and menstrual hygiene, violence against female children and abuse of girl children; Recognising and rewarding achievement of girl children in different fields; ensuring the participation of all stakeholders in the promotion of the programme. This scheme is implemented across the country and is funded through Ministry of woman and child development. The Ministry of Health and Family Welfare and Ministry of Human Resource Development also involved in implementing the scheme.

Bhagyalakshmi Scheme

Following the footsteps of government of India, several state governments including Government of Karnataka have introduced the girl child welfare programmes in order to improve declining child sex ratio in the state, to have balanced sex ratio and to protect the female children by various types of exploitations. Bhagyalakshmi Scheme is one such scheme introduced by the Government of Karnataka in 2006-07 and modified in 2008. This is a cash incentive scheme that can be availed by first two female children born in the below poverty line households. Following are the aims and objectives of the scheme – to promote birth of girl child, to enhance the health conditions of female children, to promote girls' education and to protect the female children from various kinds of exploitations. According to the scheme, the government will deposit 19,350 rupees and 19,350 rupees each in financial institutions in the name of first and second born children respectively. The beneficiary can utilise the matured amount, little more than a lakh, after attaining 18 years of age.

Sukanya Smriddhi Account Scheme

In order to save the parents of girl children from the debt trap because of the marriage expenses of the girl children or for higher education of female children, the government of

India had introduced Sukanya Smriddhi Account Scheme in 2015. Brief features of the scheme is as follow - The parents can open an account in the name of girl child from birth to 10 years of her age and deposit cash in the account which earns higher rate of interest. The account can be opened in any post office or commercial banks with the initial deposit of 250 rupees. Only one account can be opened per child and maximum 2 accounts can be opened by a parent. The condition is that a minimum of 250 rupees should be deposited in a year and the deposited amount should not exceed 1.5 lakh rupees in a year. This way of depositing should be continued till 15 years from the date of opening the account. The account will get matured after a period of 21 years from the date of opening it. The girl can operate the account from the age of 10 years and half of the deposited amount can be withdrawn at the age of 18 years. When the girl is more than 18 years and married closure of the account is allowed. Statistics reveals that a huge demand has been generated for this scheme from the community.

Objective of the Study:

To know the regional disparities in SRB in the districts of Karnataka and to assess the trends in the sex ratio at birth in the four revenue divisions of the state.

***Methodology*:**

Data for this study has been taken from Health Management Information System (HMIS) portal launched by the government of India. The HMIS provides data relating to sex of newborns every month along with other data items. It is available at district level as well as at the health facility level right from 2008. Sex ratio at birth has been worked out and year wise and district wise comparison has been made for the HMIS data for the financial year 2017-18, 2018-19 and 2019-20. Besides, geographical patterning of SRB is analyzed. Division wise SRB trend has been assessed using least square method, fitted straight line and forecasted the SRB level by first half of 2025 (April-September). District ranking has been done on SRB based on three years combined SRB from the highest value to the lowest value.

Three years combined SRB = *f01 +f02+f03/m01+m02+m03*1000*

f01=number of female at zero age in 2017-18

f02=number of female at zero age in 2018-19

f03=number of female at zero age in 2019-20

m01=number of male at zero age in 2017-18

m02=number of male at zero age in 2018-19

m03=number of male at zero age in 2019-20

Besides, year wise and district wise number of missing children has also been estimated. Missing female children are calculated based on the assumption that standard SRB is 952 girls for every 1000 boys. Number of female children at zero age to get 952 SRB was estimated and observed females at zero age were subtracted from the estimated girls.

mfc0 = ef0 – of0

mfc = missing female children at age zero

ef0 = estimated female children at age zero

of0 = observed female children at age zero

Rationale of the study:

The healthy society requires balanced sex ratio. Imbalance in sex composition leads to many social problems in the society; hence SRB should be monitored for taking corrective measures. Findings of this study would facilitate the programme managers to know the latest development in the sex ratio at birth in the districts of Karnataka. Thus, it would help in formulating the appropriate prgogramme to improve the worsening condition in population composition of the state.

Regional Disparities in Sex Ratio at Birth

Sex Ratio at birth is a common measurement used to depict the gender composition at age zero. The SRB denotes number of female babies born for every 1000 male babies born in a given time period. Normal pattern of male-female birth is more males than the females (105 boys per 100 girls). In terms of proportions, it is around 51.7 percent male births and 48.3 percent of female births. “Internationally observed normal sex ratio at birth is 952 or more

girls born per 1000 boys" (Warade, 2013). District wise SRB for three consecutive years namely, 2017-18, 2018-19 and 2019-20, percentage change between the years and 3 years combined SRB are given in Table 1. As per HMIS 2017-18, 940 girls are born for every 1000 boys in Karnataka. It has slightly increased to 947 in 2018-19 and declined to 937 in 2019-20. The data reveals that there is no consistent picture emerging over the study years in the state as a whole. With respect to SRB among the districts, Bijapur stood at the top in the first two years of the study period, Bidar and Tumkur districts are at the bottom in 2017-18 and 2018-19 respectively. In 2019-20, Chamrajnagar and Mandya are the highest and the lowest performing districts.

Further, the table shows level of SRB among the districts in the study period. If we consider the normal sex ratio at birth is 952 baby girls per 1000 baby boys, in 2017-18 only little more than one-third districts in Karnataka had balanced SRB. Such districts have increased to 14 in 2018-19 and it has dropped to 8 districts in the recent year (2019-20). It is interesting to note that the Chamrajnagar, Gulbarga, Uttar Kannada and Yadgir districts have maintained increasing tempo in all the three study years. In contrast, 13 districts have maintained decreasing trend in reference period.

With respect to the relative change in SRB, an increase of 0.7 percentage has been noticed between 2017-18 and 2018-19 and it has decreased to -1.1 percent between 2018-19 and 2019-20. Among the districts, between 2017-18 and 2018-19, SRB has increased in majority of districts (17 out of 30 districts). The highest increase has been noticed in Chamrajnagar district with 6.7 percentage points and followed by Bidar district (6.5 points). On the other hand, the highest decrease between 2017-18 and 2018-19 is observed in the Kodagu district with -4.5 points. The districts which are on same the path are – Ramnagar (-3.1 percent), Chitradurga (-2.7 percent), Tumkur (-2.0), Hassan (-1.0), and Kolar Mysore, Chikmagalur, Shimoga, Haveri, Belgaum, Mandya, Bijapur district (less than 1 percent). Coming to the SRB development between 2018-19 and 2019-20 in the districts of Karnataka, developments

are not encouraging as SRB has decreased in 19 districts in this period. The highest decline in SRB is noticed in Bangalore (Rural) district (-7.3 percent) and it is followed by Bijapur district (-5.2 percent). The districts which are on declining side are – Koppal (-3.9), Dakshina Kannda (-3.2), Bangalore (Urban) (-3.0), Gadag (-2.7), Bidar (-2.4), Udupi (-1.9), Bagalkote (-1.6), Shimoga & Bellary (-1.3), Gulbarga & Mandya (-1.2), Kodagu (-1.1) and Chikmagalur, Kolar, Uttar Kannada, Belgaum and Davanagere (less than 1 percent). The state as a whole has lost 10 points. Among the 11 SRB increased districts, the highest increase is found in Ramanagar with 7.5 percent and it is followed by Chamrajnagar with 3 percentage points.

Three Years Combined SRB and District Ranking

In order to facilitate readers to understand the SRB situation at a glance, three years combined (2017-18, 2018-19 & 2019-20) SRB was computed from the data and also district ranking was done from the highest SRB district to the lowest district. The combined SRB and district ranking is given in table 1. The top ranked district are Uttar Kannada, Bijapur and Chamrajnagar (966), Gadag and Yadgir districts stood at the second top place with SRB at 961 mark. The least average SRB is found in Mandya district (906) and it is closely followed by Bidar (907) district. It is obvious from the table that 10 districts of Karnataka have balanced sex ratio (952 or more) and among these 10 districts, 4 districts fall in Belgaum division, 3 districts are spotted in Mysore and Gulbarga divisions each. It is surprised to know that no district of Bangalore division finds a place in the top ten positions. Among the low ranking districts, 6 out of 9 districts are identified in Bangalore division and among the rest of the 4 districts, 2 falls under the Mysore division and one district each in Belgaum and Gulbarga divisions. The districts of Belgaum and Gulbarga divisions are having higher ranks and the districts of Bangalore division have got low ranks. Bangalore division districts and low performing districts in other divisions have to put more effort to achieve balanced sex ratio.

Table 1: Sex ratio at birth in districts of Karnataka and district ranking

Divisions	Districts	2017-18	2018-19	2019-20	Percentage change between 2017-2018	Percentage change between 2018-2019	3 years combined SRB	District ranking
Bangalore	Bangalore (R)	953	979	906	2.7	-7.4	946	14.5
	Bangalore (U)	926	932	904	0.7	-3	921	27
	Chikkballapur	898	936	944	4.3	0.8	926	26
	Chitradurga	941	916	927	-2.7	1.3	928	25
	Davanagere	924	936	934	1.3	-0.3	931	24
	Kolar	945	937	928	-0.9	-0.9	937	22
	Ramanagar	948	919	988	-3.1	7.5	951	11.5
	Shimoga	952	945	933	-0.7	-1.3	943	16
	Tumkur	925	906	929	-2	2.5	920	28
Belgaum	Bagalkote	954	964	949	1.1	-1.6	956	8.5
	Belgaum	949	945	943	-0.4	-0.2	946	14.5
	Bijapur	984	983	931	-0.1	-5.4	966	2
	Dharwad	910	934	957	2.6	2.5	934	23
	Gadag	956	977	951	2.2	-2.7	961	4.5
	Haveri	951	946	947	-5	0.2	948	13
	Uttar Kannada	966	970	963	0.5	-0.8	966	2
Gulbarga	Bellary	934	953	940	2	-1.3	942	17.5
	Bidar	876	933	911	6.5	-2.4	907	29
	Gulbarga	963	965	953	0.2	-1.2	960	6.5
	Koppal	958	974	937	1.7	-3.9	956	8.5
	Raichur	925	961	968	3.9	0.8	951	11.5
	Yadgir	954	962	967	0.8	0.5	961	4.5
Mysore	Chamrajnagar	915	976	1006	6.7	3	966	2
	Chikmagalur	962	955	948	-0.7	-0.8	955	10
	Dakshina Kannada	934	958	927	2.5	-3.2	940	21
	Hassan	947	937	943	-1	0.6	942	17.5
	Kodagu	974	929	919	-4.6	-1.1	941	19.5
	Mandya	912	909	898	-0.3	-1.2	906	30
	Mysure	946	938	938	-0.9	0.1	941	19.5
	Udupi	945	977	958	3.4	-1.9	960	6.5
	Karnataka	**940**	**947**	**937**	**0.7**	**-1.1**	**941**	

Causes for variation in Sex Ratio at Birth

Empirical studies conducted in different places across the globe on sex ratio at birth have identified several factors/conditions/reasons for determining the sex ratio at birth.

Legislation: Decline in SRB had started rising when abortion was legalized in India by passing medical termination of pregnancy Act which permitted the women to go for abortion for unwanted pregnancies.

Modern technology: Advent of modern diagnostics such as amniocentesis and ultrasound etc. in 1980s have facilitated the parents to use these tests for knowing the sex of the foetus. Both urban and rural pregnant women had extensively used these technologies for determining the sex of their forth coming offspring and had got aborted if they had female foetus (Kishwar, 1993).

Biological factor: Blood group and race of mothers are also determinant of sex of the baby (James, 1983).Health condition of mother matters in determining the sex of the baby; healthy mothers bear more sons than the weaker one (Fukudda et. al., 1996). In spontaneous abortions, sex of the foetus are more of males than the females because male foetus are more fragile the female foetus (Polasek et. al., 2005). The aged women are more likely to bear female children (John, 2004)). Maternal nutritional status (Williams & Gloster, 1997), Hepatitis B infection (Drew et al. 1986), habits are causing unequal SRB (Fukudda et. al., 2002). Coital frequency of couples, consumption of fertility drugs by mother (clamiphem) also affects SRB (Malaviya, 2017)). The scientists have noticed that stress in men is one of the determining factors of sex of the foetus. The movement of sperm in men varies due to stress caused by event like business collapse, war and earthquake – unlike the sperms possess X chromosomes the sperms carrying Y chromosomes moves faster but less resistant to non-conducive environment during its journey to the mother's womb (Polasek et. al., 2005).

Psychological factor: The western scientists are of the opinion that job condition, work place condition play a role in determining the sex of the foetus (Clutton-Brock et. al., 1981). Mothers who are working in stressful job are mostly likely to have female child and vice versa. Higher birth order (Hesketh & Xing, 2006), older couples, maternal weight, certain disease condition, seasonality of birth are lower the chance of male births etc. (Clutton-Brock, et. al., (1986), Gibson and Mace (2003), Koziel and Ulijaszek, (2001), Trivers and Willard (2001), Love et. al., (2005), Mackey, (1993).

Social and demographic factors: Social scientists have mixed opinion on contribution of social and economic development in the society on declining SRB. Some scholars are of the opinion that social and economic development helps to check the declining sex ratio and some others have opposite views. Increase in female literacy has positive impact on SRB. Increasing years of schooling among females is also one of the factors in reducing the preference for sons (Kaur, 2016). Recently conducted study reveals that emerging middle

class is a major contributor to improve the SRB in India. Sex selective abortion is more frequently followed by higher caste, economically better-off groups and women educated up to 10th standard compared to lower income and less educated groups (Jha, 2006). Guliomoto opined that modernization, urbanization and education plays an important role in normalizing the gender imbalance at birth. Gender bias at birth is found to be very less among the men who belonged to the higher socio-economic groups (Kaur, 2016). Ethnic and social differences in child sex ratio varies a lot – It is highest among Muslims (1255) and followed by Buddhists (779) and the lowest among the Hindus (714); the joint families have better child sex ratio (939) than the nuclear households (786) (Mamata & Andurkar, 2013).

Geographical factor like season, climate, latitude and environment also influence the SRB. Individual habits and social customs are also contributory factors for SRB (James, 1993). There are number of factors for SRB which are beyond the control of couples that determines the sex ratio at birth. The floods, global warming, would play a role in determining the sex of the foetus and there by SRB (Myers, 1977).

Number of missing female children at birth in the districts of Karnataka

In order to facilitate the readers and the programme managers, number of missing female children has been computed for all the three years. The difference between expected number of female babies in age zero in a period with the number of observed female children in age zero during the same period gives the idea of missing girls at birth. District wise and year wise number of missing girls at birth is given in Table 2. In Karnataka, close to twenty thousand plus girl babies have gone missing in three years period, i. e from 2017-18 to 2019-20. Number of missing girls are the largest in 2019-20 (8292) and the least (5011) in 2018-19 in the state. In other terms, 20, 14 and 23 female children were missed per day in the state in 2017-18, 2018-19 and 2021 respectively. With respect to division wise number of missing daughters, Bangalore division stood at the top by losing 11,034 girls babies in the corresponding years, while Belgaum division has lost the least number of girls (2447). Among the districts, Bangalore (Urban) district has missed the largest number of female children (5954) during last three years, whereas no missing babies were noticed in Gulbarga, Uttar Kannada and Yadgir districts during the study period. Year wise data reveals that little more than one-third of the districts have not experienced any missing babies in 2017-18 and such districts have increased to 14 in 2018-19 and has steeply decreased to 8 districts in

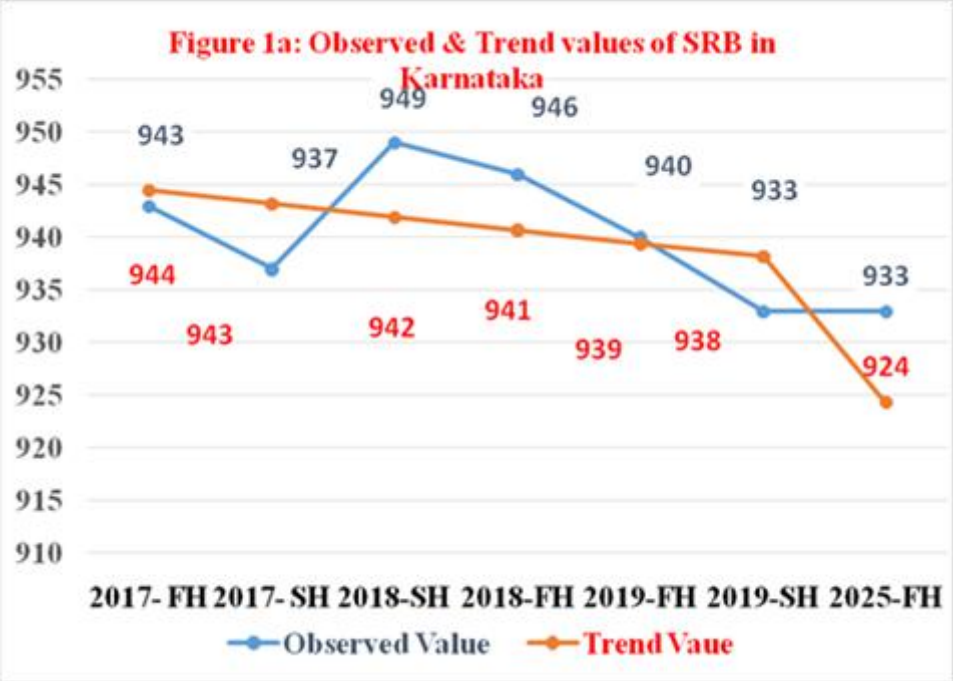
2019-20. Overall, districts of Gulbarga and Belgaum divisions are performing well and Bangalore division districts' achievements are poor.

Table 2: Number of missing female children in the districts of Karnataka

Divisions	Districts	2017-18	2018-19	2019-20	Total
Bangalore	Bangalore (Rural)	0	0	215	215
	Bangalore (Urban)	1431	1206	3317	5954
	Chikkballapur	447	122	60	629
	Chitradurga	113	389	250	752
	Davanagere	438	246	275	959
	Kolar	74	170	253	497
	Ramanagar	18	153	0	171
	Shimoga	0	89	244	333
	Tumkur	436	740	348	1524
	Division total	**2957**	**3115**	**4962**	**11034**
Belgaum	Bagalkote	0	0	63	63
	Belgaum	113	263	308	684
	Bijapur	0	0	455	455
	Dharwad	777	332	0	1109
	Gadag	0	0	10	10
	Haveri	13	67	46	126
	Uttar Kannada	0	0	0	0
	Division total	**903**	**662**	**882**	**2447**
Gulbarga	Bellary	407	0	257	664
	Bidar	1344	289	578	2211
	Gulbarga	0	0	0	0
	Koppal	0	0	216	216
	Raichur	642	0	0	642
	Yadgir	0	0	0	0
	Division total	**2393**	**289**	**1051**	**3733**
Mysore	Chamrajnagar	177	0	0	177
	Chikmagalur	0	0	28	28
	Dakshina Kannada	302	0	409	711
	Hassan	59	166	97	322
	Kodagu	0	79	110	189
	Mandya	369	400	476	1245
	Mysure	135	300	276	711
	Udupi	48	0	0	48
	Division total	**1090**	**945**	**1396**	**3431**
Karnataka		**7343**	**5011**	**8291**	**20645**
Missing girl children per day in Karnataka		**20**	**14**	**23**	

Trend in Sex Ratio at Birth

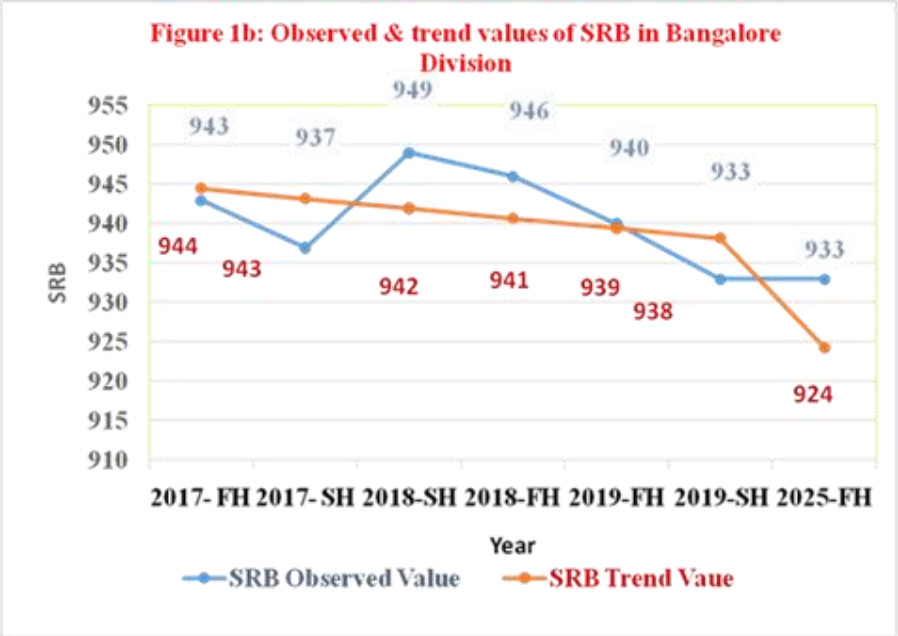
The Karnataka has four revenue divisions namely Bangalore, Mysore, Belgaum and Gulbarga. The Bangalore division consists of 9 districts such as Bangalore (Rural), Bangalore (Urban), Tumkur, Kolar, Chikkaballapur, Chitradurga, Davanagere, Ramanagar, and Shimoga. Chamrajnagar, Chikmagalur, Coorg, Dakshina Kannada, Hassan Mandya, Mysore and Udupi districts are come under the Mysore division. Following districts are under the Belgaum division – Bagalkote, Belgaum, Bijapur, Dharwad, Gadag, Haveri and Uttar Kannada. Gulbarga Division has 6 districts namely, Bellary, Bidar, Gulbarga, Koppal, Raichur and Yadgir.



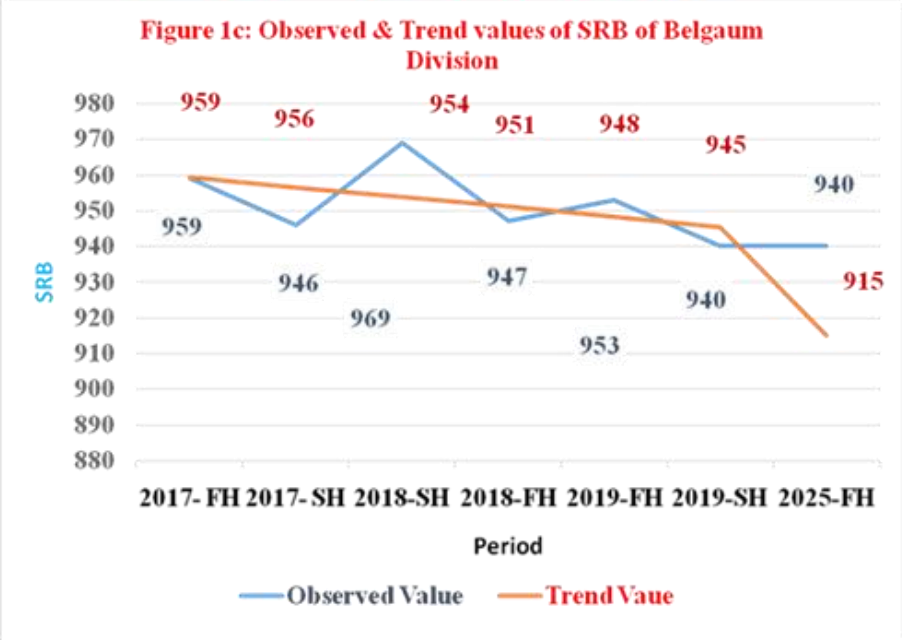
FS=April-September, SH= October-March

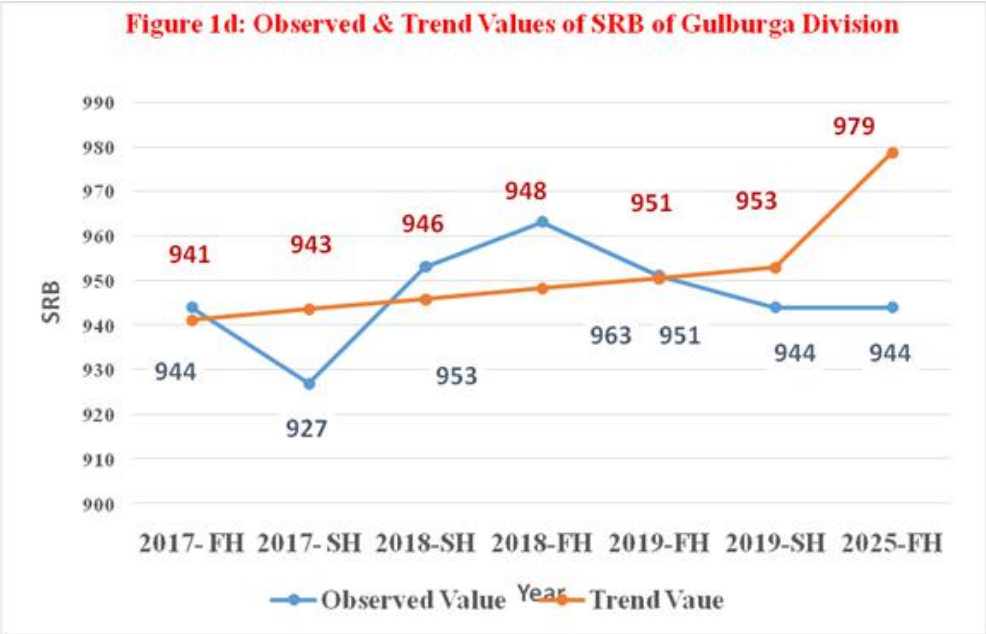
We have tried to assess the trend in SRB in the state as well as in the four revenue division. Since the HMIS data is available only for the latest 3 consecutive years i. e., 2017-18, 2018-19 and 2019-20, we have divided the each financial year into two equal parts as first half (FH) (April-September) and second half (SH)(October-March) for the purpose of calculating the trend value of SRB and to forecast the same till the end of first half (April-September) of 2025. We have applied least squares method to the data to estimate the parameters of a

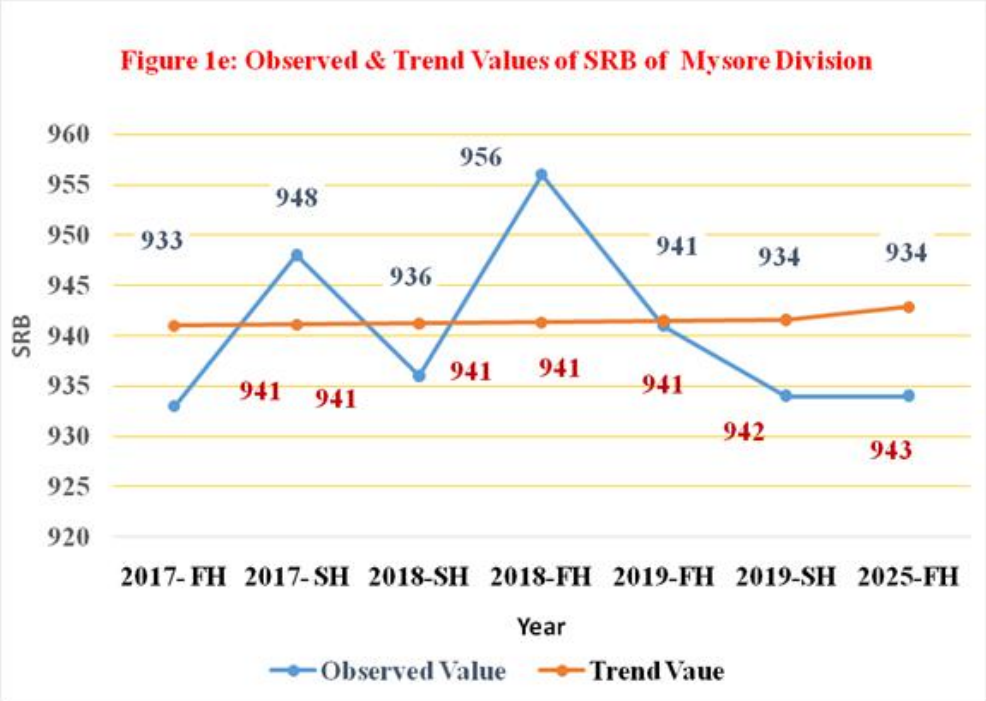
straight line. The trend values and the observed values of the 4 divisions and for the state as a whole is given in figure 1a-1e. In Karnataka state as a whole, the SRB is in declining trend and the SRB will be 924 by the end of first half of 2025 provided the socio-economic conditions and fertility behaviors of the couples will remain the same.



FS=April-September, SH= October-March







FS=April-September, SH= October-March

Similarly, the model predicts that the SRB will be in declining trend in all the divisions except in Gulbarga where it will be in increasing trend and will reach 979 mark by 2025. With respect to predicted SRB in remaining divisions, the Bangalore division (889) among all

the divisions of the state will have the lowest SRB by the year 2025; it will be followed by Belgaum division (915). The Mysore division will have SRB 943. The difference between the trend values and the observed values in the Bangalore division is less in almost all the study periods, while it is rather high in other divisions. The trend value is almost constant throughout the study period in Mysore division, while much variation is noticed with respect to observed values.

Conclusion

There are big gaps in the performance among the districts during the study periods. The state has skewed sex ratio in all the three years and among the districts, majority have imbalance in sex ratio at birth. Among the 4 divisions, districts of Gulbarga division are having normal sex ratio despite these districts being considered as economically backward. In contrast, the districts of Bangalore division have male biased sex ratio in spite of having relatively better socioeconomic condition. This finding matches with the findings of the studies conducted elsewhere in India; socio-economically developed states have skewed sex ratio at birth and vice versa. In Gulbarga and Belgaum regions, share of Muslim population to the total population is high when compared to the Bangalore and Mysore divisions. Muslims are pro-natalists and are against any kind of abortions for religious and cultural reasons. This might have contributed to some extent in maintaining the balanced sex ratio in the region.

Large number of girls has gone missing during the last 3 years in the state is a cause of serious concern. Moreover, more than half of the total missing children are from the districts of Bangalore division; This sorry state of affair is present may be because of sex selective abortion. There are many quacks who are conducting abortion quietly in rural and urban areas. District health authorities have failed to stop such malpractice and punish the culprits. No case has been booked against such offenders so far in the state.

The trend analysis predicts that sex imbalance at age zero will increase in coming years in the state as well as in the divisions except in Gulbarga where it will maintain balanced ratio. Imbalance in sex ratio has wide range of consequence on society and family. Therefore, the government to be addressed the issue with all seriousness. Prospective parents are to be made aware about the serious consequences of imbalanced in sex ratio on the society as well as on

individual family. Changing the mindset of people is very crucial. It seems that prevailing legislations and social welfare programmes of governments have made no impact or little impact on attaining the balanced sex ratio in the state. The government to be reviewed its existing programmes thoroughly and plug the loopholes by redesigned its programmes.

Reference

Agnihotri, S. B. (2000), "Sex ratio patterns in the Indian population; A Fresh exploration" in Malaviya, A. (2004), Understanding Sex Ratio at Birth in India, Paper Presented in International Institute for Population Sciences, Mumbai for Partial fulfillment of Masters in Population Studies.

Barakade, A. J. (2012), " Declining Sex Ratio: An Analysis with Special reference to Maharashtra", *Geoscience Research,* Vol-3, Issue 1, pp92-95.

Bhattacharya, P. C. (2012), "Gender Inequality and the Sex Ratio in Three Emerging Economies", Working Paper, Heriot-Watt University.

Catalano, R. A. (2003), "Sex ratios in the two Germanies: A Test of the Economic Stress Hypothesis", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Clutton-Brock, T. H. Albon, S. D. and Guinness, F. E. (1981), "Parental Investment in Male and Female Offspring in Polygynous Mammals", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Clutton-Brock, T. H. Albon, S. D. Guinness, F. E. (1986), "Great Expectations: Dominance, Breeding Success and Offspring Sex Ratio in Red Deer", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Drew, J. B. & -Lamblin, R. (1986), "Hepatitis B Virus and Sex Ratio of Offspring in East-Greenland" in; Jha, P. Rajesh Kumar, Vasn, P. Dhingra, N. Thiruchelvam, D. and Moineddin, R. (2006), *Low - Male to Female Sex Ratio of Children born in India: National Survey of 1.1 Million Households,* Lancet online/comment.

Fukuda, M. Fukuda, K. Shimizu, T. Andersen, C. Y. Byskoss, A. G. (2002), "Parental Peri conceptional Smoking and Male:Female Ratio of Newborn infants" in; Jha, P. Rajesh Kumar, Vasn, P. Dhingra, N. Thiruchelvam, D. and Moineddin, R. *Low - Male to Female Sex Ratio of Children born in India: National Survey of 1.1 Million Households,* Lancet online/comment.

Fukudda, M. Fukuda, S. Shimizu, T. Yomura, W. Shimizu, S. (1996), "Kube Earthquake and Reduced Sperm Mobility: Human Reproduction", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Gibson, MA. & Mace, R. (2003), "Strong Mothers Bear More Sons in Rural Ethiopia", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Guilmoto, C. Z. & Ren, Q. (2011), "Social Economic Differential in Birth Masculinity in China" in; Kaur, R. Bhalla, S. S. Agarwal, M. K. Ramakrishna, P. *Sex Ratio at Birth - Role of Gender, Class and Education,* United Nation population Fund.

Guilmoto, C. Z. & Ren, Q. (2011), "Socio-Economic Differentials in Birth Masculinity in China", *Development & Change* 42 (5): 1269-1296. doi:10.1111/j.1467-7660.2011.01733.

Guilmoto, C. Z. (2007), "Characteristics of Sex Ratio Imbalance in India and Future Scenarios" in Bhattacharya, P. C. (2012), Gender Inequality and Sex Ratio in Three Emerging Economies, working paper, Heriot-Watt University.

Gupta, D. & Bhat, M (1997), " Fertility Decline and increased Manifestation of Sex Bias in India" in Poul, K. & Saha, S. (2015), Declining Child Sex Ratio in India and Major Correlates, *IJCRR,* Vol 7, issue 11.

Hesketh, T. Xing, Z. W. (2006), "Abnormal Sex Ratios in Human Populations: Causes and Consequences" available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

James, H. W. (1993), "Timing of Fertilization and Sex Ratio of Offspring" in Malaviya, A. Understanding Sex Ratio at Birth in India, Seminar Papers, International Institute for Population Sciences, Mumbai.

James, W. H. (1983), "Timing of Fertilization and Sex Ratio of Offspring" in; Malaviya, A. Understanding Sex Ratio at Birth in India, ResearchGate, available at: https://www.researchgate.net/publication/315714650 (accessed 17 April 2020).

Jha, P. Rajesh Kumar, Vasn. P. Dhingra, N. Thiruchelvam, D. and Moineddin, R (2006), "Low - Male to Female Sex Ratio of Children born in India" in Kaur, R. Bhalla, S. S. Agarwal, M. K. Ramakrishna, P. *Sex Ratio at Birth - Role of Gender, Class and Education,* United Nation Population Fund.

John, M. Kaur, R. Palriwala, R. and Saraswati, R. (2008), "Planning Families, Planning Gender: Adverse Sex Ratio in Selected Districts of Madhya Pradesh, Rajasthan, Himachal Pradesh, Punjab And Haryana" in Kaur, R. Bhalla, S. S. Agarwal. M. K. Ramakrishna, P. (2016), *"Sex Ratio at Birth - Role of Gender, Class and Education",* United Nation Population Fund.

John, S. C. (2004), "Subjective Life Expectancy Predicts Offspring Sex in a Contemporary British Population", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Kiswar, M. (1993), "Abortion of Female Foetuses: Is Legislation the Answer?" Reproductive Health Matters CD on Abortion.

Koziel, S. & Ulijaszek, S. J. (2001), "Waiting for Trivers and Willard: Do the Rich Really Favour Sons?", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Kushan, A. S. Mortensen, P. B. Mc Namee, R. Baker, P. N. Abel, K. M. (2009), "Sex Ratio at Birth following Prenatal Maternal Exposure to Sever Life Events: A Population Based Cohort Study", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Love, O. P. Chin, E. H. Wynne-Edwards, K. E. Williams, T. D. (2005), "Stress Hormones: A Link between Maternal Condition and Sex-biased Reproductive Investment" , available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Mackey, W. C. (1993), "Relationships Between Human Sex Ratio and the Woman's Microenvironment", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Malaviya, A. (2017), "Understanding Sex Ratio at Birth in India", ResearchGate, available at: https://www.researchgate.net/publication/315714650 (accessed 17 April 2020).

Mamta, K. S. and Andurkar, S. P. (2013), "Child Sex Ratio and its Socio-Demographic Correlates: a Cross Sectional Study in an Urban area of Eastern Maharashtra", *National Journal of Community Medicine,* (4) 4, 618-20.

Murthi, M. Guio, A.C. and Dreze, J. (1995), " Declining Sex Ratio: An Analysis with Special reference to Maharashtra", *Geoscience Research,* Vol-3, Issue 1, pp92-95.

Myers, R. E. (1977), "Production of Fetal Asphyxia by Maternal Psychological Stress", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Polasek O, Kolcic I K, R Rudan I (2005), "Short Communication: Sex Ratio at Birth and War in Croatia (1991-1985)", available at: http://www.biomedcentral.com/1471-2458/10/269 (accessed 18 April 2020).

Puri, M. & Tamang, A. (2015), Understanding Factors Influencing Adverse Sex Ratio at Birth and Exploring What Works to Achieve Balance: The Situation in Selected Districts of Nepal, UKAID and Population Council.

Sarabu, V. (2012), "Female Sex Ratio in India – A Review, available at: http://www.researchgate.net/publication/284009557 (accessed 17 April 2020).

United Nations Population Fund (UNFPA): India (2011), "Trends in Sex Ratio at Birth and Estimates of Girls Missing at Birth in India (2001–2008)" in Warade, Y. & Balsarkar, G. A Study to Review Sex Ratio at Birth and Analyse Preferences for the Sex of the Unborn, *Journal of Obstetrics and Gynecology* 64 (1).

Warade, Y. Balsarkar, G. and Bandekar, P. (2014), "A study to Review Sex Ratio at Birth and Analyze Preferences for Sex of the Unborn', *Journal of Obstetrics and Gynecology*, 23-26.

Williams, R. J. Gloster, S. P. (1997), "Human Sex Ratio as its Relates to Caloric Availability" in Jha, P. Rajesh Kumar, Vasn, P. Dhingra, N. Thiruchelvam, D. and Moineddin, R. (2006), *Low - Male to Female Sex Ratio of Children born in India: National Survey of 1.1 Million Households,* Lancet, United Lancet online/comment.

Women Health and Development of Mountainous Communities in HP: a Case study of Chamba District

Shashi Punam[1*]

Abstract

The state of Himachal Pradesh is located in the North- West of the country. To the east, it forms India's border with Tibet, to the North lied the state of Jammu-Kashmir, U.P. in the south -east, Haryana on the South and Punjab on the west. Himachal Pradesh takes its name from the mighty Himalaya ranges that dominate its topography, climate, livelihoods and socio-economic trends. As district Chamba is concerned, it is the most mountainous district of Himachal Pradesh which includes PirPanjal range of Himalaya having altitude more than 4500 meters. Chamba district also holds the 1st rank in terms of scheduled tribe population in the state. Pangi and Bharmour tehsils along with Holi subtehsil constitute the tribal area of the district. The economy of Chamba district is mainly depending on agriculture. It has returned 196,665 persons as cultivators and holds the 5th position among the districts of the state. No doubt, Himachal Pradesh has shown remarkable progress in women's development within a short span of four decades. Even Women are repositories of culture, traditional knowledge and status of women, their progress is important for evolution of society. A majority of women in rural India is associated directly or indirectly with agricultural production, processing and distribution. About two third of the manual labour in farming is constituted by rural women. The present study was undertaken with the objective to find out the status of tribal women in India to study the statusof Women health and development of mountainous communities in Chamba district of Himachal Pradesh. A total of 96 respondents in the age group of 15-55 year had been selected fromChamba district to know about the development in their life style, health issues and about the economic status. This paper explores that there are some improvements in the socio-economic status of women of mountainous communities due to certain changes in their traditional occupations and also increase in the literacy rate as well as awareness level of people about different Govt policies, health policy to improve the lives of women.

Keywords: Mountainous Communities, Predominantly, Topography, Traditional

[1]Assistant Professor cum Head, Division of Humanities and Social Sciences, Career Point University Himachal Pradesh,

*Email: khushi12.p@gmail.com

Introduction

India has the second largest concentration of tribal population in the World. Indian tribes constitute around 8.2 % of nation's total population, constituting nearly 84.3 million in (2011). There are 635 tribes in India located in five major tribal belts across the country. There are in all 35 States and Union Territories (UTs) in India, of which in about 14, the proportion of scheduled tribe population to the total population is more than 10 percent. These states and UTs are Manipur, Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Jharkhand, Bihar, Orissa, Chattisgarh, Madhya Pradesh, Gujarat, Rajasthan, Maharashtra, Andaman & Nicobar and Lakshadweep. The main concentration of tribal people in India is the central tribal belt and the north-eastern States. Barring a few states, they have their presence in all States and Union Territories of the country. Predominantly rural, they mainly stay in forests and hilly regions (Planning Commission. 2001. National Human Development Report. New Delhi). Tribal groups are homogeneous. The tribal population in the country has poor health generally due to, among other factors, their poverty and social vulnerability. After independence the Constituent Assembly continued the prevailing definition of Scheduled Castes and Tribes, giving (via articles 341 and 342) the president of India and governors of the states a mandate to compile a full listing of castes and tribes

The Anthropological Survey of India in its 'People of India' series has identified more than 427 tribal groups of Dravidian, proto-Australoids and other races (Mohanty 2002). A careful investigation of the tribal lists published by the official agencies reveals that there are at

least 285 different communities (Ahmed 1999). The number of tribal communities recorded in India based on the scheduled castes and scheduled tribes lists (Modification order 1956) is 354 (Census of India 1961). There is, however, no consensus on the actual number of tribal communities inhabiting different parts of the country. According to Burmon (1972), there are about 450 communities throughout the country in the list of scheduled tribes.

In India the tribes have been designated as "Scheduled Tribes" under the Constitution. Article 342 provides for specification of tribes or tribal communities or parts of or groups within

tribes or tribal communities which are deemed to be for the purposes of the Constitution the Scheduled Tribes in relation to that State or Union Territory. In pursuance of these provisions, the lists of Scheduled Tribes is notified for each State or Union Territory and are valid only within the jurisdiction of that State or Union Territory and not outside. Communities are notified as Scheduled Tribes under Article 342 of the Constitution based on the characteristics such as: Primitive traits, geographically isolated, distinct culture and shyness of contact with community at large, and economically backward. When labeled "scheduled tribe" the community becomes entitled for some constitutional protections and developmental programs designed to end their marginalization and help assimilate into mainstream society. Post-independence numerous measures were adapted to ensure the tribal development.

Status of Tribal Women in India

The tribal population in the country has poor health generally due to poverty and social vulnerability. The status of the tribal women usually depends on the economic roles they play. The tribal in the past were usually forest dwellers and their livelihood to a great extent depended on the food-gathering economy. More than the men, the women walked long distances to fetch wood and fodder. Besides, they also collect fruits, roots and tubers, lac, gums and leaves for self-consumption and sale.

The tribal women in India have virtually no role to play in the social and political spheres. Even in the past though for many tribes in central India and in the North-East there were bachelor's dormitories, there was hardly anything for the girls. The girls used to fag around for the boys residing in the dormitories. The tribal women had no place in the village councils. The women were never represented in the traditional Panchayats. According to Burman (2012), the status of any social group is determined by its levels of health-nutrition, literacy education and standard of living. The tribal women, constitute like any other social group, about half of the total population. However, the health of tribal women is more important because tribal women work harder and family economy and management depends on them.

Geographical Location of Himachal Pradesh

Himachal Pradesh has a total population of 6,864,602 including 3,481,873 males and 3,382,729 females as per the final results of the Census of India 2011. This is only 0.57 per cent of India's total population, recording a growth of 12.81 per cent. The total fertility rate per woman is 1.8, one of lowest in India. In the census, the state is placed 21st on the population chart, followed by Tripura at 22nd place. Kangra district was top ranked with a population strength of 1,507,223 (21.98%), Mandi district 999,518 (14.58%), Shimla district 813,384 (11.86%), Solan District 576,670 (8.41%), Sirmaur district 530,164 (7.73%), Una district 521,057 (7.60%), Chamba district 518,844 (7.57%), Hamirpur district 454,293 (6.63%), Kulludistrict 437,474 (6.38%), Bilaspur district 382,056 (5.57%), Kinnaur district 84,298 (1.23%) and LahaulSpiti 31,528 (0.46%). There are also tribal population in the state which mainly comprises Gaddis, Kinnars, Gujjars, Pangawals and Lahaulis.

The literacy rate of Himachal Pradesh almost doubled between 1981 and 2011.Hindi is official language of Himachal Pradesh. Most of the population speaks Pahari in everyday conversation. There are a total of 32 local languages. English also has official status for government work. Hindi is spoken by 89% of the population while Punjabi is spoken by 6% of the population.

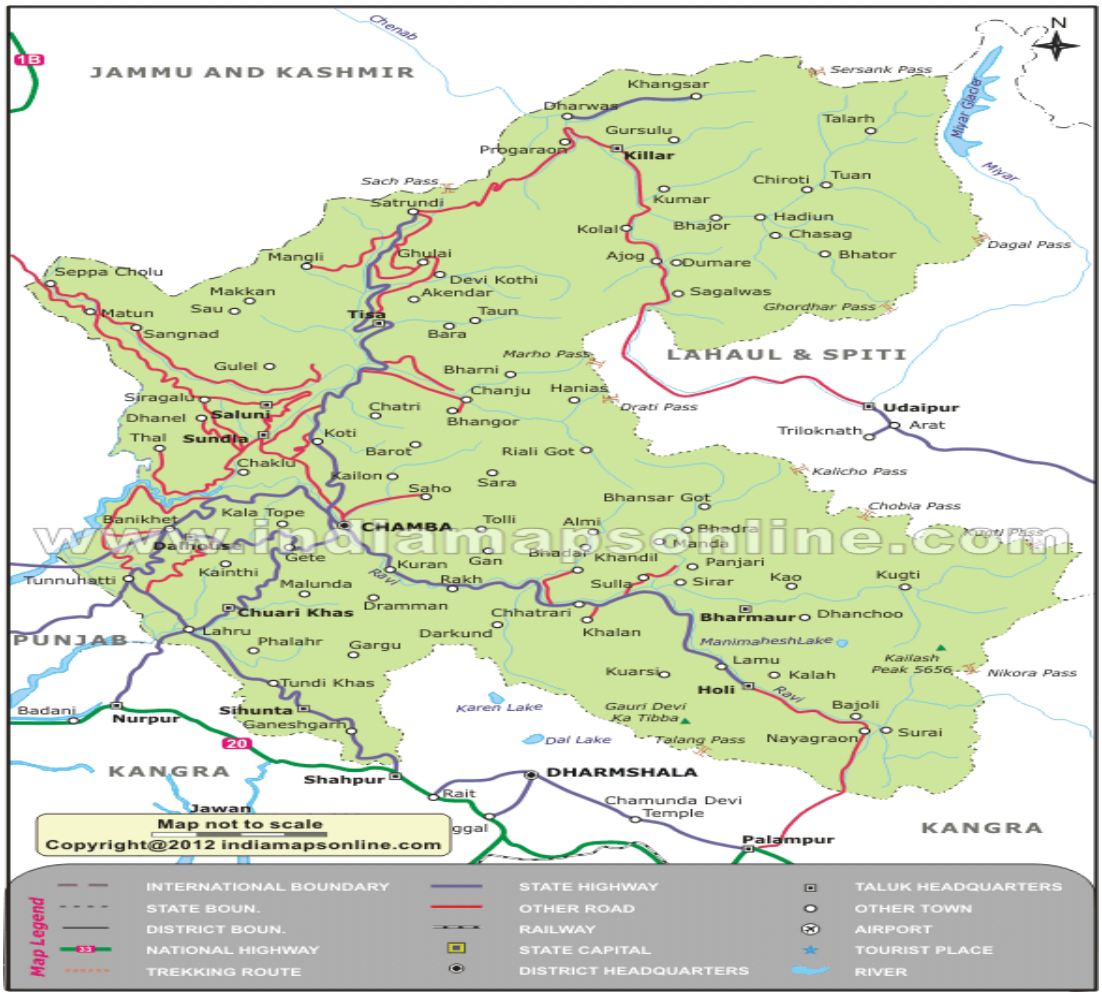
Table 1: Demographical Profile of Himachal Pradesh

S No	Items	Ranges
1	Area	55673 km^2
2	Total population	6,864,602
3	Males	3,481,873
4	Females	3,382,729
5	Population density	123
6	Sex ratio	972
7	Rural population	6,176,050
8	Urban population	688,552
9	Scheduled Caste population	1,729,252
10	Scheduled Tribe population	392,126

Source: Department of Information and Public Relations

Chamba District of Himachal Pradesh

Chamba is bounded on north-west by Jammu and Kashmir, on the north-east and east by Ladakh area of Jammu And Kashmir State and Lahaul and Bara-Bangal area of Himachal Pradesh, on the south-east and south by the district Kangra of Himachal Pradesh and Gurdaspurdistrict of the Punjab. Chambadistrict is divided into six sub-divisions, seven tehsils and three sub-tehsils. From the view point of rural development, the district is divided into six development blocks. The district has 270 Gram Panchayats. Three development blocks namely Mehla, Salooni and Tissa have been declared backward, while 11 Gram Panchayats and 17 Gram Panchayats of Chamba and Bhattiayt block respectively have been declared as dispersed backward panchayats. Bharmaur and Pangi are tribal blocks, (Census of Himachal Pradesh), **Source:** http://www.indmaps.com/state-map



Source: Census of India

The Gaddis are living mostly in the Chamba and Kangra Districts of Himachal Pradesh, but are mainly found in the Bharmour tehsil of the Chamba District and the areas near to Dharamshala. It is believed that these people migrated to the foothills of Himalayas from Central Asia, Rajasthan and Gujarat. Also believed that some castes of Gaddi tribes ran away and took shelter in hills because of the threat of Mughal ruler Aurangzeb in 17th century. Most of the Gaddi community is Hindu, but one can also find Muslim Gaddis in the upper areas of Chamba and L&S districts. Where these tribes speak in local dialects, understand and converse in Hindi. Gaddis are also known for their simple living style, religion and for their unique own democracy.

The Gaddis (Scheduled Tribe)

Himachal Pradesh is home to a sizeable tribal population like the Gaddis, Pangwals, Kinnauras, Lahaulis, Bhots, Gujjars who live in the north and north eastern extremities of the state. They inhabit Bharmour and Pangi sub-divisions in Chamba, Kinnaur and Lahaul-Spiti districts. Gaddi is a generic term that includes people belonging to different castes such as Brahmins, Rajputs, Rathis and Khatris. The Gaddis are semi-nomadic tribes who rear the sheep and goats of Kangra and Chamba districts in Himachal Pradesh who move their livestock from one grazing ground to another in a seasonal cycle, to plains in winter and hilltops in summer.

Different scholars have given different views while defining the word of ‘Gaddi’. The term “Gaddi” is derived from Mount Kailash which is the seat or throne (Gaddi) of Lord Shiva and the people who found refuge and settled in Bharmaur (in district Chamba), the territory of Lord Shiva‟s Gaddi, came to be called as the Gaddis. The origin of the term ‘Gaddi’ is shrouded

in mystery. According to Sharma (1973), that the territory of Gaddis is popularly known as ‘Gadheran’or ‘Gadaren’, that is, the land of Gaddis. The Gaddis are living mostly in the Chambaand Kangra Districts of Himachal Pradesh, butare administratively principally found in theBharmour Tehsil of the Chamba District. Theyhave migrated to these areas from plains (mostly from Punjab) at various times because of the religious persecution. The Gaddis have

been declared as a tribe mainly for the purpose of development in view of their social and economic backwardness. Some recent studies conducted on Gaddis classify them as semi pastoral and semi-agricultural community (Sharma 1973 and Negi 1976;Mehra 1992; Bhasin and Bhasin 1993;Bhasin 1996). Anthropologically, Gaddis canhardly be called a tribe. They have been declared scheduled tribe mainly due to their social and economic backwardness and relative isolation (Government of Himachal Pradesh 1980; Agro-Economic Research Centre 1988;Bhasin and Bhasin 1993,Bhasin 1996).

Objectives

Keeping in view the present study has been objectives are follows:

1. To study the status of women,health status and development of mountainous communities in Chamba district of HP.
2. To study the occupation and social and economic life of Gaddies women in HP.
3. To find out various schemes and programmes for upliftment of tribal women in HP.

Methodology

In this section, information related to research design, universe of the study, sample, data collection have been presented. The present study is based on primary as well as secondary sources. In this study we have used the exploratory as well as descriptive design. Pre-testing of questionnaire was done to make it more functional for final study. All the respondents were interviewed personally by the investigators at work spot, which enabled to get the first hand information. This section included the baseline profile and demographic variables of the studied population pertaining to age, family type, community, education, monthly income, pattern and size of land holding, types of agriculture and horticulture crops grown, rearing of animals etc.

Study Area

Chamba district of Himachal Pradesh

Sample Size

One village of each block was selected where the density of population of Gaddi tribes was higher i.e. Pukhri from Chamba, Balei from Mehla, Bhalie from Saluni, Kiler from Pangi,

Smote from Bhattiat, Baragarh from Tissa, Bhaumour from Bharmour block were selected for data collection.

Data Collection

Nutritional and health status of all the selected farm women was assessed by determining the intake of foods and nutrients. For the batter results, thisstudy is based on primary as well as secondary sources. The data were collected with the help of interview schedule and personal observations which comprise of health status generally, food items she consumed the whole day, from morning-tea to after-dinner and focus group discussion with Gaddies women at selected villages of district Chamba. Height measurement was taken with the help of an anthropometric stadiometer. The body weight was taken using portable weighing balance. Blood pressure was measured with digital blood pressure monitor. Respondents were randomly selected for purpose of primary data collection. The interview schedules originally were printed in Hindi and the questions were asked in their local dialect i.e. local language (Pahari) and Hindi. Interview schedule have twenty seven questions. At the close of each interview the interview schedule was re-checked to ensure that all the information was recorded.Secondary data has collected from various published and unpublished sources.In-depth interaction was undertaken with the respondents as male, female respondents to gather insight into the cultural norms, group dynamics.

Analysis

After the collection of data the information gathered were tabulated. The statistical tools applied were chart Graph, percentages and chi-square test.

Results & Discussion

Before assessing the status, health status and compiling information on various aspects of respondents, a baseline survey of ninety six selected Gaddi men and women from different blocks of district Chamba was done to document their general profile in addition to recording of socio-economic indicators like land holding pattern, income, occupation, education and animals rearing pattern etc. The objective behind this, was to assess the quality of lifestyle of

Gaddi specially Gaddi women and to study the influence of these demographic and socio economic factors on health and nutritional status of selected respondents.

General Profile of the Respondents

Table 2: Gender wise distribution of respondents

Gender	Total	%
Male	34	35.42
Female	62	64.58
Total	96	100

The Gaddis have been notifies as a scheduled tribe in Himachal Pradesh. Gaddis tribes are known for its totally uniqueness of their culture, customs, dress, food habits rituals and festivals etc. In all 35.42 percent female respondents and 64.58 percent male respondents (Table 2) were included for interviews.

The state of Himachal Pradesh has predominately rural settlement. Chamba district has considerable diversity in its physiography, land use pattern and cropping system. More than 90 percent of total population directly or indirectly depends upon agriculture for their livelihood. The age-wise distribution of respondents is presented in Table 3. Table reveals that majority of respondents (46.88 percent) belonged to the age group of 36- 45 years, followed by 26.04 percent from 46-55 years age group and 21 percent from 26-35 years age group and only 5.20 percent of the respondents were from 15-25 years age group. The economic profile of the respondents as assessed from infrastructure revealed a better economic condition in terms of owned house (98.33%) which was semi-pucca (45.00) and pucca (36.66). Only 18.33% had kuccha house.

Table 3: Age wise distribution of respondents

Age group	Total	%
15-25	5	5.20
26-35	21	21.88
36-45	45	46.88
46-55	25	26.04
Total	96	100

Occupation and Social Life of Gaddis

Women are the major work force in Himachal Pradesh and play a significant role in agriculture and other allied activities. They are the veritable back-bone of subsistence agriculture because about 80% of the field works in agriculture, from sowing to harvesting, post-harvest management and dairy management is done by hill women farmers.It is very true that the peculiarity of Gaddi tribe is their Khanabadosh by nature. They always travel to the pastures along their flocks.Gaddi have taken up many occupational activities, but the occupation of Gaddis is agriculture and shepherding. They make their livelihood by rearing and selling sheeps, goats, mulls and horses.Gaddi tribes have strict moral values to which they try to stick always in even any circumstances.The lifestyle of Gaddis is honest, disposition and peaceful. There are non-vegetarian and they consume goat milk.

Table 4: Occupation wise distribution of respondents

Occupation	Total	%
Only Agriculture	17	17.71
Sheep and Goat rearing	19	19.79
Agriculture & Sheep and Goat rearing	54	56.25
Others	6	6.25
Total	96	100

Occupation and Social Life of Gaddis

Gaddis women participate in extremely tedious, time consuming and labour intensive agricultural operations, viz land preparation, manuring, sowing, transplanting, weeding, hoeing, applying fertilizers, taking care of crops, harvesting and even post-harvest management like shelling, cleaning, grading, storage of food grains and processing etc. The data shows that 93.75percent people are agriculturist and allied occupations such as sheep and goat rearing, weaving and spinning of wool etc. 6.25 percent having others business like Govt job in public and private sectors (Table-4). The sheep and goat breeders and grazers Gaddis of Bharmour in Chamba district, Himachal Pradesh, in the Mid Himalayan Zone are transhumant, who spend summer in their permanent homes in Bharmour and cultivate their lands. In winter, which is characterized by heavy snowfall, they migrate to lower hills with their sheep and goat and some family members. For about three to four months of winter's

heavy snowfall, the Gaddis generally migrate to the lower hills and plains along with their flock of sheep and goats. This transhumant way of life nurtured by ecological factors has affected the population structure. It may be concluded as it is observed that ecological and environmental factors existing to Gaddi women a special economic power, an elevated social status and authority almost equal to men. However, there are certain domains in which men continue to dominate, as is culturally required. Moreover, community authority still is in the hands of men. There is a kind of duality observed here.

Social and Economic Life of Gaddis and their women

They lack adequate education facilities, means of communication, productive and irrigated land, medical facilities, mechanized cultivation and big irrigated holdings. Agriculture production is reduced by the shorter season, low temperature, high altitude and smallness of the land holdings.

Table 5: Social and Economic Life of Gaddis and their women

Statement	Total	(%)
Education facilities	51	49
Means of communication	41	59
Productive and irrigated land	60	40
Medical facilities	38	62
Mechanized cultivation	11	89

Table-5 shows that 51 percent said that they adequate education facilities, means of communication (41%), productive and irrigated land (60%), medical facilities (38%), mechanized cultivation (only 11 %) Their social life is very hard and unsatisfied. Agriculture production is reduced due to shorter season, low temperature, high altitude and smallness of the land holdings.

Perceptions on Social and Economic Life of Gaddis women

- **Husband's Contribution in Work at Home:** About forty percent women in the study area replied in affirmative. Husbands should and do help in cooking and bringing water in some occasions.

- **Ownership of Jewellaryafter Marriage:** More or less (51 %) all the women considered it as their right to own jewellary.
- **Views about Remarriage permission of a divorced Woman**: 90 percent women agreed on the point that like men, women should also have the prospect to remarry.
- **Voting Rights for women:** Tribal women take pleasure in their voting rights and about 100 percent of women in the study area exercised their right.
- **Violence against Women:** Few tribal women (60 %) are free from threat and violence at the hands of their husbands. 80 percent said that there tribe is equal rights for men and women.
- **Equal Rights for Men and Women**: Tribal women recognize that they have been discriminated against in education, income, consumption, status and access to power; they have a worse health record than men; they suffer from social, cultural and legal discrimination and often from violence (Table-6).

Table 6: Perceptions on Social and Economic Life of Gaddis women

Statement	Yes/ (%)	No (%)
Husband's Contribution in Work at Home	100	-
Ownership of Jewellary After Marriage	51	49
Views about Remarriage permission of a divorced Woman	90	10
Voting Rights for women	100	0
Violence Against Women	40	60
Equal Rights for Men and Women	80	20

Access to Health Care and General Health Seeking Behaviour

Tribal people of Himachal Pradesh have poor access to health services and there is underutilization of health services owing to social, cultural, psychological and economic factors. Some of the problems of accessibility and poor utilization of health services unique to tribal areas are: difficult terrain and sparsely distributed tribal population in forests and hilly regions; locational disadvantage of sub-centers (SCs), Primary Health Centres (PHCs), Community Health Centres (CHCs); non availability of service providers due to vacant posts and lack of residential facilities; lack of suitable transport facility for quick referral of emergency cases; lack of appropriate policies to encourage/motivate the service providers to work in tribal areas; inadequate mobilization of NGOs; lack of integration with other health programmes and other development sectors; IEC activities not tuned to the tribal beliefs and

practices; services not being client friendly in terms of timing, cultural barriers inhibiting utilization; noninvolvement of the local traditional faith healers and weakmonitoring and supervision systems. Gaddi women are careful about their health. Mostly Gaddi women suffer joint pain and leukoderma, a skin disease. The cause for this is their labourious life style. Earlier for treatment Gaddi women use to go to the local doctor "vaidya" or religious specialists "chela" but now they have started going to the hospital. They have adopted various contraceptives and attended family planning camp Aaganwadi's are present in every village when expecting mothers are given proper nutrition so that they can deliver a healthy child. Educational facilities and Primary Health care centers have made an impact on literacy and health, respectively. The rural hill farm women are involved in extensive work on fields and at household levels daily and are hence exposed to all the risks of ill health, poor nutrition and inadequate care. The women also have to undergo a very hard life due to geo-physical conditions of the hilly region. Nutritional surveys indicate large gaps in nutritional requirements and consumption among females as compared to males. A majority of rural and tribal women suffer from anaemia which leads to low birth weight among babies (Jhamtani, 1995). Low nutritional status of woman makes her more prone to several diseases.

Apart from anthropometric assessment, nutritional status of Gaddi women was also assessed through their diet and nutrient intake. The diet consumed by farm women consisted largely of carbohydrates usually obtained primarily from cereals viz. rice, wheat, corn etc. in the form of boiled rice, chapaties or roti. Comparison with suggested dietary intake revealed that the Gaddi women had low intake for all food groups except sugar and oils. 63.17% of Gaddi women had 231.78g of cereals/millets intake as against 312g suggested intake. More or less, similar scenario was calculated for pulses, milk and milk products, roots and tubers as well as for other vegetables group. It was discouraging to know that a very low consumption of fruits and green leafy vegetables was reported by respondents despite their acceptability to these foods in their kitchen garden/land. Only 36.83% Gaddi women consumed fruits daily. Further, women were also not aware about the easy nutritional tips like supplementation, complementation, sprouting and other techniques to enhance the nutritive value of food.

The main occupation of Gaddi tribes is shepherding and they the secondary means of livelihood is by rearing and selling sheep, goats, mules and horses. The majority of Gaddis

are property-owner and hence they practice agriculture and horticulture as one more means of livelihood apart from rearing the herds. They also grow the world famous variety of red royal and golden delicious apple, chestnut and almond trees. According to 1878 Forest Law, a system of reserved and protected forests was introduced to regulate most forests and the grazing lands. The settlement reserved grazing areas for each Gaddi family and the size of the flock was fixed. The migratory routes for each family were also fixed and it was provided that each flock will move at least 5 miles each day stopping for one night at a stopover. The Gaddis did not appreciate these controls. Also they have to get a yearly permit for grazing their sheep and goats by paying a grazing fee of Rs 1.00 each sheep and Rs 1.25 per goat. The permit contains details about the flock, the grazing is and the migratory route.

Over the time, with the shrinkage of grazing pastures, it has become difficult for the tribe to continue with the traditional profession of shepherding. Also, the younger generations do not want to venture out in this profession but wish to have a white collared job and settle at one place. Hence many are leaving this profession and venturing into other jobs like teachers in government institutions and private organizations. Some work as unskilled labourers in public work department and forest department. The ones who are not much educated are unemployed or underemployed as seasonal wage labour in construction, agriculture or community work). The occupational diversification is also due to the facilities and schemes provide by the government.

Gaddi females are skilled craftswoman and they weave a variety of woolen fabrics. They sort the wool fibres as per the length. Then wash, clean and comb the wool. The combed wool is spun with the help of a spinning wheel called charkha and the wool is finally woven handloom called as Rachh or Khaddi. These woolens are generally woven for personal needs as well and to sustain in the harsh weather. These woven ethnic products are not so popular in the local market and they do not get the correct value if sold.

Status of Modern Gaddi Women

To measure any society, the position of its women within that society is a definite pointer to analyze its development. Gaddi community believes that ‘Gods reside where woman is worshipped’, hence Gaddi give outmost importance to women. The Gaddi womenfolk stay

back while the men move out with livestock. Modern Gaddi women are educated and feel free to express themselves in case of social matters. They take sole responsibility of upbringing their children, financial decisions, tending the herds along with collection of fuel and fodder. The Gaddi women have a major role in the economic decision and their presence is felt in the religious circles as well. Gaddi women are empowered to spend money, independently without seeking permission from male, members of the family, and also, to access healthcare services for themselves and their children. Gaddi women are also excellent weavers and craftswomen. Their hand-woven woolen shawls and scarf's with elaborate folk designs are a testimony to this talent. What empowers them is the belief that they can do all those things, which supposedly are meant for men only.

Girl Child

(a) Her Work as a Child: Among tribes understudy girls are not considered as burden because of their economic value. In all the four societies girls participate in all types of work at home and agricultural activities along with their mothers. They act as pseudo-parents and look after their siblings.

(b) Freedom in Selection of Life Partners: The ideal, the arranged marriage between an unrelated pre-pubertal boy and girl, both coming from different villages holds good for all the four communities. The girl choice is also considered but the boy has to fulfill the other conditions.

Table 7: Some Govt schemes under these tables below: Detail of Various Schemes Run by the Corporation for SC and ST

Sr. No.	Title of the Scheme	Short Description of The Scheme
1.	Swarojgar Yojna (Self-Employment Scheme)	Financial Assistance up to Rs.50,000/- for setting up & expansion of Income generating avocations.
2.	Himswablamban Yojna (NSFDC&NSTF DC)	To provide loans for Projects Costing more than Rs.50,000/- in collaboration with NSFDC and NSTFDC
3.	Study Loan	To provide loan upto Rs.1,50,000/- for a full course of five years
4.	Study Loan Scheme In Collaboration With NSFDC	To provide loan uptoRs. 10.00 Lac for a full course of 5 Years
5.	Dalit Varg Vayavsaik PrashikshanYojna	To provide training to the SC and ST youth in traditional and non-traditional trades through ITI/ Private Institution/ Master Craftsman
6.	Construction of Shop/Shed Scheme (Laghu Vikray Kendra Yojna)	Corporation Provides Loan to the MunicipalCorporation/ Municipal Committees/ Nagar Panchayats/ Blocks Samitis/ GramPanchayats for Construction of Shops/Sheds for SC's/ST's .

7.	Hast Shilp Vikas Yojna	Corporation provides working capital assistance up to Rs.5000/- to individual as well as Group/ Society/Association of artisans.
8.	Small Business Yojna (NSFDC)	To meet the small Financial need of poor Scheduled Castes families to start small and petty business individually, the term loans assistance up to Rs 50,000/- is provided by the Corporation directly in collaboration with NSFDC
9.	Small Business Yojna (NSTFDC)	To meet the small Financial need of poor Scheduled Tribes families to start small and petty business individually, the term loans assistance up to Rs 50,000/- is provided by the Corporation directly in collaboration with NSTFDC.
10.	National Safai Karamcharis Finance & Development Corporation (NSKFDC)	Financial assistance to set up any income generating activity of higher cost i.e. above Rs. 50000/- on concessional rate of interest such as small business unit, Taxi, Mahindra Jeep, Tata Sumo, Shuttering, Piggery farm etc.
11.	Micro Credit Finance (MCF)	Provide Loans up to Rs.50,000/- under Small Loan Scheme (In collaboration with National Corporation).

Source: www.hpgovt.co.in

Major Results

Scheduled Tribes are geographically, socially isolated and economically marginalized communities in Himachal Pradesh. Of the various hill tribes of Himachal Pradesh, the Gaddi is the most dominant tribe. As compared to the other tribes the Gaddis are most populous. The language of Gaddis is Gadi. The major part of the life of a Gaddi is spent in rearing the sheep and goats which is their main profession, the financial condition of the Gaddis is better than that of their counterparts in other states but since a majority of them lead semi-nomadic, pastoral life practicing transhumance, their standard of living has not improved over time. Maintenance of large herds of sheep and goats and to provide fodder for their cattle is the major occupation of this tribe. The analysis revealed that Gaddies and their women are exclusively dependent upon agriculture and sheep goats as their source of income. Some of them have also settled down at different locations and live in a joint family system. In this study found that the main occupation of Gaddis, animal husbandry, weaving, various other crafts rearing of cattle which is also their main source of livelihood. No better education at all. Less Government, institutional support for their upliftment. Politically also they have little representation. Only few families are engaged in income from other sources than agriculture. They have no permanent source of income. Still they are unaware/ ignorant about the various policies of Govt.

Suggestions

Gaddies should be made tax free that makes reform in agriculture. Job oriented education should be started for Gaddis women. They are very backward so they should be included in special backward classes. Government should also initiate policies, programs for the Gaddis. Government should develop agricultural industry in villages for better employment chances for Gaddies. Technical and vocational institutes should be established in villages for the training of Rural Youth as well as villagers of ST. As the studies on tribal education suggests that the policy makers approach paid little attention to culturally linked education. This has led to drop outs and directly impacted their overall educational status of Gaddi women. Engage youth as partners in their own development and the development of their communities; Promote positive development so youth will be engaged in their communities and more likely to promote the well-being of other young people. All institutes should adopt at least one ST villages for the betterment of rural villages scheduled tribe children especially for all the girls. Panchayat Level Committee have to be formed for the proper implementation of the Sarva Shiksha Abhijan and also to ensure the access to higher education for all ST children. Self-help groups have to be formed for the dissemination of knowledge. Vocational training and computer training have to be imparted through special camps and necessary financial assistance to be provided. Provision has to be made for more freedom and choice for selection of courses and combination of courses. More Polytechnics and professional colleges have to be established in the rural areas.

Conclusion

The increasing population, economic development and expansion of diversified job opportunities, income generating schemes by the Government organisation has changed the employment pattern among the Gaddis. Also, the Gaddi women need to uplift themselves with respect to socio-economic status and participate in various employment and economic activities. Over the period of time, in the process of socio-cultural interfusion with the local people, The Gaddis have absorbed many customs and traditions of the locals. As a result, their costume, food and living habits have gradually under gone a complete metamorphosis and have lost their originality. For about three to four months of winter's heavy snowfall, the

Gaddis generally migrate to the lower hills and plains along with their flock of sheep and goats. This transhumant way of life nurtured by ecological factors has affected the population structure. It may be concluded as it is observed that ecological and environmental factors existing to Gaddi women a special economic power, an elevated social status and authority almost equal to men. However, there are certain domains in which men continue to dominate, as is culturally required. Moreover, community authority still is in the hands of men. There is a kind of duality observed here. Men dominate in public and community affairs and continue to play the role of the head of the family and bread winner, women enjoy greater say in family life, great deal of social freedom and several of their actions are condoned/tolerated. Tribal women in the study area recognize the fact that they have been discriminated against in education, income, consumption, status and access to power; they have a worse health record than men; they suffer from social, cultural and legal discrimination and often from violence. They are discriminated on grounds of equity (which refers to equality of opportunities and choices) and efficiency. There is need for quantitative measurement, for a complete set of cultural and rights indicators to assess women's rights. The study reveals that a number of development efforts have been made by both the central Government and state Government during last five to six decades for improving the socio-economic conditions of the tribal people , including Gaddis of Chamba District.

References

Agro-Economic Research Centre (1988), Block Level Plan of Bharmaur in District Chamba, Himachal Pradesh. Shimla: Himachal Pradesh University.

Ahmad Aijazuddin (1999), "Social Geography",Jaipur: Rawat Publications.

All India Survey on Higher Education (2011-12), Government of India 2011 Scheduled Castes and Scheduled Tribes.

BhasinVeena (1996), "Caste dynamics in a transhumant society,"*Journal of Human Ecology,* Vol.7, No 2, pp 77-94.

BhasinVeena, Bhasin MK. (1993), "Ecology, population dynamics among transhumant of Himalayas: A case study of Gaddis of Himachal Pradesh",*Journal of Human Ecology,* Vol.4 No 3, 171-219.

Census of Himachal Pradesh (2011).

Census of India (1961),Office of the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India, 1(4): 68.

Government of Himachal Pradesh (1980), Bench Mark Survey Report, ITDP Bharmaur, District Chamba. Shimla: Tribal Development Department.

Jhamtani (1995), "Rural women the powerless partners in development,"*Kurukshetra,* 61 - 133.

Mathiyazhagan, T. (2004), A Pilot Study on Communication Strategy for Reaching the Unreached Tribal Population in Mandla district of Madhya Pradesh: 3.

MehraPriti (1992), "Women, work and position:Astudy among the Gaddis of Palampur, Himachal Pradesh,"*Indian Anthropologist,* Vol 22 No. 2, pp 41-55.

Mohanty PK. (2002), "Tribes within tribes"*Geography and You,* Vol 2 No. 11, pp. 15-23.

Negi TS. (1976), "Scheduled Tribes of Himachal Pradesh: A Profile". Meerut: Raj Printers.

Planning Commission (2001), National Human Development Report. New Delhi.

Sharma JP. (1973), "Pastoral economy and transhumance in the Himalayan Ravi-Chenab interfluve"*Geographical Review of India,* Vol. 35No.3, pp. 232-247.

Shashi S. (1977), Gaddi Tribe of Himachal Pradesh: A Sociological Study,Delhi: Sterling Publishers.

Singh AK. (1999), "Tribal Development in India", 2nd Edition. New Delhi: Classical Publishers.

Caesarean section and Risk of Acute Respiratory Infection (ARI) in children: Evidence from NFHS-4 survey

Ruchita B. Sakpal[1*]

Abstract

Caesarean section delivery is growing rapidly worldwide, and it is also increasing rapidly in India. But there are a few studies that have shown the effect mode of delivery on children health. Here, we examined the association between caesarean section and the risk of Acute Respiratory Infection (ARI). The study has used National Family Health Survey 4 data. Unadjusted and adjusted ORs and 95% CIs were obtained from Inverse probability weighted (IPW) logistic regression. The outcome of the study was acute respiratory infection. out of 185,101most recent singleton births, 19.4 were delivered by caesarean section, 5666 (2.9%) of all children less than five years had ARI. In the unadjusted analysis, caesarean delivery was not associated with ARI. Further, in the adjusted analysis on NFHS-4 data, it was associated with ARI. This study showed that caesarean delivery was found to be associated with ARI after accounting for factors related to the mode of delivery. A possible investigation of the relationship between caesarean delivery and its adverse outcomes on children is needed.

Keywords: ARI, caesarean section, health, India

Introduction

In the last few decades, caesarean section has risen rapidly in developed and developing countries, turning into a serious public health issue. Thus, In India, the caesarean section rates have also increased. The National Family Health Survey, 2015-16, estimates that 17.2 % of all births nationwide are delivered by caesarean section (IIPS, 2017). The WHO guideline states that cesarean deliveries should be between 5 and 10 percent (Zhang et al., 2016). The states that the exceeding percentage comes with no additional benefit in reducing mortality due to cesarean sections. There is emergence of evidence that children born by caesarean delivery have different physical, bacterial, and medical exposures and that these exposures can alter neonatal physiology (Neu and Rushing, 2011).

[1] Research Scholar, International Institute for Population Sciences, Mumbai, India
*Corresponding author: ruchita.sakpal.8@gmail.com

The risks of caesarean section comprise altered immune development, an increased likelihood of allergy, reduced intestinal gut microbiome diversity. Also, it has been found to be associated with adverse infant consequences, including respiratory health, impaired gastrointestinal, and mortality (Sandall et al., 2018).

Acute respiratory infection (ARI) is a respiratory tract infection and is most common in childhood, causing childhood morbidity and mortality in the world (World Health Organization, 2019). These include the lower respiratory tract infections, such as bronchiolitis or pneumonia, and the upper respiratory tract infections, like common cold, laryngitis,and tonsillitis. Respiratory infection remains a significant cause of hospital admission among children in low- and middle-income countries. Every year ARI account for over 12 million hospital admissions among children below five years of age; Worldwide, pneumonia causes 809 thousand deaths attributing to the fifteen percent childhood mortality (IGME,2018). The majority of these deaths have been reported in sub-Saharan African and South Asian countries (WHO, 2019). The million-death study reported that pneumonia alone contributed to 369 thousand deaths in India among children below five years (Million Death Study 2010). Furthermore, it was reported that 30 to 50 percent outpatient attendance, as well 20 to 40 percent hospital admission may be attributed to respiratory infections (WHO, 2018)

Studies examined that caesarean section is a risk factor for hospital admission for ARI in infancy (Green et al., 2016, Roberts et al., 2012) and childhood (Moore et al., 2010, Miller et al., 2020) in some developed countries. Some studies have investigated that caesarean section increases the risk of unplanned hospitalization due to respiratory morbidity (Paranjothy et al., 2013, Peters et al., 2018). Besides the mode of delivery, other factors like gestational age at birth are independent risk factors for childhood respiratory infection (Paranjothy et al., 2013, Miller et al., 2016). In addition to this, most studies found that not being breastfed is also associated with infant infection (Duijits et al., 2009, Payne and Quigley, 2017). Majority of these researches were done in developed countries and have reported the effects of caesarean section delivery on infant health. There is a lack of such research in the Indian setting. It is a crucial issue in the Indian scenario, as caesarean section delivery is increasing nationwide (Gondwe et al., 2018). Therefore, the objective of this study is to examine whether caesarean section delivery is associated with ARI.

Methods

This study is based on the National Family Health Survey-4 (2015-16) India Data. NFHS was conducted by the International Institute for Population Sciences in all 29 states and 7 union territories of India during 2015-2016 under the Ministry of Health and Family Welfare (MoHFW) sponsorships and the Government of India. The primary purpose of NFHS is to provide reproductive and maternal and child information at the district, state and national level. These cross-sectional data provide information at individual and household levels. The survey identified a total of 723,875 eligible women age 15-49 for the interview among interview households. The survey interviewed 699,686 women with a 97% response rate. This extensive survey aimed to provide information on essential population indicators, health and nutritional status, including maternal and child health, fertility, morbidity, mortality, family planning methods, immunization, etc (IIPS, 2017).

The NFHS-4 survey applied a stratified two-stage sampling process. Primary sampling units (PSUs) were identified in the first stage, i.e., villages in rural areas and census enumeration blocks in urban areas. These PSUs were selected using the population proportion to size sampling (PPS) method. In the second stage, in each selected PSU, the required number of households was randomly selected by systematic sampling in the rural areas. In the urban areas, the required number of households was selected from enumeration chosen blocks. This study includes the children born five years before the survey. The final sample included responses from 190898 women (IIPS, 2017).

Outcome variable

Assessment of mode of delivery among the women in the interview was determined by self-reported question ‘was (child’s name) delivered by caesarean section?’. The Acute respiratory infection was assessed through a maternal report by recent severe illness (cough combined by short or rapid breathing) in the two weeks before an interview in children less than five years of age.

Explanatory variables

Analysis in the study includes a range of socio-demographic, economic, healthcare and maternal factors. Socio-demographic factors included place of residence, region, caste, wealth index, maternal age, and maternal education. Reproductive variables included parity. Antenatal care variables included number of ANC visits, the timing of the first ANC visit. Prenatal conditions included maternal iron supplementation. Delivery-related variables included place of delivery. Infant covariates included infant sex, reported birth weight. Breastfeeding status was included whether they ever breastfed, initiation of breastfeeding, currently breastfeeding. Other predictors were mothers smoking behaviour, other household members smoking in the household, type of cooking fuel, household crowding (≤persons per room, >3 persons per room), and household having a separate kitchen.

Statistical analysis

A binary logistic regression model was used to create a propensity score with the help of demographic, antenatal and delivery factors for the mode of delivery. The propensity score was used to balance background factors associated with the exposure variable (mode of delivery) to reduced bias for unknown confounders in the relationship between mode of delivery and ARI. The logistic regression obtaining ORs and 95% confidence interval was used to assess the unadjusted association between the mode of delivery and ARI. The product of sampling weight and the inverse of the propensity score was used as a weight to the logistic regression to obtain an adjusted odds ratio for the relationship between mode of delivery and ARI in children under age 5. All analyses conducted using statistical analytical software STATA 16.

Results

Among 185,101 living under-five children, 19.4 were delivered by caesarean section. About 2.9% of children still alive suffered from ARI in the past two weeks of the survey.

The positively associated variables with caesarean section were included in the propensity score multivariable model predicting mode of delivery included mothers age at birth, place of

residence, caste, wealth index, mother's education, region, place of delivery, parity, prenatal iron supplementation, number of ANC visits, the timing of first antenatal appointment and birth weight.

Table 1 summarizes the characteristics of children under age 5 with ARI. It is seen that the children with ARI (18.4%) and not having ARI (19.4%) who had a caesarean section have a small proportion of the difference. Furthermore, a higher proportion of the children who were not having ARI were reported to have initiated breastfeeding immediately within first hour and day. The prevalence of ARI was higher among male (57.5%) children than female (42.5%) children.

Table 1: Characteristics of children under age 5 with Acute Respiratory Infection, India, 2015-16

	Children not having ARI n=179435	Children having ARI n=5666
Sex of child		
Male	54.4	57.5
Female	45.7	42.5
Mode of delivery		
Normal	80.6	81.6
Caesarean	19.4	18.4
birth weight (mean)	2833.4	2798.4
Breastfeeding		
Ever breastfed Initiated breastfeeding	95.7	96.7
Initiation of breastfeeding		
within 1 hour	42.2	37.1
within day	82.4	78.3
Currently breastfeeding		
No	39.6	32.5
Yes	60.4	67.5
Mother smoking tobacco		
No	99.0	98.6
Yes	1.0	1.4
Smoking HH member		
No	48.2	44.4
Yes	51.8	55.6
Type of cooking fuel		
clean fuel	36.9	31.6
biomass fuel	63.1	68.4

Household crowding		
<=3	46.8	43.7
>3	53.3	56.3
Household having separate kitchen		
No	42.8	50.9
Yes	57.2	49.1

Source: National Family Health survey (NFHS-4, 2015-16), n-unweighted cases

Table 2: Unadjusted Odds Ratio and Adjusted Odds Ratio of the association between mode of delivery and Acute respiratory infection among children under age 5, India, 2015-16

	uOR (95% CI)	p-value	aOR (95% CI)[a]	p-value	aOR (95% CI)[b]	p-value
Mode of delivery						
Normal ®						
Caesarean	0.937 (0.838, 1.046)		1.271 (1.160, 1.393)	***	1.186 (1.064, 1.324)	***

*Source: National Family Health survey (NFHS-4, 2015-16),[a]Model adjusted for inverse probability weighting predicting mode of delivery with Socioeconomic and demographic, maternal, antenatal, and delivery factors. [b] Adjusted for propensity score weight and breastfeeding status (ever breastfed, initiation of breastfeeding, currently breastfeeding and mothers smoking behaviour, other household member smoking behaviour, type of cooking fuel, household crowding (≤persons per room, >3 persons per room), and household having separate kitchen. ® Reference Category; (***P>0.01; ** P>0.05; * P>0.1); aOR=Adjusted Odds Ratio,(uOR)= Unadjusted Odds Ratio; 95% CI= Confidence Interval*

The children whose mothers were smoking had a more prevalence of ARI. A considerably higher proportion of children suffered from ARI, where any member of the household smoked within the house (55.6%) compared to those having no smoking among family members (44.4%). Children living in households using biomass fuels (68.4%) had a higher prevalence of ARI than those living in households using cleaner fuels (31.6%). The prevalence of ARI was higher among children living in households having a separate kitchen (49.1%) than those who did not have it (50.9%). Moreover, the occurrence of ARI was higher among children who stayed in crowded households (56.3%) (more than three persons lived in the same room) compared to children who remained in a less crowded household (43.7%).

Table 2 shows an unadjusted and adjusted association between ARI and mode of delivery. The unadjusted odds ratio indicates that caesarean delivery was associated with decreased odds of caesarean section. After adjusting the inverse of the propensity score as weight in the model, caesarean section delivery was positively associated with ARI (aOR 1.271 [1.160, 1.393]. This association remains further positively associated after adjusting for breastfeeding status and predictors of ARI.

Discussion

ARI is a severe public health problem that leads to high neonatal and child mortality in India. Moreover, caesarean section is increasing rapidly in India, which can have an adverse impact on children's health. ARI is the single most prominent cause of under-five morbidities, though it has not been studied adequately in India. Several global health agencies, such as United Nations Children's Fund (UNICEF), World Health Organization (WHO), all focused on this area (Mathew et al., 2011). Though, there are few reports on the association of caesarean section delivery and ARI among children under age five. This study reveals the association of mode of delivery and ARI among children under age 5.

Our study demonstrated that birth by cesarean section in children under age five was positively associated with ARI. We have first identified demographic and socio-economic factors associated with increased odds of cesarean delivery for the results. After controlling the inverse of propensity score as a weight, we found that caesarean section delivery was positively associated with ARI among children under age five. This result is relevant with studies carried out in western countries where the prevalence of caesarean section is high (Sandall et al., 2018). Few Indian studies in small settings like hospitals revealed the association between mode of delivery and ARI, and Caesarean section was associated with a higher incidence of ARI (Kumar et al., 2020). Another Indian study explained this phenomenon as the fecal microbiota of caesarean delivered babies are distinctly different from infants born through the vaginal mode of delivery; this relates to the emerging evidence that children born by vaginal delivery exposed to mothers intestinal and vaginal bacteria or microbes at birth compared with children delivered caesarean section thus makes them susceptible to immune-related conditions throughout their lives (Pandey et al., 2012). However, there are some contradictory reports in this regard. After three years of age, respiratory morbidity and hospitalization due to asthma are independent of recurrent hospitalization during infancy and not due to the mode of delivery (Moore et al., 2015). A cohort study from the peri urban region of Telangana State in India shows unlike reports as western countries. (Gondwe et al., 2018). A systematic review by Darabi et al. revealed that caesarean section delivery increased the risk of childhood ARI (Darabi et al., 2019). As the

trend of caesarean section increasing and some conflicting findings point to the complexity in studying associations at the population level, therefore, it is crucial for further investigation into the mode of delivery and occurrence of ARI in children is needed using prospective studies.

Conclusion

This study showed that caesarean delivery was found to be associated with ARI after accounting for covariates associated with mode of delivery in India. In the light of increasing trend of caesarean section in India, interventions should be implemented to reduce ARI as it eventually results in morbidity, hospitalization and mortality. A possible investigation of the relationship between caesarean delivery and its adverse outcomes on the children is needed.

References

Darabi, B., Rahmati, S., HafeziAhmadi, M.R., Badfar, G. and Azami, M., (2019). The association between caesarean section and childhood asthma: an updated systematic review and meta-analysis. *Allergy, Asthma & Clinical Immunology*, *15*(1), pp.1-13.

Duijts, L., Ramadhani, M.K. and Moll, H.A., (2009). Breastfeeding protects against infectious diseases during infancy in industrialized countries. A systematic review. *Maternal & child nutrition*, *5*(3), pp.199-210.

Gondwe, T., Betha, K., Kusneniwar, G.N., Bunker, C.H., Tang, G., Simhan, H., Reddy, P.S. and Haggerty, C.L., (2018). Mode of delivery and short-term infant health outcomes: a prospective cohort study in a peri-urban Indian population. *BMC pediatrics*, *18*(1), pp.1-6.

Green, Christopher A., David Yeates, Allie Goldacre, Charles Sande, Roger C. Parslow, Philip McShane, Andrew J. Pollard, and Michael J. Goldacre, (2016). "Admission to hospital for bronchiolitis in England: trends over five decades, geographical variation and association with perinatal characteristics and subsequent asthma." *Archives of disease in childhood* 101, no. 2: 140-146.

IGME, U., (2018). Levels & trends in child mortality: Report 2019, estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation.

International Institute for Population Sciences (IIPS) and ICF, (2017). National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS.

Kumar, R.K., Nagar, N. and Sowmya, M.V., (2020). Acute Upper Respiratory Tract Infections in Children and Mode of Delivery. *Pediatric Infectious Disease*, *2*(4), p.131.

Mathew, J.L., Patwari, A.K., Gupta, P., Shah, D., Gera, T., Gogia, S., Mohan, P., Panda, R. and Menon, S., (2011). Acute respiratory infection and pneumonia in India: a systematic review of literature for advocacy and action: UNICEF-PHFI series on newborn and child health, India. *Indian pediatrics*, *48*(3), p.191.

Miller, J.E., Goldacre, R., Moore, H.C., Zeltzer, J., Knight, M., Morris, C., Nowell, S., Wood, R., Carter, K.W., Fathima, P. and De Klerk, N., (2020). Mode of birth and risk of infection-related hospitalisation in childhood: A population cohort study of 7.17 million births from 4 high-income countries. *PLoS medicine*, *17*(11), p.e1003429.

Miller, J.E., Hammond, G.C., Strunk, T., Moore, H.C., Leonard, H., Carter, K.W., Bhutta, Z., Stanley, F., De Klerk, N. and Burgner, D.P., (2016). Association of gestational age and growth measures at birth with infection-related admissions to hospital throughout childhood: a population-based, data-linkage study from Western Australia. *The Lancet Infectious Diseases*, *16*(8), pp.952-961.

Million Death Study Collaborators, (2010). Causes of neonatal and child mortality in India: a nationally representative mortality survey. *The Lancet*, *376*(9755), pp.1853-1860.

Moore, H.C., De Klerk, N., Richmond, P. and Lehmann, D., (2010). A retrospective population-based cohort study identifying target areas for prevention of acute lower respiratory infections in children. *BMC Public Health*, *10*(1), pp.1-9.

Moore, H.C., Hall, G.L. and De Klerk, N., (2015). Infant respiratory infections and later respiratory hospitalisation in childhood. *European Respiratory Journal*, *46*(5), pp.1334-1341.

Neu, J. and Rushing, J., (2011). Cesarean versus vaginal delivery: long-term infant outcomes and the hygiene hypothesis. *Clinics in perinatology*, *38*(2), pp.321-331.

Pandey, P.K., Verma, P., Kumar, H., Bavdekar, A., Patole, M.S. and Shouche, Y.S., (2012). Comparative analysis of fecal microflora of healthy full-term Indian infants born with

different methods of delivery (vaginal vs cesarean): Acinetobacter sp. prevalence in vaginally born infants. *Journal of biosciences*, *37*(1), pp.989-998.

Paranjothy, S., Dunstan, F., Watkins, W.J., Hyatt, M., Demmler, J.C., Lyons, R.A. and Fone, D., (2013). Gestational age, birth weight, and risk of respiratory hospital admission inchildhood. *Pediatrics*, *132*(6), pp.e1562-e1569.

Payne, S. and Quigley, M.A., (2017). Breastfeeding and infant hospitalisation: analysis of the UK 2010 Infant Feeding Survey. *Maternal & child nutrition*, *13*(1), p.e12263.

Peters, L.L., Thornton, C., De Jonge, A., Khashan, A., Tracy, M., Downe, S., Feijen-de Jong, E.I. and Dahlen, H.G., (2018). The effect of medical and operative birth interventions on child health outcomes in the first 28 days and up to 5 years of age: A linked data population-based cohort study. *Birth*, *45*(4), pp.347-357.

Roberts, C.L., Algert, C.S., Ford, J.B. and Nassar, N., (2012). Mode of delivery may be the risk factor for infant infectious morbidity. *Archives of disease in childhood*, *97*(8), pp.759-759.

Sandall, J., Tribe, R.M., Avery, L., Mola, G., Visser, G.H., Homer, C.S., Gibbons, D., Kelly, N.M., Kennedy, H.P., Kidanto, H. and Taylor, P., (2018). Short-term and long-term effects of caesarean section on the health of women and children. *The Lancet*, *392*(10155), pp.1349-1357.

World Health Organization, (2018). Government of India, Students Handbook for IMNCI: Integrated Management of Neonatal and Childhood Illness, WHO India Country Office, New Delhi, India, 2003.

World Health Organization, (2019). *World health statistics 2019: monitoring health for the SDGs, sustainable development goals*. World Health Organization.

Ye, J., Zhang, J., Mikolajczyk, R., Torloni, M.R., Gülmezoglu, A.M. and Betran, A.P., (2016). Association between rates of caesarean section and maternal and neonatal mortality in the 21st century: a worldwide population-based ecological study with longitudinal data. *BJOG: An International Journal of Obstetrics & Gynaecology*, *123*(5), pp.745-753.

Appendix

Supplemental Table 1: Adjusted Odds Ratio (aOR) showing association between mode of delivery and background characteristics among children under age 5, India, 2015-16

Background characteristics	Categories	aOR(CI)	n**
Region	Central®		50736
	East	1.69 (1.583, 1.804)	38028
	Northeast	1.72 (1.597, 1.853)	28084
	North	1.049 (0.973, 1.132)	35125
	West	0.88 (0.804, 0.963)	13604
	South	2.298 (2.151, 2.455)	19524
Place of residence	Urban®		46735
	Rural	0.823 (0.777, 0.871)	138366
Mother Age at birth	<20®		18343
	20-29	1.289 (1.194, 1.392)	133169
	30-39	2.016 (1.819, 2.234)	31264
	40-49	2.450 (1.873, 3.204)	2325
Caste	SC®		33901
	ST	0.761 (0.687, 0.842)	36710
	OBC	0.847 (0.791, 0.907)	71827
	Others	1.085 (1.001, 1.176)	42663
Wealth index	Poorest®		44778
	Poorer	1.289 (1.176, 1.413)	42205
	Middle	1.764 (1.607, 1.937)	37299
	Richer	1.813 (1.639, 2.006)	32509
	Richest	1.851 (1.651, 2.075)	28310
Mother's education	no education®		52778
	Primary	1.176 (1.059, 1.306)	25764
	Secondary	1.189 (1.098, 1.287)	86719
	Higher	1.213 (1.098, 1.34)	19840
Place of delivery	Public®		102772
	Private	3.754 (3.559, 3.96)	40529
Parity	1®		63021
	2	0.761 (0.721, 0.802)	63428
	3+	0.347 (0.32, 0.376)	58652
Prenatal iron	No®		42582

supplementation			
	Yes	1.169 (1.09, 1.255)	141904
Number of ANC visits	<5®		117363
	>=5	1.329 (1.259, 1.404)	67738
Timing of 1st Antenatal appointment	<4®		107277
	4—6	1.042 (0.98, 1.109)	37854
	>=7	0.972 (0.866, 1.09)	7405
Birth weight	less than 2.5kg®		23908
	more than or equal to 2.5kg	0.855 (0.803, 0.909)	120603
Constant		0.072 (0.062, 0.084)	185101

Source: National Family Health survey (NFHS-4, 2015-16), Note: survey sampling weight is applied, aOR=Adjusted Odds Ratio, 95% CI= Confidence Interval, n-unweighted cases

Popular Articles

Gastritis or Gas Troubles; Causes and some measures for Prevention

Industrialised/urbanisation led mechanical life has many implications on health including what is commonly and trendy name known as 'Acidity'. Gastritis/Acidity is a general term for a group of conditions with one thing in common: inflammation of the lining of the stomach. The signs and symptoms of gastritis include burning ache or pain (indigestion) in your upper abdomen that may become either worse or better with eating. Common symptoms of Gastritis are Nausea, Vomiting, a feeling of fullness in your upper abdomen after eating. However, Gastritis doesn't always cause signs and symptoms. In simple words there are three basic causes for Gas troubles and are known by trio-words; Hurry, Curry and Worry. Hurry is a common phenomenon in modern mechanical and industrialized society. Professional related pressure of work, time bound work makes the person busier and to get the things done he has to follow the way called Hurry. Another important factor is excessive in take of curried items which often lead to indigestion and result is excess release of gas. Worrying is another leading cause of Gastritis. This is especially so when a person enters in to adults and as the age grows different type of expectations/failures, unforeseen incidents, ill health causes severe stress/ worry and often lowers digestive capacity and lead to hyper-acidity. Apart from this some of the medication such as excessive dosage of pain-killers and antibiotics also result Gastritis. Self-medication is one of the most dangerous attitudes that often result in multiple health risks including prolonged Gastritis. Excessive alcohol use is also equally damage causing factor. Alcohol can irritate and erode your stomach lining, which makes your stomach more vulnerable to digestive juices. Excessive alcohol use is more likely to cause acute gastritis. Interestingly, gastrointestinal bacterial infection can also cause gastritis. It's a bacterium that infects the lining of the stomach. The infection is passes from one person to other but can also be transmitted through contaminated food/any liquid items.

Prevention and tips

Lifestyle changes is very much helpful to combat Gas Troubles. Balanced approach in life style, related to food habits, regular exercise and sound sleep are the key to break the circle of the problem. Give utmost importance for your breakfast. Reserve enough time for breakfast, do not be hurry, mind what you eat, and try the same timings for breakfast. Boiled rice and vegetables are very-much helpful in prevention of Gastritis. While chewing the food (Primary digestion) chew it properly with your teeth and do not swallow food in hurry. Eating smaller, more frequent meals can also help ease symptoms. High fiber foods, such as whole grains, fruits, vegetables, and beans are helpful. Tea and coffee both are not good for acidity. However, for habitual person only small quantity is advisable. Avoid watching TV while eating, avoid junk food too. There are good Ayurveda medicines to combat the acidity. *Bhunimbadi Kahayam* 10 ML(before breakfast) with equal quantity of water would be helpful. Any Allopathic medicine shall be strictly administered under the supervision of a physician, self-medication may aggravate multiple problems. Remember, you are the best assesses of your general health. You should try to assess which is good and which is bad for you. !!!! Once you assess yourself follow the right habit of food, consistently.

Dr. N. Sheetal Kumar,

Ayurveda physician (AYUSH stream),
Anantheswara Clinic, Naaravai, Karkala Taluka,
Daskshina Kannada District.
Aurveda Practionere since 35 Years in rural place.

Pregnancy during Pandemic Period; Some inputs for safety

Unpresidential pandemic in our generation posed many health care challenges including care during pregnancy. In fact, challenges of ANC care have increased due to increased number of pregnancies during lockdown, than normal period, and restricted movement has challenged the accessibility of appropriate ANC services. Early registration for checkups without missing the appointments is critical. However, with COVID-19 pandemic the interaction with pregnant women has been restricted. This sometimes likely to miss out some of the signs/symptoms which eventually lead to pregnancy diabetes blood pressure and other complications. Therefore pinpoint diagnosis through appropriate investigation plays utmost important rather having more interaction with patients due to restricted social gatherings. Advice for at least 4 visit even during the pandemic is a must. Thereafter teleconsultation till 7-8 month of pregnancy is advisable. The women who are residing at urban areas always have relative advantage over rural women. Because women in urban area likely to be having easier accessibility of appropriate health care facility. The pregnant women who are residing at remote places should shift to such place where better facilities are available. It is very important whether a pandemic or normal period, pregnant women should understand that Pregnancy is not a disease, it just one of the critical phases that every woman passes through. Eating healthy and nutritious food, good sleep, and pregnancy appropriate exercises, positive thought are critical on the part of every pregnant woman. Self-medication should be avoided. Avoiding sexual intercourse during the pregnancy journey is a must. Do not panic for any covid related information/developments. But, try to see that such information is really true or false. Covid Vaccination at any stage of pregnancy proved to be safe. Therefore, opt it never miss it. Do not entertain any rumors on vaccine.

With still insufficient information that is available regarding the COVID- 19 each country formulates their own guidelines to protect pregnant women, to protect their infant and ensure healthy pregnancy. She should be advised to stay at home, practice hand and respiratory hygiene and defer from social gathering as far as possible. In Rural areas front line workers ANM/ASHA workers shall visit more often than normal period to provide predefined inputs

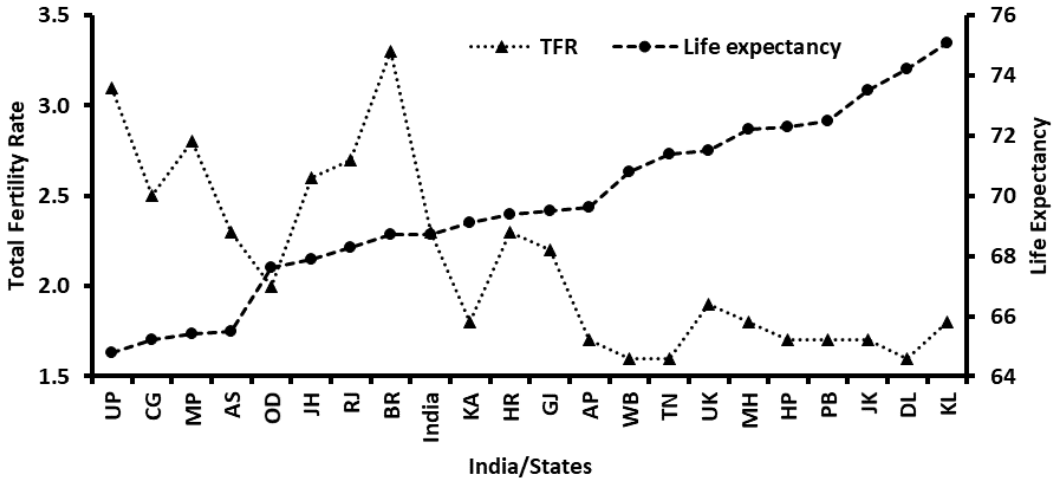
and to boost morale. There is every possibility of psychological stress during pandemic than usual period. Therefore, pregnancy appropriate Yoga and meditation is highly critical for better maternal health.

At facility level, my recommendation is that an exclusive medical fraternity has to be devoted exclusively for maternity care despite/whatever the covid situation. Otherwise, there will be hamper and paralyzed approach in ensuring maternal care. Public sector has numerous attractive schemes for pregnant women, implementing of which, only realize the quality output. Private hospitals shall still be more service oriented during covid situation. Respectful maternity care should be ensured whatever the pandemic pressure. Pandemic has some positive impact also. People are certainly more hygienic than pre-pandemic period. It has reduced multiple secondary infections in pregnancy. Quality food habits by men and women certainly improved birth outcome. Padenmic has reduced unnecessary travel and reduced strain on the part of pregnant women. The average time of reaching hospital by a pregnant women has certainly been reduced too due to reduced vehicle and human traffic. The pandemic has prepared medical fraternity to handle pregnant women better in subsequent Covid waves if any (????!!!)

Dr. Disha Ajila
MBBS, MS(OBG),
Senior resident
A.J. Institute of medical Sciences and Research Centre,
Mangalur. Dakshina Kannada District, Karnataka

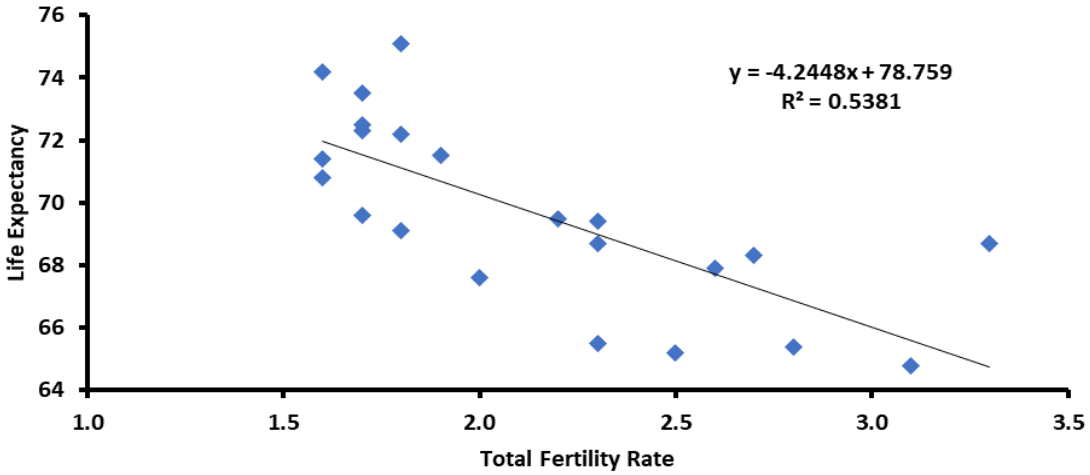
Current Statistics

Figure 1: Life expectancy and total fertility rate, India and bigger states, 2012-2016 & 2016



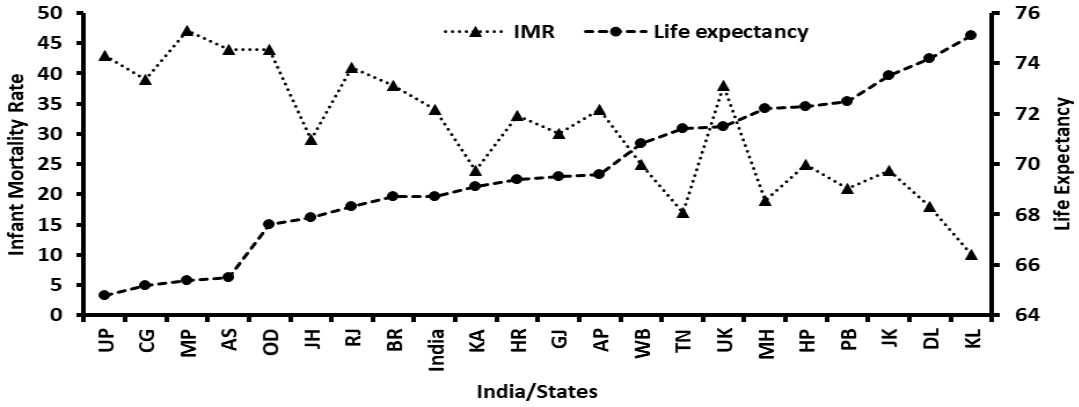
Note: AP=Andhra Pradesh; AS=Assam; BR=Bihar; CG=Chhattisgarh; DL=Delhi; GJ=Gujarat; HR=Haryana; J&K=Jammu & Kashmir; JH=Jharkhand; KA=Karnataka; KL=Kerala; MP=Madhya Pradesh; MH=Maharashtra; OR=Odisha; PB=Punjab; RJ=Rajasthan; TN=Tamil Nadu; UP=Uttar Pradesh; UK=Uttarakhand; WB=West Bengal. **Total fertility rate –** The number of children born to a woman if she passes through the childbearing years. **Source:** Sample Registration System, 2012-2016 & 2016.

Figure 2: Life expectancy and total fertility rate, India and bigger states, 2012-2016 & 2016



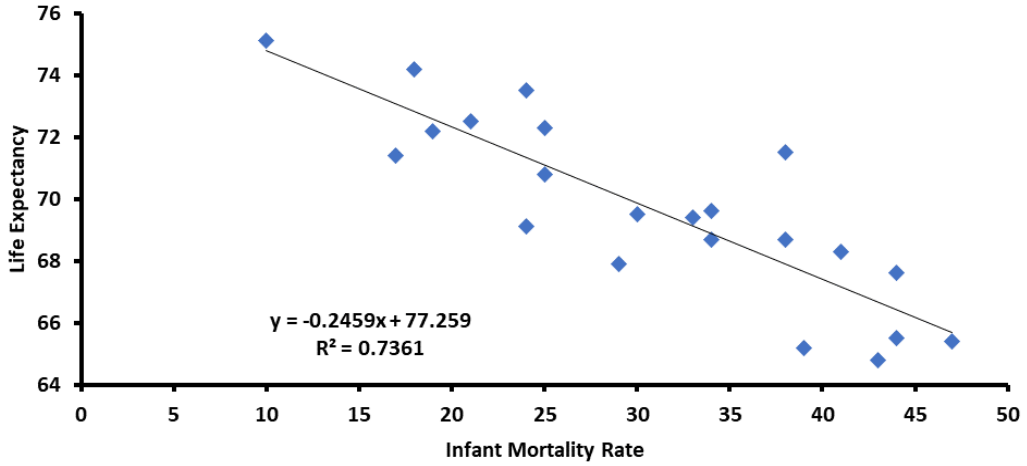
Note: Total fertility rate – The number of children born to a woman if she passes through the childbearing years. **Source:** Sample Registration System, 2012-2016 & 2016.

Figure 3: Life expectancy and infant mortality rate, India and bigger states, 2012-2016 & 2016



Note: AP=Andhra Pradesh; AS=Assam; BR=Bihar; CG=Chhattisgarh; DL=Delhi; GJ=Gujarat; HR=Haryana; J&K=Jammu & Kashmir; JH=Jharkhand; KA=Karnataka; KL=Kerala; MP=Madhya Pradesh; MH=Maharashtra; OR=Odisha; PB=Punjab; RJ=Rajasthan; TN=Tamil Nadu; UP=Uttar Pradesh; UK=Uttarakhand; WB=West Bengal. **Infant mortality rate -** Probability of dying between birth and exactly one year of age expressed per 1,000 live births. **Source:** Sample Registration System, 2012-2016 & 2016.

Figure 4: Life expectancy and infant mortality rate, India and bigger states, 2012-2016 & 2016



Note: Infant mortality rate - Probability of dying between birth and exactly one year of age expressed per 1,000 live births. **Source:** Sample Registration System, 2012-2016 & 2016.