**Evidence of Selective Gender Preferences in India- A Longitudinal Study: Investigating the Influence of Literacy Rate on Gender Ratio**

**Abstract**

 **Purposes:** The central purpose of the study was to examine the impact of literacy and illiteracy on the selective birth choices among females in the region under study, besides to identify the factors or drivers other than literacy and illiteracy that compel females to exercise selective options.

**Theoretical Framework:** The study has devolved to study the forces that restrict the growth of the population especially the birth of a girl child, which the earlier population theories like Malthus, Neo Malthus, and Cornucopian have not examined. Accordingly, the present research works on the fact that literacy and illiteracy have a significant role in containing population growth.

**Design Methodology:** The Study used longitudinal data and examined the relationship and interdependence between literacy and population growth in rural and urban areas of the region using parametrical statistical measures including simple Karlpearsons’s correlation and bivariate regression analysis.

**Findings and Recommendations:** The study based on parametric analyses found that literacy significantly contributes to selective sex births both in urban and rural areas and illiteracy largely favors unselective sex births. Moreover, the study revealed that selective sex births syndrome is overwhelmingly adopted by the literate population. This seems to be a major reason for the aggravated sex ratio in Jammu and Kashmir. Further, the study based on some advanced studies in medical science says that eliminating feticide on the basis of advanced medical aid is yet not a full proof procedure to know exactly the type sex of new birth in advance. Therefore, the paper attempts to refute the belief that the sex of a foetus can be be determined exactly.

**Research Practical and Social Implications:** The study is confined to the state of Jammu and Kashmir and can be helpful for policy design at the state and national level for the larger benefit of society at large. It can also guide researcher to chase and underline moments in the socio-cultural and economic domains of life of people and societies.

**Originality/Value :** The paper is based on the original research work undertaken by the author and the data used in the study is collected from the authentic sources.

**Key Words**: Population, Gender, Sex Ratio, Literacy rate, gender preference, infanticides

**Introduction**

India is sure to be the world’s next most populous nation. It will take over China in a couple of years because of high fertility and the growth rate of the population. Although there is a visible improvement in the health, education, and housing condition of people in India in terms of a fall in death and birth rate, rise in literacy, and housing conditions. However, these changes have not raised the overall quality of life of people in the region. The socio-economic structure of the country is still dominated by orthodox and dogmas understanding and pushes people to resort to selective gender preferences, especially by elite educated classes. Gender Preference is a major socio-cultural and economic issue that nations and societies across the world are facing. Gender preference is an innate choice that females lull and adopt all possible human and medical interventions to have the gender of their desire. Gender preference is somewhat not an unlike misconceived option chosen by females, however, a deliberate and conscious decision pursued based on a pre-examined socio-cultural and economic paradox. The research of Wood et all (1997) says that Parents gender preferences for children are embedded in cultural and religious traditions and community norms, shaping individual attitudes and behavior. Children of a particular sex are often desired in order to provide certain utilities or to minimize financial or psychological costs. The problem- gender preference is prevalent much bigger in proportion in the developing world than in affluent societies. A growing body of research has shown that preference for sons was more prevalent in Southern Asia, Western Asia, and Northern Africa, Egypt, Nepal, and China. In contrast, in the other research study of the 28 countries in sub-Saharan Africa, sons preference was seen in 16 countries. These findings demonstrate that preference for sons was not predominant across countries, and daughter preference was common in many countries. However,  among the countries from South East Asia region, a strong preference for sons has been observed in India, China, and South Korea. Although, past research has underlined socio-economic factors pushing females for selective births, however, there are many other demographic changes equally responsible for leading gender preferences.

Demographic change is an inevitable phenomenon. It is a major indicator of economic progress and backwardness, depending upon the stage in which a nation is passing. Demographic change is the byproduct of multiple socio-cultural forces that shape people’s behavior to actions leading to demographic change. Rightly, demographic change can’t be stopped altogether. However, its directions can be moved to suit the interests of a nation through appropriate demographic policy interventions. Today, most regions and countries are experiencing unprecedentedly rapid demographic change. Almost four billion have been added since 1950. The population expansion is expected to continue for several more decades before touching 10 billion later in the twenty-first century. Around 2070, the world's population will be 10 times larger than in 1800. The population statistics have recorded new trends. Although, women’s fertility has dropped, life expectancy has swollen, and the ratio of the young population is accentuating. The world is experiencing a somewhat new demographic order. Contemporary societies are now at very different stages of their demographic transitions including India which is the second most populated country in the world after China. The population of India is projected to surpass China by 2024 and is expected to become the habitat of more than 1.5 billion people by 2030 despite the fact, that India records recede in population growth from 2.3 percent to 1.3 percent in the decadal population growth data between 1972 to 1983. At present, India has more than 50 percent of its population below the age of 25 years and 65 percent below the age group of 35 years. The average age of an Indian is 28 .4 years compared to 37 for China and 48 years in Japan. The population data of India hints at a mix of favorable and somewhat uneven disturbing changes. Gender statistics is one of them.

 Gender statistics are a profound domain of research involving male and female compositions and sex ratio. It is one of the most important social parameters of a society that indicates the balance between males and females says Christophe (2007). The sex ratio means the number of females against 1000 males. It typically refers to the number of females’ available to one thousand males. The sex ratio is a proposition used to indicate the proportion between men and women (Suresh,1990 ). It varies from one area to another area and from one age group to another group depending on the age-specific mortality rates and sex-specific migration rates. In India, the sex ratio has remained quite low for all ages, especially in the pre-independence period. Suresh (1990) reports that life expectancy started to increase regularly in India after 1920, it appears that men reaped more benefits from this progress than women. Though the sex ratio in the country is low at 940 females per 1000 males, it has increased from 933 females per 1000 males as reported in 200. The unfavourable sex ratio is not unique to India. Distorted sex ratios are reported in many Asian countries, including China, Taiwan, Singapore and Vietnam. However, the alarming fact is that India has one of the lowest child sex ratios (female-male ratio of children below 6 years) in the world, with 914 girls /1000 boys, which has fallen from 927 girls/1000 boys in 2001. This has brought the dark side of India's demographic imbalance into the world's attention. Gender bias, even when not disastrous, may still generate greater debility among surviving girls. The preference for sons can result in gender-based inequality within the households, which manifests itself in the form of discrimination against daughters in providing food, health care, and education, which in turn increases the vulnerability of the surviving girl child. Thomson Reutex Trust Law Women in its recent Survey, says that India ranks fourth as the most dangerous place for women due to the increasing number of female infanticides, foeticides, and human trafficking. The other three countries include Afghanistan, Congo, and Pakistan. The prospect of a further worsening India’s sex composition requires close monitoring of current sex-ratio trends in the country. In India especially in the state of Jammu and Kashmir, the phenomenon of gender statistics is much more difficult to understand due to the heterogeneous composition of the population in terms of culture, religion, socio-economic factors, government regulations etc. Christophe (2007) views that the Indian scenario of female discrimination is extremely complex in view of India’s social and economic diversity. The interplay of cultural and economic factors, along with the impact of policy initiatives has produced a heterogeneous situation, in turn, this complexity offers ways to better understand the mechanisms at work, and to inform the policy debate on the struggle against gender discrimination. In this context, the existing literature on gender statistics has unfolded that advanced medical science is a basic culprit for deteriorating sex ratio in India. Therefore, in view of the gravity of the situation, this paper is a modest attempt to unfold the myths and realities that are responsible for the poor sex ratio in the state of Jammu and Kashmir.

**Literature Review**

Population and demographic changes is an inevitable fact to happen within any nation and across the world. The earlier theories attempted to uncover the facts which according to them may regulate population size commensurate to available resources. Malthus ( ) the first contender of the domain held that universe is governed by positive checks ( like wars, famine and starvation ) which restore optimum population number in a country. These factors leave no choice on humans to decide about the population size. Nevertheless, the Neo Malthusian camp Paul Ehrlich ( ) took complete turn to past doctrine and opined that it is only environment that would determine and regulate population number fit for a nation. He pointed environmental pollution created by affluent people would kill excess population and accordingly balanced size of people would only live and thrive. While Cornucopian (1981) observed that world would never experience food scarcity and as such people may not die for want of food or due to environmental factors. Population would grow and food productivity would also grow. The thought seems more relevant even today and world on one side witness exponential growth in population while on the other side we record consistent rise in food productivity. Therefore, there are other factors that have role in the population transition be medical science or education. These two knowledge domains have made people to think differently with regard to population growth and its associated aspects like gender preferences and choices.

 Gender preferences and selective birth decisions are always complex and have significant impact on demographic panorama of a country. These decisions are more specific and deliberate. They affect population composition, family size, sex ratio and economic growth and human development in the long run. Gender preferences have predominantly impacted global demographic scenario right from late nineteen century which saw grass reversal of whooping population growth during Post-Malthusian Regime. The focus of people has significantly shifted to small family emphasizing sons shall be an essential member of such family. Although, this form of demographic transition has enhanced development opportunities for male kids in the shape of education, nutrition, health and other allied socio-economic benefits, however, it instantly disturbed balanced sex order.

The sex ratio is the indicator of number of females available against 1000 males in a particular region. A skewed sex ratio in favor of males has been a major concern since the first census was held in India in1871. The adverse sex ratio of demographic transition is not an exception to India only. However, globally many nations are equally fighting against this adverse demographic change. Majumdar (2013) says that the sex ratio shows the extent of gender-based population equality in a country. The problem of gender-based disorder was initially investigated by Amartya Sen (1990) and subsequently by other researchers, including Dyson and Moore (1983), Ruchi (2018), and of course, UNO. The earlier research has shown that the adverse sex ratio in the post-liberalization era is specifically due to the growth of literacy and the availability of advanced sex-determination medical facilities. Amartya Sen (1990) opines that a balanced sex ratio and high literacy rate are essential indicators of socio-economic and cultural advancement. While Chandna (2015) says that literacy is one of the important aspects of demography and is more often considered as a fairly reliable index of socio-cultural and economic advancement. Literacy and sex ratio usually share relation between themselves and it is overwhelmingly expected that high literacy would significantly lead to high sex ratio. Nevertheless, the research of Ruchi (2018) has revealed that the sex ratio and literacy are inversely correlated indicating that growing literacy led to declines in the sex ratio. Similarly, the research of Kumar and Yadav (2018) have shown that the literacy and sex ratio are negatively correlated and move often in an opposite direction. Supporting the argument, the research of Bhalotra and Cochrane (2010) unfold that women education and sex ratio share opposite relation and more education for women has been found to worsen child sex ratios, because women with more education want to have fewer children overall, but want a son—are more likely to abort girl children (Mayer 1999; Das Gupta and Mari Bhat 1997). Further strengthening the argument the research outcome of Bhalotra and Cochrane (2010; Jha et al (2011); Madan and Breuning (2014) have noted that this phenomenon is universally visible in most parts of the India predominantly in the urban packets and among the literature women and the discourse is exclusively facilitated by scientific advancement of medical science and access to prenatal sex determination.

 Besides the advancement in medical science for prenatal sex determination, the researchers have rolled out other factors that are also responsible for low sex ratio in the country. In this context, Dyson and Moore (1983) have seen kinship structures enjoys distinctive weight for adverse sex ratio in India . While Das and Gupta (1987), Krishnaji (1987) Miller (1997) have found socio economic status is the basic culprit for adverse sex ratio in country. Similarly, the research of Rosenzweig and Schultz (1984); Berik and Bilginsoy (2000), have unfolded that minimal employment opportunities for adult women and their poor economic value contribute to low sex in the country. Likewise, Das Gupta and Mari Bhat ( 1997) ; Jayachandran (2017); Malhotra, Vanneman and Kishor (1995) reported that overall fertility decline leads to adverse sex ratio. The research of Agnihotri, Palmer-Jones, and Parikh (2002) and Kishor (1993) have found that low female labor-force participation and low wage earnings pushes adverse ratio in India. Further, the research of Chakraborty (2015) hints about the trade openness spurt sex ratio inequality in India. Similarly, the research findings of Murthi, Guio, and Dreze (1995); Sudha and Rajan (1999) reveal that development/urbanization and Bhalotra, Brule, and Roy (2020) reveal the female inheritance rights contribute to adverse sex ratio. The underline commentary in view of literature review lead to the conclusion that literacy and sex ratio are not more often independent to each other, however are overwhelmingly inversely related all through in the Indian context which may not or may not be consistent in the global context.

**Objectives**

**The study is undertaken to attain the following objectives**

* To examine the relationship between literacy and the sex ratio
* To study the impact of literacy on the sex ratio

**Hypothesis**

Null Hypothesis: Literacy and Sex ratio are independent of each other in in the state of Jammu and Kashmir.

Alternative Hypothesis: Literacy and sex ratio are not independent to each other in the state of Jammu and Kashmir

**Scope of the Study**

The study is longitudinal covering three decades 1990-2021-22 and exclusively specific to the state of Jammu and Kashmir

**Research Methodology**

The study is exclusively based on secondary population data relating to literacy and sex ratio. The data was collected from both official and nonofficial records of the Department of Economics and Statistics, planning and Development, and Department of Information, including journals, research papers, magazines, and Internet, etc. The gathered pertains to the two main aspects of the demographic domain - sex ratio and literacy. The data collected were tabulated and put into various statistical operations including correlation, regression, trend analysis. The Karlpearson’s correlation was used along with simple Fisher’s bivariable regression model. Moreover, time series analysis was applied to draw trends and patterns of the data to derive results and arrive at conclusion.

**Analysis and Discussion**

Demographic transition is profound and swift. It has almost impacted all domains of population composition and economic development of people. The fall in death rate and birth rate has contributed to population explosion and rise in literacy rate led adverse sex ratio. However, apart from these factors, what leads to demographic change has remained a grate challenge to demographic experts to investigate. In fact, past research has documented demographic change as an outcome of many heterogeneous factors around the world, of them literacy has been found a predominant force responsible for a major change in the demographic transition. This is because, education is more enlightening and decisive force which influence and motivates an individual to act and function rationally on the basis of logical and sound edifice of knowledge and reasoning. Surely it has affected the composition of gender matrix- the sex ratio. The sex ratio measured by the number of females per 1000 males is an indication of gender equality in a region. Biologically, a girl child is more resistant to disease and more likely to survive infancy than a male child, but the sex ratio shows an adverse trend in India indicating that a male in society is preferred over a female. This has been confirmed by the research of Majumdar (2013); Chanda (2014) and Ruchi (2018). There are number of factors which have led to adverse sex ration in India including in the state of Jammu and Kashmir. Therefore, to study how far the literacy has impacted the sex ratio in the region under study, an analysis and introspection of official data pertaining to the subject has been undertaken hereunder.

**Gender Statistics at All India Level**

The Millennium goal of UNO and of course India’s demographic policy is to attain balanced sex ratio though its demographic policy interventions to alien the same to natural specifications. Nevertheless, the deceit human behaviour has always fiddled with nature for his/her personal gain and disturbed this balanced sex ratio matrix in many regions of the world. The past research (Majumdar,2013) has shown that mostly female deliberately act unevenly and resort to selective births. They overwhelmingly prefer male over the female children. This leads to adverse gender imbalance and demographic disorder. Accordingly, adverse gender statistics is a most sensitive issue for demographic scientists and policy think tanks says Sen (1990). It has long-run policy ramifications for the country as a whole. The adverse gender statistics that existed even during pre-colonial periods repots Majumdar (2013). The British administration has observed male-dominant sex ratio in India in many parts of India during the 19th century as reported by the research of Agnihotri (20000 ; Croll, (2000) and Attane and Guilmoto (2007). While Visaria (1971) has found that usually high mortality levels are prevalent among women of all ages. The research of (Yugali et all ,2014 ) has indicated that medical interventions has immensely added to adverse sex ratio in India. In this context, the historical facts show that in some provinces of West India female infanticide was rampantly practised and some affluent cast groups disliked the birth of female baby and were killing them immediately on their birth even before the independence. The demographic plight of female further worsened with the high mortality rate of females between the age group of 0-5 years and bought a worst sex ratio scenario even in the post-independence period as can be seen from the given table below.

 Table No 1- **Sex Ratio at all India Level**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1901 | 1911 | 1921 | 1931 | 1941 | 1951 | 1961 | 1971 | 1961 | 1991 | 2001 | 2011 | 2021 |
| Sex Ratio | 972 | 964 | 955 | 950 | 945 | 946 | 941 | 930 | 934 | 927 | 933 | 940 | 1020 |
| % fall in Sex Ratio | - | 0.13 | 1.75 | 2.27 | 2.78 | 2.69 | 3,19 | 4.33 | 4.00 | 5.63 | 5,20 | 4.30 | +104.93 |

**Source: DEPS, UT, J &K**

 **Table No 2- Sex Ratio of the Child and Overall population, India, 1951-2021**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1951 | 1961 | 1971 | 1981 | 1991 | 2001 | 2011 | 2021 |
| Sex Ratio | 100 | 102 | 104 | 106 | 108 | 110 | 112 | 108 |
| Percentage Rise | - | 0.2 | 0.4 | 0.6 | 0.8 | 0.10 | 0.12 | 0.8 |

**Source: DEPS, UT, J &K**

 The adverse sex ratio is vividly visible in the official data depicted in the above table No 1. The data clearly show that sex ration in India over the last more than one century is continuously declining. It has gone down by 12 (1972-1960) points from 1901 to 1911. Besides the socio-cultural factors, this decline in sex ratio is significantly attributed to growing literacy among the women in India, coupled with a convenient availability of medical technological intervention to abort the girl foetus. The similar findings have been reported by the research of Bhalotra and Cochrane (2010) ; Guilmoto (2009); Jha et al (2011) ; Madan and Breuning (2014). These research findings lend a plausible clue that with the growth of female literacy rate although, the quality and standard of family unit in India has improved however, it adversely shifted against female gender preferences. Despite the dismay of adverse sex ratio in the past from 1901- 2011 first time in 2021 sex ratio hints an upward movement to 1020 showing more female than males in India. In this context, it is pertinent to mention that out 201 countries surveyed by UN 125 countries have more females than males hinting unbaised growth of female population in india and across the world. The rise in sex ratio in India seems due to variety of factors like drop in legal marriage age for both men and women to 23.3% and 17.7% respectively, decline in fertility rate to 2%, and infant mortality to 35.2. The position is almost identical in all the states of Indian union as is visible from the table No 3

 **Table NO 3- State Wise Sex Ratio**

|  |  |  |  |
| --- | --- | --- | --- |
| S.NO | State |  Sex Ratio | % Change in Sex RatioFrom 1991 to 2021 |
|  |  | 1991 | 2001 | 2011 | 2021 |
| 1 | Jammu and Kashmir | 927 | 892 | 883 | 883 | -4.75 |
| 2 | Himeachal Pradesh | 896 | 900 | 974 | 974 | +8.70 |
| 3 | Punjab | 882 | 874 | 893 | 893 | +1.01 |
| 4 | Chandigarh | 790 | 773 | 810 | 818 | +1.03 |
| 5 | Uttranchal | 936 | 964 | 963 | 963 | +1.02 |
| 6 | Harayana | 865 | 861 | 877 | 877 | +1.38 |
| 7 | Delhi | 872 | 821 | 866 | 866 | -0.01 |
|  | Rajastan | 910 | 922 | 926 | 926 | +1.01 |
| 9 | Utterpradesh | 876 | 898 | 908 | 908 | +1.03 |
| 10 | Bihar | 907 | 921 | 916 | 916 | +0.09 |
| 11 | Skim | 878 | 875 | 889 | 889 | +0.12 |
| 12 | Andrapradesh | 859 | 905 | 920 | 920 | +1.07 |
| 13 | Nagaland | 886 | 909 | 931 | 931 | +1.05 |
| 14 | Manipur | 958 | 978 | 987 | 987 | +3.02 |
| 15 | Mizoram | 921 | 938 | 975 | 975 | +5.86 |
| 16 | Tripura | 945 | 950 | 961 | 961 | +1.69 |
| 17 | Megalay | 955 | 975 | 986 | 986 | +3.24 |
| 18 | Assam | 923 | 932 | 954 | 954 | +3.35 |
| 19 | West bangal | 917 | 934 | 947 | 947 | +3.27 |
| 20 | Jarkhand | 922 | 941 | 978 | 978 | +6.07 |
| 21 | Orisa  | 971 | 972 | 991 | 978 | +0.72 |
| 22 | Chhatisgrah | 985 | 990 | 930 | 991 | +0.60 |
| 23 | M.P | 912 | 920 | 918 | 930 | +1.97 |
| 24 | Gujrat | 934 | 921 | 618 | 918 | -0.172 |
| 25 | Daman & Dev | 969 | 709 | 775 | 618 | -34.33 |
| 26 | Dada and Nagar Haveli | 952 | 811 | 812 | 775 | -11.93 |
| 27 | Maharashtra | 934 | 922 | 992 | 925 | -1.00 |
| 2 | Andrapradesh | 972 | 978 | 968 | 992 | +2.05 |
| 29 | Karnataka | 960 | 964 | 968 | 968 | +0.83 |
| 30 | Goa | 967 | 960 | 946 | 968 | + 0.00 |
| 31 | Lakshdeep | 943 | 947 | 1084 | 946 | +0.31 |
| 32 | Kerala | 1036 | 1050 | 995 | 995 | -0.40 |
| 33 | Tamil Nadu | 974 | 1001 | 1038 | 995 | +2.10 |
| 34 | Andaman Nicobar | 818 | 846 | 878 | 878 | +7.33 |
| Overall | India | 927 | 933 | 940 | 1020 | +10.03 |

 **Source: DEPS, UT, J &K**

The demographic transition is an out come of multiple factors unfolded by growing literacy of females , urge for small family size, economic status, low earning opportunities for females , male dominated society, low value for female in society, social pitfalls-dowery, modern outlook , quality of work life etc. This transition has pushed mainly by rich and well to do class of society. These segments of society set new trends, standards, benchmarks and styles which other groups of societies copy and emulate especially the poor people and people living in semi urban pockets and villages closer to cities. Consequently, a homogeneous trend with regard to adverse sex ratio is visible all across the states in India as is manifested by the official statistics.

 The state-wise data unfolds that the sex ratio for the majority of the states of the Indian union over the last three decades is not somewhat appreciable. Although the majority of the states have shown a rise in the sex ratio over the last three decades, however, it is still not up to the mark. In many northern states, the sex ratio is pegging below the 900 mark. Whlie, it is fairly better some southern states of India like Kerala, Tamil Nadu, Andrapradesh and Chattisgarh. The sex ratio in these states has remained closer to the 1000 mark. The UT of Punjab, Haryana, and Jammu and Kashmir record adverse sex ratios of 818, 877, and 8883 against 1000 men respectively, despite the fact, it is rising at a much lower rate. This seems predominantly due to low socio-economic conditions and undefined population policy in these states. Here it is pertinent to mention, that the states which enjoy a better sex ratio have robust medical care systems in place along with balanced nutrition facilities available for pregnant women and children through the extensive network of children and women welfare-centric institutions.

These facilities help to improve the health and nutrition status of its women and children and as such were able to attain a reasonably better sex ratio. The research of Ruch (2018) has unfolded similar findings in the context of adverse sex ratio analysis. While the other research studies ( Mujamdar , 2013; Chanda 2014 ) refute the argument by saying that women are least benefited under welfare schemes as compared to men. These research findings, therefore, plead that there are the number of other factors for low sex ratio ( besides the advancement of medical science for elimination of female fetus) that force the women not to have the girl child compared to male child, This may include poor plight of women in society , early marriage, dowery, slavery attitude of society towards the women , excessive disrespect shown by men towards women , not having ability to earn livelihood as men earn etc. Therefore, the low sex ratio is believed significantly to be an outcome of “Women Neglect Syndrome” . The research of Agnihotri, Palmer-Jones, and Parikh (2002) and Kishor (1993) revealed somewhat similar facts vis-à-vis the background of adverse sex ratio in India. Nevertheless, with the advancement of medical science and consequent upon the growing socio- economic evils associated with women, deliberate attempts to abort the unwanted births is seen a major factor for poor sex ratio in Indian states. Das Gupta ( 1987) and (Miller ) 1981 report the similar facts.

**Gender Statistics in Jammu and Kashmir**

In the state of Jammu and Kashmir, low sex ratio is a matter of serious concern for the government and demographic scientists. Despite some marginal improvement, the state has registered continuously low sex ratio over the last more than three decades. At the national level the sex ratio has increased from 933 females per 1000 males in 2001 to males 940 females in 2011 and 1021 females in 2021 registering a surge of twenty eight points during the last three decades. In fact, for the first time India’s the sex ratio is moveing closer to the global sex ratio While, sex ratio in Jammu and Kashmir has dropped by nine points from 892 to 883 in 2001 to 2021. Within the state, lowest sex ratio were recorded in the district Leh 690 and Kargil 810, Rajori 860 and Bandipora 889. While the highest sex ration were recorded in kulgam and Shopian, 959, Anathnag 927, Doda 919 and Srinagar 900. These districts have sex ratio somewhat inline to the national average. Consistent to this, the researchers opine that low sex ratio in the state is largely due to the availability of medical sex determination facilities. Supporting the argument, one independent study about female feticides’ in 2007 reported that about 13 percent of diagnostic centers in valley carried out gender determination test with respect to selective births. The study further reports that, out of pregnant female sample respondents about 10 percent have gone for the first sex determination test, while 30 percent sample respondents have gone for the second test and aborted a girl test. Besides the unregulated and secret medical care, it seems that there are other factors contributing to adverse sex ratio in the state. The study found that besides the literacy, modernization, two-child policy slogan, existing social evils are responsible for adverse ratio in the state. These findings are in tune with the research of Das Gupta and Mari Bhat(1997); Ruchi (2018) and Kishore (1993).

**Gender Statistics and Literacy**

The literacy rate is measured as a percentage of population aged seven years and above who are able to read, write and form simple sentences as per National Statistical Office (NSO) 2021. A high literacy rate is an indication of socio- economic development of a society and vice versa. In India, male literacy rate (84.70 percent ) is higher than female literacy rate (70.30 percent ), the same is true in the state of Jammu and Kashmir. According to the a new survey of the National Statistical Office (NSO) male literacy in Jammu and Kashmir is 85.70 percent which is much higher than the female literacy rate 68 percent. The survey reveals that in rural areas, female literacy is lower than urban area. The urban female literacy rate is (75.70 percent ) and literacy rate of women in rural areas is 66 percent. The female literacy in the state of Jammu and Kashmir hovers around 68 percent, which is around 9.70 percent lower than the national average as per census 2021. In order to study the correlation between literacy and sex ratio both in urban and rural areas, the data pertaining to these two domains is presented in the table NO: 4

**Table NO 4-Karlpearson’s Co-efficient of Correlation Between Literacy and Sex Ratio in Rural and Urban Population**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S.NO | District | Sex Ratio | Literacy | Overall in 2001 | Overall in 2011 |
| Rural | Urban | Rural | Urban | Sex Ratio | Litercy | Sex Ratio | Literacy |
| 1 | Anantnag | 936 | 842 | 43.70 | 62.60 | 922 | 46.50 | 927 | 62.69 |
| 2 | Pulwama | 952 | 883 | 47.90 | 63.40 | 945 | 49.60 | 912 | 63.48 |
| 3 | Srinagar | 913 | 835 | 38.70 | 65.10 | 851 | 59.80 | 900 | 69,41 |
| 4 | Budgam | 940 | 854 | 40.20 | 60.30 | 930 | 42.50 | 894 | 56.08 |
| 5 | Baramullah | 912 | 839 | 42.30 | 60.30 | 903 | 45.50 | 885 | 64.43 |
| 6 | Kupwara | 916 | 688 | 42.40 | 62.80 | 906 | 43.20 | 835 | 64.51 |
| 7 | Leh | 904 | 611 | 59.90 | 81.80 | 823 | 65.30 | 690 | 77.20 |
| 8 | Kargil | 861 | 559 | 58.80 | 80.80 | 837 | 60.80 | 810 | 71.34 |
| 9 | Jammu | 902 | 828 | 71.70 | 83.50 | 868 | 77.00 | 880 | 83.45 |
| 10 | Udhampur | 897 | 684 | 49.20 | 85.40 | 860 | 55.20 | 870 | 68.49 |
| 11 | Doda | 918 | 727 | 61.70 | 89.40 | 903 | 64.00 | 919 | 64.68 |
| 12 | Kathua | 912 | 835 | 63.10 | 80.01 | 901 | 65.60 | 890 | 73.09 |
| 13 | Rajori | 890 | 736 | 55.80 | 85.40 | 878 | 58.00 | 860 | 68.17 |
| 14 | Poonch | 932 | 745 | 62.50 | 93.50 | 919 | 65.00 | 893 | 66.74 |
| 15 | \*kulgam |  |  |  |  |  |  | 951 | 59.23 |
| 16 | \*Bandipora |  |  |  |  |  |  | 889 | 56.28 |
| 17 | \*Samba |  |  |  |  |  |  | 886 | 81.41 |
| 18 | \*Reasi |  |  |  |  |  |  | 890 | 58.15 |
| 19 | \*Ganderbal |  |  |  |  |  |  | 874 | 58.04 |
| 20 | \*Ramban |  |  |  |  |  |  | 902 | 54.27 |
| 21 | \*Shopiyan |  |  |  |  |  |  | 951 | 60.76 |
| 22 | \*Kishtiwar |  |  |  |  |  |  | 920 | 56.20 |

**Source: DEPS, UT, J &K**

\*These district were created in August 2019, as such no exclusive data is available about them prior to their existence.

The official statistics depicted above shows that the sex ratio is fairly better in rural areas than urban areas while literacy is appreciably high in urban pockets than in rural ones. This in another sense hints that rural areas have a somewhat good number of females than urban areas and urban areas enjoy high literacy rate than rural areas. The official data when put to some advanced statistical operations unfolds that there is somewhat inverse relationship between the literacy and sex ratio hinting that high literacy contributes to adverse sex ratio. This in pure sense can be put that high literacy ***contributes to a low sex ratio while low literacy spurts a high sex ratio***. The finding proves correct as their overall Karlpearson’s coefficient of correlation appeared negative at -0.516, while for rural and urban areas it appeared negative at +0.363 and +0.5034 respectively. It implies that the null hypothesis is accepted which presumes that literacy contributes to declining in sex ratio. This finding is reinforced by the other studies ( Agnihotri , 2000: Corll ,2000 ) low sex ratio is overwhelmingly visible among the elite and high literate classes of the society. In order to further reinforce the above results obtained by using Karl Pearson’s correlation coefficient, the data was further put into simple bivariable regression model analysis.

**Correlation and Regression Analysis**

In order to find the relationship between the two variables literacy and sex ratio and their correspondence interdependence, the data was put to correlation and simple bivariable regression analysis, wherein literacy was held as the independent variable and sex ratio as the dependent variable. The results of the two analyses are presented in the following table NO: 5

 **Table No 5-Regression and Correlation Analysis of Literacy and Sex Ratio**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sex-ratio 2001 & 2011 | Co-efficient | Std Error Coefficient | T | P> [ t] | Correlation |
| Literacy 2001 | -1.840443 | 0.8812169 | -2.09 | 0.059 |  0.516 [ 0.363 and 0.5034 for rural and urban areas] |
| Constant  | 999.9052 | 50.9858 | 19.49 | 0.000 |
| Literacy 2011 | -3.037091 | 1.308765 | -2.32 | 0.031 |
| Constant | 1081.468 | 86.12685 | 12.56 | 0.000 |

The statistics show that the regression coefficients are negative between literacy and sex ratio indicating an inverse relationship between the two and hinting that added literacy leads to a decline in sex ratio. The same has been confirmed by a p-value of 0.059 and 0.031. Moreover, the data was further put into time series analysis to study the behavior of the two variables and their future trend.

**Time Series Trend Analysis**

 The results of the time-series analysis are depicted in graphs which reveal that sex ratio consistently records zigzag oscillations and literacy however uniform movement. This hints that sex ratio changes violently with the constant or uniform change in literacy rate. Therefore, it is vividly clear sex ratio is dictated by the dominant variable called literacy with some marginal exceptions. The red line indicating sex ratio oscillates rigorously and the blue line referring to the literacy rate moves uniformly thereby depicting their interconnection and interdependence.

**Fig 1-Sex-Literacy Graph: 2001**

**Fig 2-Sex-Literacy Graph: 2011**

**Lack of Uniform Population Policy Agenda**

Besides the literacy and elite status of some fraction of the masses, the state does not have clear cut population policy agenda. Understandably, there appears mess of uncoordinated efforts within the different fractions of government machinery and as a result, uniform policy agenda with respect to gender statistics is altogether missing. The department of health on one side emphasize upon the concept of Family Planning / Necular Family/ Small Family/ one child policy etc while on the other hand, the demographic think tanks are crying over poor sex imbroglio. There appears a wide conflict within the population policy of the government. Long before, the government of Jammu and Kashmir consistent to the government of India , gave a wide family planning slogan “ WE TWO AND OUR TWO” and subsequently one child policy. This slogan rightfully is a predominant factor for selective births and elimination female fetus as the parents are going ahead with planed strategies to avoid female births. It is because they are left with limited probabilities for having male baby therefore, they avoid every risk of not having the female baby.

**Availability Advanced Medical Care**

Poor sex ratio in the state of Jammu and Kashmir is predominantly attributed to female feticide through ultrasound prenatal sex determination. The million dollar question is how accurate is the sex determination of a fetus? Is it necessary for a female to undergo for ultrasound during her pregnancy? Can a sonologist find exactly the sex of fetus ? The available research literature on the subject has clearly state that sex of the fetus cannot be determined exactly. Khuroo (2011) states that it has been repeatedly stressed in the literature by well done studies that determination of prenatal sex through ultrasound is subject to many variables and can be grossly fallacious. Determination of prenatal sex is dependent upon the equipment quality and type of ultrasound probes, age of pregnancy and of course expertise of the operator. Inappropriate fetal position, excess amount of amniotic fluid and increased thickness of the abdominal wall of the mother can grossly adversely affect prenatal sex determination. Many the genital tubercle of female times if prominent can look like a male organ and vice versa. Sometimes umbilical card in a female fetus may resemble male organ and give fallacious results Thus chance of making a correct prenatal sex determination at 11 weeks of pregnancy is around 50 percent subject to availability of high quality ultrasound machine and well experienced sinologist is doing a careful examination. Despite of the fact, sex determination of fetus can never reach 100 percent. Therefore a true sex of a baby can be determined only at birth.

**Socio Economic Bottlenecks**

Even in the twenty first century women is looked down as inferior specie due to prevent socio cultural and economic factors. The violence against the women is an order of the day. She does not receive adequate safety equal to men both in and outside the home. She is chased for malicious activity, knotted in marriage for dowry and viewed as an obedient servant for family. We as enlightened society yet have not accepted her a vital part of our system equal to men. These odds attached to female in all time force parents to proceed for selected births and abort a female fetus. According to one-survey Jammu and Kashmir ranks at second in Indian union as far as violence against the women is concerned. Moreover, the reduction of human values, deprecation of family norms, rising cost of living, diminishing role of socio cultural institutions etc. motivate parents to discourage female fetus.

**Main Findings**

* The sex ratio is continuously falling in both at the national and state levels in India.
* The literacy rate is continuously growing both at the national and state level in India
* The sex ratio and literacy rate is inversely related, and the former is affected by the latter
* The availability of fetus determination facilities helps the females to avoid the birth of a female child in the region under study
* The choice of females for small families motivates them to prefer male children only.
* The socio-cultural factors are fully against the females in the region
* The females have inadequate earning opportunities in the region.

**Suggestions**

In the backdrop of the above discussion, the following suggestions are made:

* The government of state Jammu and Kashmir should draw a comprehensive population agenda or policy which should cover all areas and aspects falling under the domain of gender statistics. The population policy be drawn in view of the available resources and potential to translate such resources for overall quality development human element and overall national and international requirements. The population policy should take care of the existing situation of females and should evolve the mechanism that can push female empowerment.
* The government should frame strict laws to contain violence against women so that her position in the society is elevated. This will enable women to enjoy equal status in the society. This would also motivate women not to abort female child and rather would encourage her to have her next child only female. Such laws should strictly implemented to ensure that male culprits are punished.
* The government should empower women by giving her due recognition and role in all aspects of life. The women should be allowed to work freely and hold prominent positions of public life. They should be given adequate role for social and economic development of the state and nation. This will empower women and as such she would not prefer to have male baby over the female child.
* The government should educate the people in general and women in particular through public media that sex determination of fetus through ultrasound yet not is an exact means to find the true sex of baby. The false propaganda should be widely exposed that medical science determine gender of the fetus. The people at large and specifically women should be educated that using ultrasound is a false and baseless method to find the gender of a fetus. A sex of fetus can not be determined completely and exactly. For this purposes, the government should work hard to bring more and more females in the fold of education so that they improve their own lot and the lot of their family.
* The society should accept girl child as a blessing than a curse. People should reverse their attitude and mindset towards the girls. The society should not lookdown female child as burden and debt ridden liability. The government should plan and devise special schemes for betterment and progressive life and contribution of women.
* The social evils like dowry should be banned by the government. We as a society should learn to perform zero dowry marriages. The government should enact stringent laws to minimize and eliminate dowery menace. The society should become conscious to eliminate all undesirable acts and traditions which bringdown the overall value, prestige and well being of female.

**Limitations of the study**

The main limitation of the study is that it is limited to the state of Jammu and Kashmir and examines the panel data pertaining to the last two decades. Therefore, the study needs to be further undertaken in other states of India to reinforce its findings or otherwise.

**Conclusion**

The adverse sex ratio is in the state of Jammu and Kashmir is predominantly an offshoot of growing literacy among the females and sex determination medical centers besides the other socio-economic factors. This trend is sure to continue in the future as well with some marginal variations.

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