Intensity of Natural Selection among Scheduled Castes of District Banda, Uttar Pradesh

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ABSTRACT

The present cross-sectional study is based on a sub-sample of 482 mothers. These mothers belong to four scheduled castes namely- Chamar, Kori, Dhobi and Domar of District Banda of Uttar Pradesh. The extent of natural selection was computed using demographical variable following Crow (1958) and Johnston and Kensinger (1971). The average of live birth per mother was found to be 6.5 with a variance of 6.317. As per Crow's index, the value of natural selection intensity was found to be 0.554 but, the total index of selection (I_2) varies between Kori (1.3) to Chamar (1.4), which indicates high embryonic mortality (0.842). The comparison of present findings with other contemporary populations indicates that the scheduled caste groups have higher selection index as well as embryonic mortality.

KEYWORDS: *Fertility, Mortality, Embryonic Mortality, Live Birth, Index of Selection*

INTRODUCTION

Natural selection is Darwin's concept of evolution, survival of the fittest or selection of the best-fitted organism by nature, is called natural selection. It is a process of preservation of beneficial gene/genotype among organism, and occurs when there is differential rate of reproduction (Gautam 2007; Kumar & Gautam, 2014, 2015 and 2016). Natural selection is the rate of increase in fitness of any organism of any time; it may arise from the difference in survival, fertility rate, mortality rate, the rate of development, mating success and another factor of life.

The process of natural selection increases the chance of survival, procreation and multiplication from generation to generation at the expense of less advantageous ones and

measured by using specific birth rate of any population. It also acts as a significant force to control and influence the demography of population (Kshatriya et al., 2010 & Fisher 1929, 1930).

It measures the actual selection, only if the heritability of fitness was complete and if birth and death rate were totally determined by genetic factors (Reddy and Chopra, 1990; Gautam et al., 2009 and Crow, 1972, Malakar and Ray, 2014).

Reddy &Chopra (1990) and Gautam et al. (2009) have stated that the process of natural selection does not operate only through differential fertility; the existence of differential survival of descendants up to reproductive age also determines the biological fitness. For, its indirect quantitative estimation based on demographic statistics i.e. birth and death rate, Crow's index is widely accepted and being used. Crow (1958) had interpreted the Fisher fundamental theory of Natural selection using demographic data and which was later modified by Johnston and Kensinger (1971).

Worldwide many scholars and scientists have conducted several studies to find out the association between bio-social determinants and intensity of selection like Spuhler (1962, 1963, 1973 & 1976), Johnston and Kensinger (1971), Saha (1981), Sahu (1983), Rao (1977), Gautam et al., (2007), Basu et al., (1988), Yadav and Sharma (2001), Rao and Murthy (1984), Chaudhary (1976), Gandhi (1978), Das (2006), Gautam et al., (2009), Kumar and Gautam (2014), Cavalli-Sforza and Bodmer (1971), Philippe and Yelle (1978), Henneberg (1980, 1976 & 1985), Barrai and Fraccaro (1964),Cruz-Coke et al. (1966), Bharati (1981), Rao and Murthy (1984), Rajnikumari and Rao (1986), Barua (1976, 1981 & 1983), Reddy and Lakshmauudu (1979), Reddy (1983), Reddy and Chopra (1990) and Basu et al. (1980); they have focused on relationships between indices and religion. Similarly impact of socio-economic condition on the indices was studied by Bharati (1981); Rao and Murthy (1984); Padmanabhan (1985); Rajanikumari et al., (1985); Rajanikumari and Rao (1986); Frisancho et al., (1976); Das & Sikdar (2010), Malakar and Ray (2014) and so on. The various cultural practices also have role in determining the natural selection, which was studied by Sphuler (1962); Sengupta & Geguon (1988); Kapoor et al., (2001) and etc., whereas another variables like economy, health and nutrition status, practices of technology, habitation (rural and urban), practices of religious activities and etc., have significant impact on deciding the opportunity of natural selection (Rajunikumari et al., 1985; Gautam et al., 2009; Ghosh 1970,

Barua 1976; Reddy and Lakshmandu 1979; Bharti 1981 and Kshatriya et al. 2010; Kapoor et al., (2003). Still, studies on scheduled caste population are meagre. Further, the regional coverage is also not uniform and the state of Uttar Pradesh is least studied, therefore here is an attempt to fill the gap.

METHODOLOGY

The present cross-sectional study is based on a sub-sample of 482 Mothers. These mothers belong to four scheduled castes namely: Chamar, Kori, Dhobi and Domar. They were selected randomly from 1050 household of 35 villages of District Banda of Uttar Pradesh. The villages were selected on the basis of proportional to population size (PPS), for that the villages were listed in descending order as per density of the target group.

The data on pregnancy history, enumeration of live births, abortions, still per births, premature delivery, the number of surviving children were obtained along with age at first menarche, age at menopause, age at first marriage, age at first birth, the current age of mother etc on a semi-structured schedule. The data provided by respondents was cross-checked from other available members of the households and the health-workers/Anganwadi workers to avoid misreporting and error.

A pre-tested semi-structured interview schedule was used to collect the information by *door to door survey*. The extent of natural selection was computed using Crow (1958) and Johnston and Kensinger (1971) index.

The four caste group selected for the study are unique. They are classified as scheduled caste but they are strictly endogamous. There is a wide gap between their socio-cultural practices. They are considered untouchables in the rural setting; none of the individuals of other caste accept food and water from these castes simultaneously, and they practice untouchability between themselves also. Here is a brief account of the caste group studied.

Caste Group

The **Chamar** is a caste of tanners and menial labourer of northern India. They are found in most of the Hindi speaking belt. During recent past, they were engaged in traditional works like Leather worker and shoemakers, but now they are found in a variety of occupations from leather work to blue collar jobs and even at top of politics. But, the majority of them are still daily wage earners, following agricultural practices etc. and were still considered impure.

The **Dhobi** is one of the professional caste group, engaged in washing clothes and known as 'Washer man'. Nowadays, they are involved in other professional works like carpenter, blacksmith, agriculturist, labourer, house servant and other jobs such as government (teacher/policeman/doctor etc.)

The **Kori** is a caste of traditional weavers of northern India. In Uttar Pradesh, the Kori claim their origin from the rulers, but in a neighbouring state like Madhya Pradesh, they trace their origin from Kabir, a great social activist, reformer and poet.

The **Domar** are found in many states of India including Uttar Pradesh. They are also known as Mehtar and have scheduled caste status. They were tracing their origin to Balmik (ancient poet). The Domar are still employed as sweepers and scavengers. In present circumstances, many urban Domar are employed as cleaners in hospitals and other services like a peon, doctors, security guard, household servant etc.

The intensity of natural selection among scheduled caste population of district Banda (U.P.) was computed by following Crow (1958) and Johnston and Kensinger index (1971).

Crow in 1958 devised an Index to facilitate quantitative estimation of the amount of selection in the human population known as Index of opportunity for Natural Selection.

The Crow's index can be calculated by the formula given below:

$$I_t = I_m + \frac{I_f}{P_s}$$

On the consideration of embryonic mortality, the crow's index was modified by Johnston and Kensinger (1971). It can be calculated by following formula:

$$I_2 = I_{me} + \frac{I_{mc}}{p_b} + \frac{I_f}{P_b P_s}$$

Where I_m = Index of mortality

P_d = Proportion of per-reproductive deaths.

P_s = Proportion of survivor up to 15 years.

V_f = Variance of the number of live birth

$\overline{X}$= The number of live birth per women or that is the mean live birth.

I_t = Index of opportunity for total selection per generation

I_f = Index of fertility and calculated by: $I_f = \frac{V_f}{\overline{X}^2}$

For post reproductive women, considered generally as average 40-45 years of age, who attained menopause.

I_m or I_{mc}= Index of Mortality

Index of mortality was computed by

$$I_m = \frac{P_d}{P_s}$$

I_{me} = Proportion of embryonic death

P_{ed}= Proportion of survivors upto birth

$$P_b = (1 - P_{ed})$$

I_{me} = Index of embryonic mortality and calculated by

$$I_{me} = \frac{P_{ed}}{P_b}$$

P_{ed}

$$= \frac{\text{Total prenatal death experienced by mother(age} \geq 45 \text{ years)and completed fertility}}{\substack{\text{Number of pregnancies experienced by the same mother of age of} \\ \text{45 years and above with completed fertility}}}$$

P_bP_s = Proportion of survivors, early embryonic stage to 15 years of age

RESULTS AND DISCUSSION

To understand the extent of natural selection/index of opportunity among studied population, consolidated demographical variables were used, as displayed in Table1. It is apparent from the Table 1 that out of 482 mothers recruited for the present analysis, 333 were Chamar, 88 were Kori and remaining 61 belongs to Dhobi & Domar caste. These above-cited mothers had a total of 3377 pregnancies, out of which 2968 resulted in live births; of these live births 2091 were from Chamar, 579 were from Kori and 380 were from Dhobi & Domar. Further, out of 2968 live births 2195 survived to their reproductive age, a total of 773 children died before attaining maturation to reproductive period. On the other hand, a total of 459 foetal wastages were reported by these. The average of live birth per mother has been found to be 6.5 with a variance of 6.317, which varies from Chamar (6.73) to Dhobi and Domar (4.54). It is evident from the error bar and box plot diagram (Figure 1& 2) that there is the significant difference in the number of pregnancy experienced by mother, children ever born and the total number of surviving children of Chamar. It can be understood that among Chamar, there are high foetal and child loss reported as compared to Kori, Dhobi and Domar. Among Kori, insignificant difference was observed in the number of pregnancy experienced and the

number of children ever born, but the numbers of children survived were reported to be significantly less as compared to others. Similarly, among Dhobi and Domar, the number of children surviving was significantly less than the number of pregnancy. The foetal loss and child mortality are high among the studied population; Chamar, Kori, Dhobi & Domar. To understand the differences in mortality and fertility among the studied population, the Crow index of natural selection was computed and the findings are displayed in Table 2. It is apparent from the Table 2 that the proportion of survivors from birth to reproductive age was 0.739, which was higher in Dhobi & Domar as compared to Kori (0.760) and Chamar (0.725). However, the differences in values of the proportion of survivors from birth to reproductive age and the proportion of pre-reproductive deaths (P_d) of Chamar (0.274), Kori (0.239) and Dhobi & Domar (0.206) were significant. The value of natural selection intensity for present studied population varies from Chamar (0.594) to Kori (0.699), whereas for Dhobi and Domar i.e. were (0.646).

The Index of mortality (I_m) was estimated to be 0.352 for pooled data, which varies from Dhobi & Domar (0.260) to Chamar (0.352) and for Kori i.e. 0.314.

On the basis of Crow's Index, the computed value of the natural selection intensity (I_t) was 0.554, which was higher than many previous studies like, Brahmin (0.387) of Andhra Pradesh, (Laxmi 2002); populations of Uttar Pradesh, viz. Bhoksa (0.35), who were studied by Garg et al. (1980); Munda (0.320) of West Bengal, (Kapoor and Kshatriya, 2000); Biaga (0.345) of Madhya Pradesh (Gautam et al., 2007), Aimol, Chiru and Kabir of Manipuram, (Asghar et al., 2014), Kinnaura of Himachal Pradesh, (Gautam et al., 2006) and others. Similarly, it was lower than, Biod Mali (0.650) of Andhra Pradesh, (Babu and Kusuma, 1995), Christians of Kerala by Kapoor et al., 2001; Yerukulas (1.24) of Andhra Pradesh, (Prakash et al., 2009) and etc. The opportunity of selection intensity with the proportion of embryonic mortality is computed using Johnston and Kensinger (1971) are presented in Table 3. It is revealed from the Table 3 that the proportion of embryonic or prenatal death was found to be 0.135, which was high among Kori (0.148 per mother) than Dhobi & Domar (0.121) and Chamar (0.135). Similarly, the proportion of survival to birth was reported 0.864. However, the proportion of embryonic mortality is not much varying (0.866) among Domar and Dhobi to Kori (0.822). The index of embryonic mortality (0.842) for present study differs from previous studies. The index of fertility varies from Dhobi and Domar (0.30) to Chamar (0.149) and it was also lower than other previously studied Indian

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population like Chamar of Madhya Pradesh (0.45) Gautam et al., 2007); Scheduled caste of Kerala (0.96) (Kapoor et al., 2001); Baiga and Gond of Madhya Pradesh (Gautam et al., 2007); Kinnaura of Himachal Pradesh (0.159) (Gautam, 2009); Chiru of Manipuram (0.165) (Asghar et al., 2014) and so on. The index of selection intensity with embryonic mortality was computed using the formula of Johnston and Kensinger (1971) and it reveals that index of mortality and embryonic mortality is higher than the index of fertility, which affect the index of selection. Further, the percentage of fertility component is estimated to be (13.3%) for studied population and varies from Chamar (13.49%) to Dhobi & Domar (21.78) whereas the proportion of mortality component was found to be 25.55% which is less than the percentage of embryonic mortality component (61.15%). It was indicated that percentage of mortality component and percentage of embryonic mortality have the significant contribution on the percentage of fertility among them. To understand the selection process pressure operating to the present studied populations, the finding are compared with other contemporary populations viz. schedule caste, scheduled tribe, other backward and general castes and is displayed in Table 4. The comparison of present population with previously studied schedule tribes shows that the intensity of natural selection among the present population is very close to tribal population like Kol (0.685) and Ladiya (0.521) of Madhya Pradesh; Semsa (0.610) of Assam, (Ghosh and Limbu 2002), Khords and Khond of Kerala and others. Contrarily, it was higher than Baiga and Gond (Gautam et al., 2007) and Kol, of Madhya Pradesh (Gautam, 2007); Aimal (0.143) Chiru (0.173) and Kabui of Andhra Pradesh and was also higher than tribes of West Bengal such as Munda (0.32), Lodha (0.435) and tribes of Himachal viz. Kinmaura (0.384), and populations of Jammu and Kashmir like Tibetan (0.512), Bodh, Brokpas (0.759) and Boltis (1.02).

Further, the intensity of selection of present studied population is higher than the tribes of Rajasthan; Uttranchal- Barbatiya. But, it is lower than Christian of Kerala and Santal of Odisha followed by Yerupala of Andhra Pradesh.

To find out the association between Index of selection intensity (I_2 & I_t) and mean live birth, the variance of live birth and index of fertility, mortality and embryonic mortality in the present study and previously studied populations, linear regression analysis has been done and findings are displayed in Table 5. It is evident from Table 5 that the Index of selection intensity was significantly associated with a variance of live births, index of fertility and index of mortality among all comparative groups of the population. But, Index of embryonic

mortality was not having the statistically significant regression with the index of natural selection intensity.

An inter-social group comparison of an average value of the index of natural selection intensity (I_t) is presented in Figure 5. It is highest for other occupation groups followed by the population of scheduled caste; scheduled tribe, general caste and other backward caste groups. Further, it is apparent from the comparison of fertility and mortality indices that the average of mortality indices was lower than the average of fertility indices among people of general, OBC, scheduled caste and other occupation groups excluding scheduled tribe populations. Similarly, an inter-region comparison of average Index of natural selection Intensity (I_t) is displayed in Figure 6. It is apparent from Figure 6, that in most states the mortality component is lower than fertility component except these states i.e. Assam, Madhya Pradesh, Meghalaya, and Uttar Pradesh and presents studied population. The highest rate of mortality component has affected the index of natural selection intensity among studied population. The highest value of average selection intensity (I_t) was found in Kerala and lowest in Manipuram state. Figure 7 presented the year wise means of index of selection intensity, fertility and index of mortality. It shows the secular trend (I_t), across 38 years between 1980 and 2016.The trend line (It) clearly shows a declining trend. The highest value of fertility component as compared to mortality component was reported up to the 2014 year, but, the mean value of mortality components was found higher than fertility component from the 2015 year.

CONCLUSION

The index value of Natural selection was found high among the scheduled caste people of district Banda, Uttar Pradesh. The comparison of present findings with other contemporary population indicates that the scheduled caste population have a higher index of selection than others. The regression shows that it is not dependent on mean live birth, the variance of live birth and index of fertility, mortality and embryonic mortality. Here, it should be noted that among the present studied population, the mortality component is higher ($I_m = 0.352$) than the fertility ($I_f = 0.149$). In terms of percentage, the contribution of fertility is 13.3% whereas remaining 86.7% is being contributed by postnatal (25.55%) and embryonic mortality (61.15%). The regression analysis shows that index of natural selection intensity was significantly associated with variance live birth, index of fertility, and index of mortality. The trend line of the index of natural selection intensity shows a declining trend in between 1980

to 2016 years. The average of natural selection intensity was found to differ between inter-region and inter-social groups.

It is really a matter of great concern and needs an extensive study to know about the determinants of mortality so that it can be reduced by the specific programme.

Table 1: Demographical variable used in computation of selection intensity

Variable	Chamar	Kori	Dhobi/Domar	Pooled Data
Mothers with completed fertility	333	88	61	482
Number of Pregnancies experienced	2418	579	380	3377
Number of Children ever born	2091	543	334	2968
Number of Surviving children	1517	413	265	2195
Mean of Children ever born	6.73	5.03	4.54	6.5
Variance of Children ever born	7.09	7.41	6.32	6.31
Number of Fetal Loss	327	86	46	459
Number of Child Loss	574	130	69	773

Table 2: Crow's Index of opportunity for total selection for the present studied population

Crow's Index	Chamar	Kori	Dhobi &Domar	Pooled Data
Proportion of pre reproductive deaths (P_d)	0.274	0.239	0.206	0.260
Proportion of survivor from birth to reproductive age (P_s)	0.725	0.760	0.793	0.739
Index of selection to mortality(I_m)	0.378	0.314	0.260	0.352
Index of selection to fertility (I_f)	0.156	0.292	0.306	0.149
Total index of selection (I_t)	0.594	0.699	0.646	0.554

Table 3: Johnston & Kensinger's Index of opportunity for total selection among schedule caste of district Banda (U.P.) India

Johnston and Kensinger's Index	Pooled	Chamar	Kori	Dhobi/Domar
Proportion of embryonic (pre-natal death) (P_{ed})	0.135	0.135	0.148	0.121
Proportion of survivor to birth (P_b)	0.864	0.865	0.851	0.878
Index of selection due to embryonic mortality(I_{me})	0.842	0.843	0.822	0.866
Index of selection due to mortality (I_{mc})	0.352	0.37	0.314	0.260
Index of selection due to fertility (I_f)	0.149	0.156	0.292	0.30
Total index of selection (I_2)	1.3	1.4	1.45	1.43
Percentage of fertility component	13.3	13.49	21.73	21.78
Percentage of mortality component	25.55	26.7	21.61	18.14
Percentage of embryonic mortality component	61.15	59.73	56.6	60.08

Table 4: Indices of natural selection among different previous studied population groups

State	Population	Crow' Index (1958)			Johnston & Kensinger Index		References
		I_m	I_f	I_t	I_{me}	I_2	
Schedule caste							
Banda(Uttar Pradesh)	**Pooled data (SCs)**	**0.35**	**0.149**	**0.55**	**0.84**	**1.30**	**Present study**
Madhya Pradesh	Ladiya	0.396	0.089	0.521	-	-	Gharami 2001
Madhya Pradesh	Chamar	0.385	0.453	1.012	0.069	1.15	Kshatriya et al., 2010
Kerala	Schedule caste	0.204	0.96	1.34	0.099	1.57	Kapoor et al., 2001
Himachal Pradesh	Schedule caste	0.108	0.244	0.379	-	-	Kapoor et al., 2003
Uttaranchal	Shilpkar	0.193	0.326	0.582	-	-	Kapoor et al., 2003
Uttaranchal	Shilpkar	0.089	0.263	0.376	-	-	Kapoor et al., 2003
Schedule Tribe							
Madhya Pradesh	Biaga	0.077	0.249	0.345	0.072	0.441	Gautam et al., 2007
Madhya Pradesh	Kol	0.504	0.122	0.688			Gharam et al., 2007
Madhya Pradesh	Gond	0.125	0.253	0.409	0.111	0.566	Gautam et al., 2007
Andhra Pradesh	Khonds	0.324	0.372	0.613	-	-	Rao et al., 2006
Andhra Pradesh	Khond	0.321	0.372	0.613	-	-	Rao et al., 2006
Manipuram	Aimol	0.006	0.136	0.143`	0.023	0.169	Asghar et al., 2014
Manipuram	Chiru	0.007	0.165	0.173	0.114	0.307	Asghar et al., 2014
Manipuram	Kabui	0.071	0.165	0.248	0.035	0.291	Asghar et al., 2014
West Bengal	Munda	0.132	0.166	0.320	-	-	Kapoor & Kshatriya, 2000
West Bengal	Santhal	0.081	0.302	0.407	-	-	Kapoor & Kshatriya, 2000
West Bengal	Lodha	0.157	0.292	0.495			Kapoor & Kshatriya, 2000
Uttar Pradesh	Bhoksa	0.282	0.058	0.356	-	-	Garg et al., 1980
Assam	Semsa	0.471	0.098	0.616	-	-	Ghosh &Limbu, 2002
Himachal Pradesh	Kinnaura (pooled data)	0.194	0.159	0.384	0.194	0.41	Gautam et al., 2009
Himachal Pradesh	Kinnaura(Middle attitude)	0.202	0.153	0.386	0.034	043	Gautam et al., 2009
Himachal Pradesh	Kinnaura(high altitude)	0.187	0.154	0.370	0.007	0.38	Gautam et al., 2009
Himachal Pradesh	Kinnaura	0.194	0.159	0.384	-	-	Gautam, 2006
Jammu & Kashmir	Tibetean	0.142	0.324	0.512	-	-	Kapoor et al., 2003
Jammu & Kashmir	Bodhs	0.201	0.327	0.594	-	-	Bhasin & Nag 2002
Jammu & Kashmir	Baltis	0.624	0.243	1.02	-	-	Bhasin & Nag, 2002
Jammu &	Brokpas	0.506	0.168	0.759	-	-	Bhasin & Nag, 2002

Kashmir							
Jammu & Kashmir	Arghuns	0.2265	0.455	0.828	-	-	Bhasin& Nag 2002
Jammu & Kashmir	Bodh	0.114	0.244	0.386	-	-	Kapoor et al., 2003
Meghalaya	Sankar Koch	0.262	0.070	00.254	-	-	Kotal & Sengupta, 2003
Mizoram	Hmar	0.085	0.250	0.357	-	-	Varte & Varte 2006
Rajasthan	Sahariya	0.145	0.212	0.388	-	-	Kapoor & kshtriya 2000
Rajasthan	Mina	0.104	0.146	0.265	-	-	Kapoor & kshtriya 2000
Rajasthan	Bhil	0.105	0.203	0.329	-	-	Kapoor & kshatriya 2000
Rajasthan	Sahariya	0.45	0.144	0.663	-	-	Bhasin & Nag 2007
Rajasthan	Mina	0.149	0.130	0.299	-	-	Bhasin & Nag., 2007
Rajasthan	Bhil	0.214	0.137	0.381	-	-	Bhasin & Nag., 2007
Rajasthan	Kathodi	0.245	0.250	0.557	-	-	Bhasin & Nag., 2007
Rajasthan	Damor	0.167	0.265	0.477	-	-	Bhasin & Nag., 2007
Rajasthan	Garasia	0.160	0.358	0.575	-	-	Bhasin & Nag., 2007
Uttaranchal	Barbatiya	0.243	0.443	0.794	-	-	Kapoor et al., 2003
Uttaranchal	Buthalia Bora	0.148	0.226	0.407	-	-	Kappor et al., 2003
Uttaranchal	Harkotiya	0.223`	0.330	0.627	-	-	Kapoor et al., 2003
Uttaranchal	Rajput	0.148	0.263	0.450	-	-	Kapoor et al., 2003
West Bengal	Santal group (Controlled group)	0.159	0.204	0.395	0.062	0.48	Malkar & Roy, 2014
West Bengal	Santal group (Un-controlled group)	0.200	0.322	0.587	0.013	0.60	Malkar & Roy, 2014

Other back word Classes

Madhya Pradesh	Thakur	0.219	0.129	0.377	0.007	0.359	Kshatriya et al. 2010
Goa	Kharvi	0.064	0.196	0.273	0.062	0.317	Kshatriya et al. 2010
Madhya Pradesh	LoharGadiya	0.167	0.043	0.218	0.236	0.506	Yadav & Sharma, 2001
Kerala	Ezava	0.08	0.123	0.21	0.037	0.26	Kapoor et al., 2010
Kerala	Christians	0.01	0.12	1.22	0.006	1.24	Kapoor et al., 2010
Manipuram	Muslim	0.180	0.094	0.297	0.127	0.457	Asghar et al., 2014
Andhra Pradesh	Vadabalija	0.061	0.15	0.22	-	-	Kapoor et al., 2012
Andhra Pradesh	Palli	0.06	0.2552	0.32	-	-	Kapoor et al., 2012
Andhra Pradesh	Jalari	0.102	0.286	0.415	-	-	Kapoor et al. 2012
Goa	Kharvi	0.064	0.196	0.273	-	-	Kapoor et al., 2012
Goa	Bhandari	0.047	0.259	0.318	-	-	Kapoor et al., 2012
Andhra Pradesh	Rajak	0.160	0.120	0.280	-	-	Prakash & Narayananan, 2009

Andhra Pradesh	Kapu	0.042	0.492	0.534	-	-	Raju & Prakash , 2009
Andhra Pradesh	Bod Mali	0.200	0.450	0.650	-	-	Babu & Kusuma 1995
Andhra Pradesh	Manzali Mali	0.21	0.210	0.500	-	-	Babu &Kusuma 1995
General Castes							
Madhya Pradesh	Brahmin	0.178	0.157	0.362	0.028	0.42	Kshatriya et al., 2010
Maharashtra	Sindhi	0.13	0.284	0.452			Das et al., 2006
Andhra Pradesh	Kshatriya women	0.098	-	0.426	0.084	0.55	Dharani Priya et al.,2003
Andhra Pradesh	Kshatriya women(urban)	0.0845	-	0.3744	0.104	0.51	Dharani Priya et al.,2003
Andhra Pradesh	Kshatriya women(rural)	0.1106	-	0.4690	0.076	0.581	Dharani Priya et al.,2003
Andhra Pradesh	Brahmin	0.039	0.348	0.387			Lakshmi 2002
Manipuram	Bamon	0.016	0.136	0.358	0.151	0.563	Asghar et al., 2014
Jammu & Kashmir	Kashmir Pandit	0.059	0.214	0.286	-	-	Bhasin & Nag., 2002
Jammu & Kashmir	Kashmir Muslim	0.154	0.556	0.795	-	-	Bhasin & Nag., 2002
Jammu & Kashmir	Dogra Rajput	0.074	0.233	0.313	-	-	Bhasin & Nag., 2002
Uttranchal	Brahman	0.059	0.312	0.389	-	-	Kapoor et al., 2003
Odisha	Santal	0.538	-	0.724	-	-	Kuiti et al., 2015
Others population groups							
Madhya Pradesh	Bidi Worker	0.201	0.158	0.393	0.095	0.52	Kumar & Gautam 2015
Andhra Pradesh	Settibalija	0.055	0.386	0.463	0.020	0.45	Prakash & Sudhakar, 2011
Andhra Pradesh	Yerukula	0.19	1.05	1.24	-	-	Prakash et al, 2009
Andhra Pradesh	Mala (Rampal)	0.336	0.336	0.7	-	-	Ramesh & Babu, 2003

Table 5. Bivariate regression analysis among schedule caste keeping index of natural selection I_2 and index of total selection I_t as dependent variable.

Independent Variable	R	R^2	β	SE	t	F	df	p
Index of selection intensity (I_2)								
Mean live birth	0.065	0.004	-0.019	0.045	-0.415	0.172	42	0.681
Variance of live birth	0.797	0.63	0.082	0.010	7.92	62.38	36	0.001
Index of selection to fertility (If)	0.676	0.458	0.986	0.124	7.95	63.27	76	0.001
Index of selection to mortality(Im)	0.481	0.231	0.875	0.178	4.901	24.02	81	0.001
Index of selection due to embryonic mortality(Ime)	0.005	0.000	0.009	0.368	0.025	0.001	27	0.980
Index of total selection intensity (I_t)								
Mean live birth	0.016	0.000	-0.007	0.139	-0.054	0.003	12	0.958
Variance of live birth	0.805	0.648	0.099	0.022	4.49	20.219	12	0.001
Index of selection to fertility (If)	0.049	0.002	-2.306	10.09	-0.22	0.052	23	0821
Index of selection to mortality(Im)	0.159	0.025	13.36	16.22	0.824	0679	27	0.418
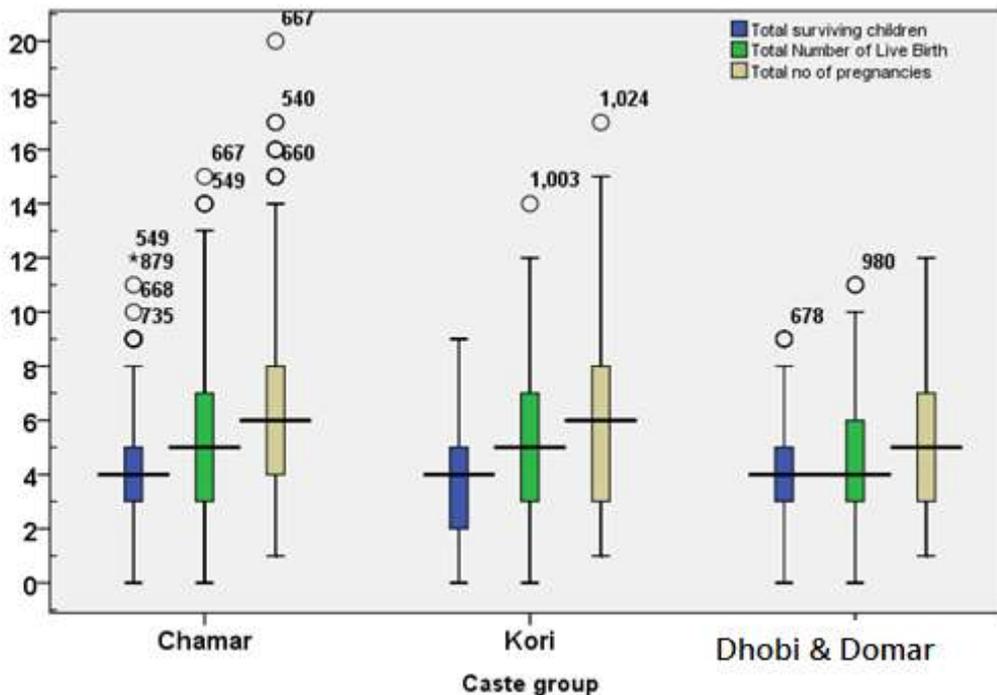
Figure 1: Cluster Box plot diagram showing comparative details of median, quartile and extreme value of number of pregnancies, total live birth and total survival children among studied population (Chamar, Kori and Dhobi and Domar).

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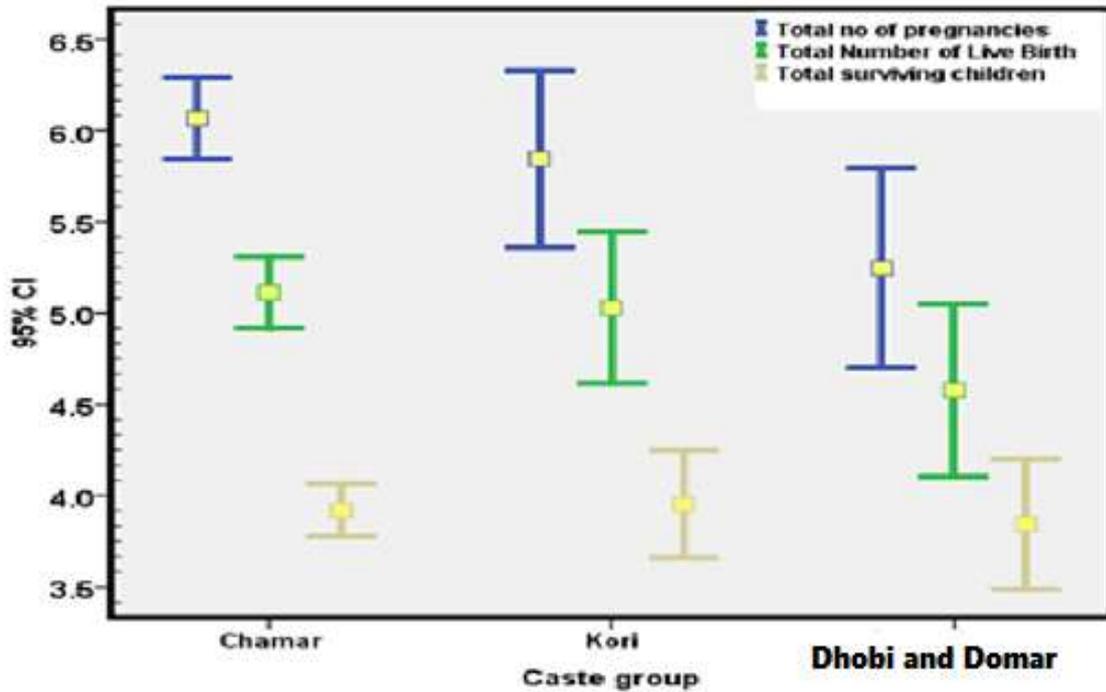
Figure 2: Error Bar diagram showing comparative details of median, quartile and extreme values of number of pregnancies, total live birth and total surviving children among presents studied population (scheduled caste).
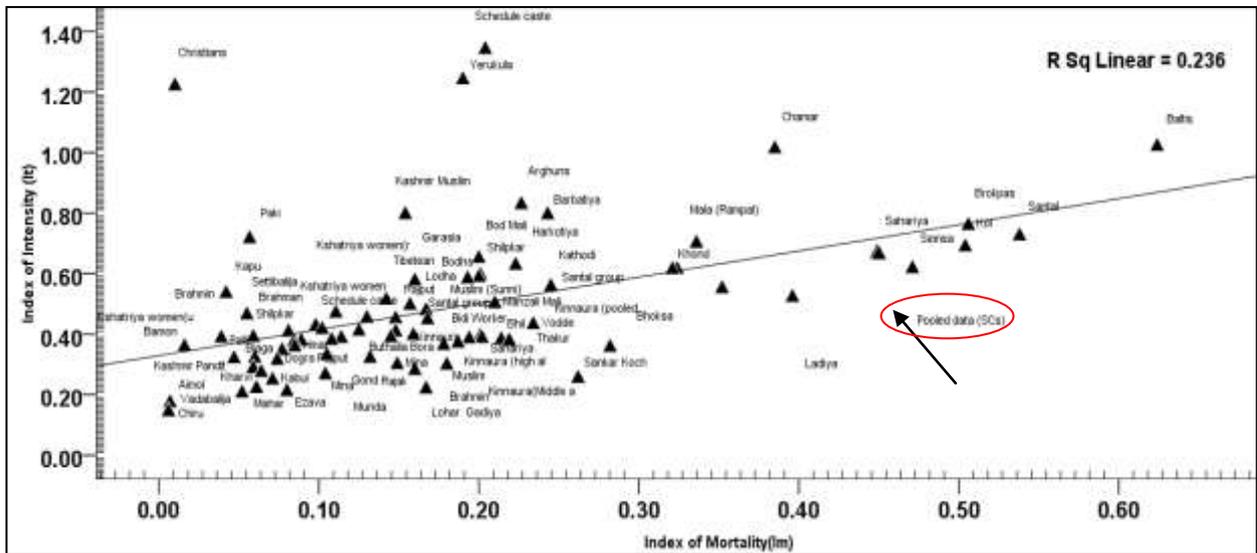
Figure 3: Bi variate scattered plot diagram between Index of natural selection intensity and Index of mortality among different population group of India and Present studied Schedule caste people.

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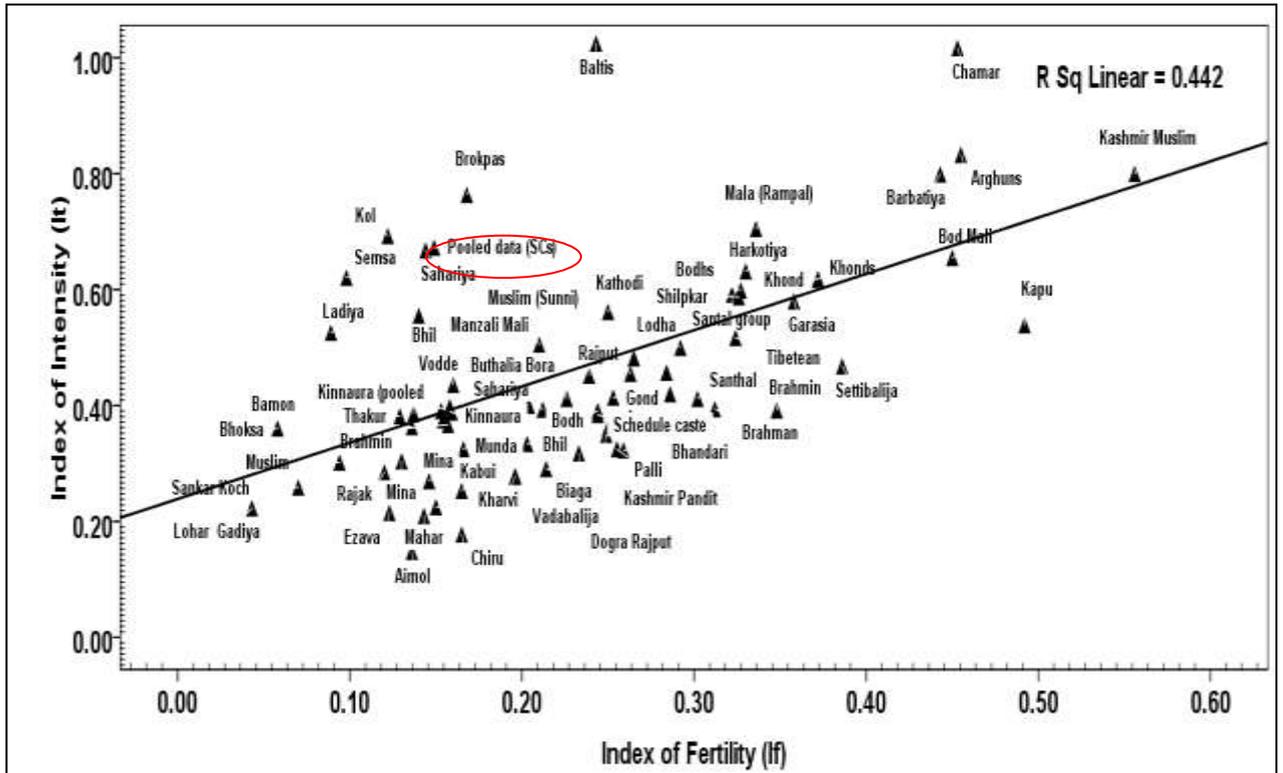
Figure 4: Bi variate scattered plot diagram between Index of natural selection intensity and Index of mortality among different population group of India and presently studied schedule caste peoples.
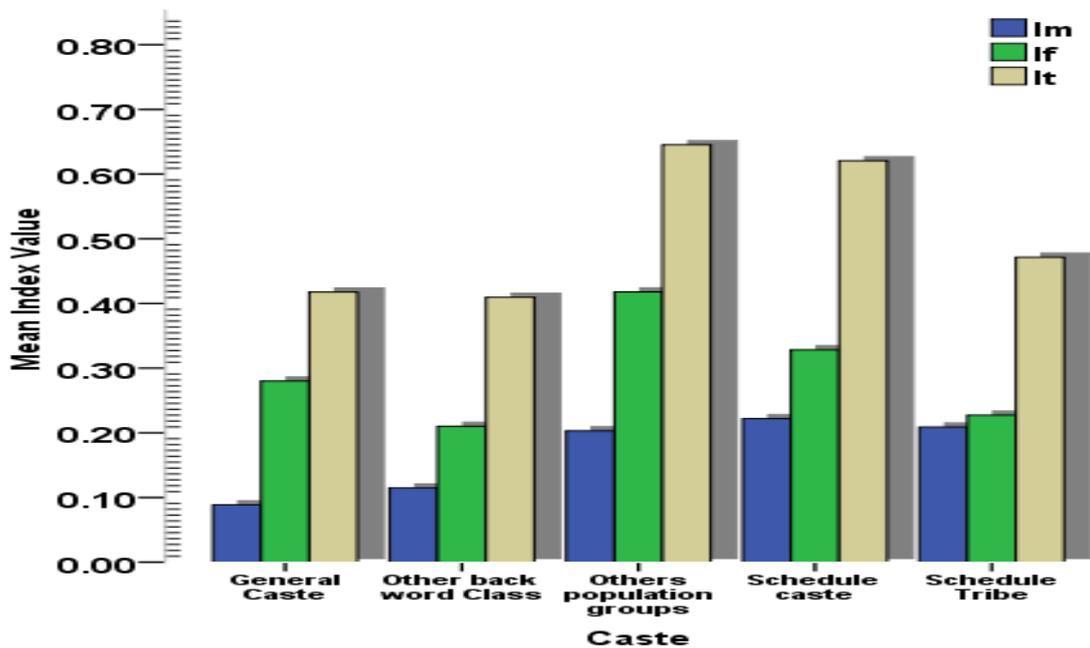
Figure 5: Inter-social group comparisons of fertility, mortality and total index of selection among Indian populations.
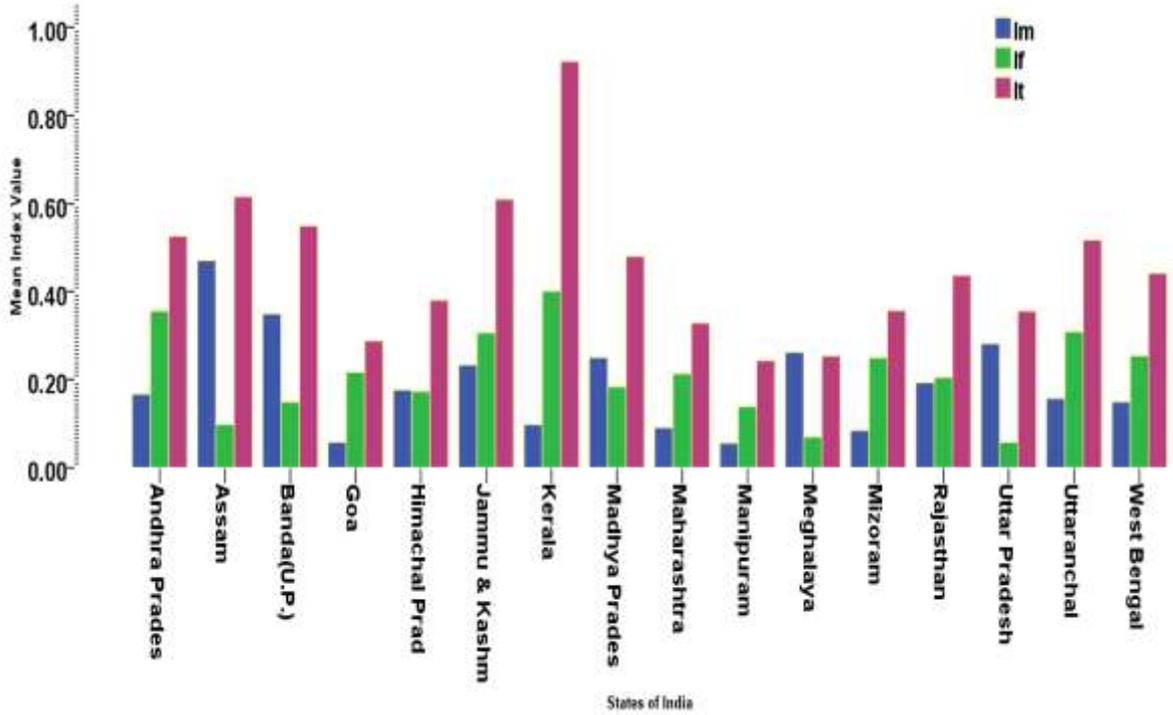
Figure 6: Inter-regional comparisons of fertility, mortality and total index of selection among Indian populations
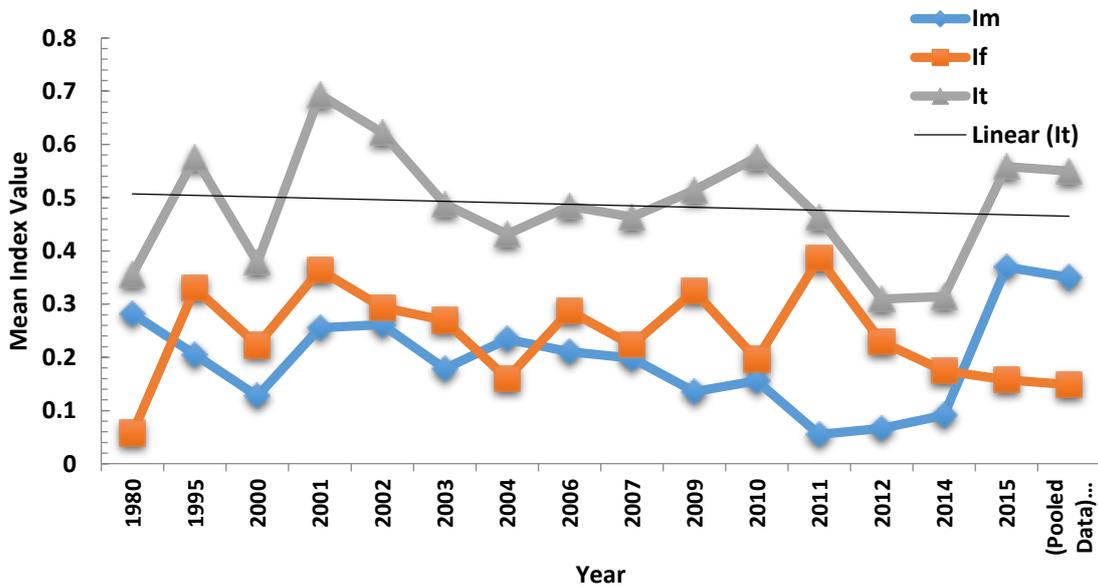
Figure 7: Yearly and decadal mean fertility, mortality and total index of selection among Indian populations.

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