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Factors Affecting Fertility and Mortality: A Case Study among the Setti Balija Community of Andhra Pradesh

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ABSTRACT An attempt is made in this paper to find out the influence of bio-social factors on fertility and mortality among Setti Balija of Southern Andhra Pradesh. Data pertaining to socio-economic and bio-demographic characters have been collected from a total of 200 couples. Out of them, 81 are consanguineous (40.50%) and 119 are non-consanguineous (59.50%) marriages. The mean sex-linked (F_X) value (0.0365) is slightly higher than the mean autosomal (F_A) value (0.0307). All fertility components are higher for non-consanguineous couples compared to the consanguineous couples. However, reverse trend is observed for mortality measures. Low income group shows high fertility and mortality than middle and high income groups. The age at menarche is correlated strongly with the age at marriage. The net survivorship is high (87 to 89) among women of middle range age (14-15 years) at menarcheal age followed by women of late age (16+ years) at menarche (83) and early age (< 12 years) at menarche (74). The same trend is observed for age at marriage also. The study finds that women of early menarche and marriage will have higher rates of prenatal as well as postnatal mortality. The net survivorship of offspring is also related to the onset of menarche as well as age at marriage.

INTRODUTION

The numbers of births and deaths that take place are themselves influenced by the size and age distribution of the population. The difference between the number of births and deaths, natural change, is a key determinant of population size and growth. If there are more births than deaths, a population will experience natural increase. Conversely, if more deaths occur than births, a population will experience natural decrease (Rajasekhara Reddy 2005). Fertility and mortality are fundamental determinants of population growth in order to understand the changes in the genetic structure of a population. Biological as well as socio-cultural factors are responsible for the differential fertility and mortality among human populations (Elizabeth 2000; Emma Kerkeni et al. 2007; Mostafizur Rahman et al. 2008).

Research studies repeatedly emphasize that biological and socio-cultural variables like age at menarche, age at marriage, type of marriage, economic levels, education and birth control methods have significant influence on the fertility and mortality of a population (Meerambica et al. 1999; Das and Goswami 2004; Hammami 2005; Al-Kandari 2007; Bosch 2008; Koc 2008). However, the net influence of the factors vary from population to population depending on their bio-cultural status. In view of this there is a need to study and document the effect of these factors on fertility and mortality in various sub-population groups. So far no anthropological research work has been reported on Setti Balija, a sub-caste of Balija community of Andhra Pradesh.

Therefore, an attempt has been made in the present study to assess the influence of various bio-social factors *viz.*, type of marriage, income, age at menarche and age at marriage on fertility and mortality of the *Setti Balija* community residing in the Nellore district of Southern Andhra Pradesh, India.

MATERIALS AND METHODS

The materials selected for the present study are 200 couples from an endogamous sub-caste known as Setti Balija of a major caste Balija. The study was carried out in the four villages of Seetharamapuram Mandal, Nellore district of Andhra Pradesh in the months of February and March, 2008.

A pretested schedule was administered to obtain the information. Information on demography was collected from Setti Balija families by

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the door to door interview schedule method. Data were collected using random sampling method through construction of bilateral genealogical tree of the possible extent. The data was cross-checked wherever felt necessary using the indirect and non-formal conversations. Information comprised the name of the head of the family, age of wife, husband and children, type of consanguineous relationship between spouses, marital status, income, age at menarche, age at marriage, fertility and mortality. In the present study, fertility has been measured by average number of live-births and mortality by prenatal deaths (fetal deaths), including abortions and stillbirths, post-natal deaths, including infantile deaths (neonatal and post-neonatal deaths), child deaths and deaths after 6 years of age to reproductive age.

The Balijas are one of the largest Telugu speaking caste populations of Andhra Pradesh and are divided into several endogamous subcastes namely, *Setti, Linga, Periki, Musugu, Bogam, Odde, Uppara, Dasari, Idiga, Vada, Gajula* balija etc. (Singh 2003; Thurston 1909). Like other Telugu castes, the Balijas also have endogamous septs (*inteperu*) and *gotras*. Setti Balija males are of medium stature with straight nose, while women are on an average short to medium stature. Consanguineous marriages are more prevalent (40%) among the Setti Balija. Monogamy is the general pattern of marriage and nuclear families are common in occurrence. Agriculture is their main source of economy. But, some are in defense and government services and some engaged in business. Literacy rate is moderate in which more of the women are illiterates.

The pooled data was computed by applying suitable statistical tools to draw inference.

RESULTS AND DISCUSSION

There are two types of marriages, consanguineous and non-consanguineous. The former type of marriage occurs among the related individuals. It leads to inbreeding thus increasing the frequency of homozygosity which affects the genetic structure of a population. The marriage types and inbreeding coefficients are given in table1. Out of 200 couples, 81 are consanguineous (40.50%) and 119 are non-consanguineous (59.50%). The Setti Balija prefer to have first cross

Table 1: Marriage types and inbreeding coefficient

	Consanguineous					*Non-consan-guineous*	*Total*	*Inbreeding coefficient (F)*	
	UN	*FSD*	*MBD*	*ICI+*	*Total*			*Mean Autosomal (F_A)*	*Mean Sex linked (F_X)*
No.	20	20	36	5	81	119	200	0.0307	0.0365
%	10.00	10.00	18.00	2.50	40.50	59.50	100.00		

UN – Uncle-niece
MBD – Mother's brother's daughter
FSD – Father's sister's daughter
ICI+ - First cousin once removed and beyond

Table 2: Frequency distribution of total conceptions

Results of conceptions	*Consanguineous*		*Non-consanguineous*		*Both*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Total conceptions	335	100.00	460	100.00	795	100.00
Pregnancy wastage:	20	5.97	14	3.04	34	4.28
a. Abortions	11	3.28	3	0.65	14	1.76
b. Stillbirths	9	2.69	11	2.39	20	2.52
Live births	316	94.33	451	98.04	767	96.48
I. Already dead	50	14.93	45	9.78	95	11.95
i. Neo-natal deaths (0-29 days)	21	6.27	23	5.00	44	5.53
ii. Infant mortality (29-1 year)	12	3.58	8	1.74	22	2.77
iii. Child mortality	8	2.39	8	1.74	16	2.01
iv. Deaths after 6 years	9	2.69	6	1.30	15	1.89
II. Living children	266	78.40	406	88.26	672	84.53
Including twins	1		5		6	

cousin marriages (28.00%) than the uncle-niece marriages (10.00%). The mother's brother's daughter (MBD) type of marriage is predominant (18.00%) than father's sister's daughter (FSD) (10.00%). First cousin once removed is only 2.50% of total marriages in the present study. The mean sex-linked (F_X) value (0.0365) is higher than the mean autosomal (F_A) value (0.0307), may be due to higher proportions of MBD and UN type marriages.

Fertility is a complex process responsible for the biological maintenance of the society, while mortality determines the survival index. The fertility and mortality differentials in relation to consanguineous and non-consanguineous marriages are portrayed in table 2. In the present study fertility has been measured by the average number of live births and mortality by prenatal deaths, including abortions and stillbirths, postnatal deaths, including infantile deaths (neonatal and post neonatal deaths), child deaths and deaths after 6 years of age to reproductive age.

Out of the total study sample, 96.48% are live births and the rest consist of prenatal deaths 4.28%, including abortions (1.76%) and still births (2.52%). All fertility components are higher in non-consanguineous couples than consanguineous couples. The proportion of living children in the related mating (94.33%) is lower than in the unrelated mating (98.04%) showing higher mortality rate in related couples.

However, reverse trend is observed for mortality measures. It is observed that the pregnancy wastage is slightly higher in proportion among the related mating (5.97) than unrelated mating (3.04). Similarly, same trend is observed in already dead children (consanguineous 14.93%; non-consanguineous 9.78%). The proportion of living children in consanguineous mating (78.40%) is somewhat lower than non-consanguineous mating (88.26%) due to higher proportion of the dead children in the former group than the latter, showing higher mortality rate in the related mating.

Fertility and mortality in relation to income levels are shown in table 3. Low income group (Rs <15,000) couples shows high fertility and mortality than middle and high income group couples. It is evident from the table that in low income groups more number of pregnancies (322), live births (307) and living children (255) are present than middle (251; 240; 216) and upper (226; 218; 200) income groups. It is observed from the table that mortality rates of both prenatal (3.54) and postnatal mortality (7.96) is low in upper income group than middle (4.38; 9.56) and low income groups (4.66; 16.15). The net survivorship ratio in upper income group is more (88.50) than middle (86.00) and lower (79.19) income levels. It is evident that the per capita annual income of the Setti Balija has considerable impact on mortality status both at prenatal and postnatal life. It is obvious that mortality decreased with better income level. It may be assumed that pregnant women with lower income have more stress and unwillingness of rearing children leading to higher induced prenatal mortality. Further, women and children of lower income groups could not get proper healthcare facilities which may be one of the reasons for higher prenatal and postnatal mortality. This high fertility and mortality differentials in low income people is attributed to their living conditions like, poor socio-economic status, low literacy rate, lack of awareness in family planning and birth control devices.

Menarche is a biological phenomenon representing the symbolic start of womanhood. It gives an opportunity for selection and constitutes one of the major factors of differential fertility. Menarcheal age which constitutes an important aspect of population dynamics varies from population to population. Tables 4 and 5 depicts the percentage distribution of fertility and mortality in relation to age at menarche and age at marriage respectively.

The menarcheal age of present population

Table 3: Frequency distribution of fertility and mortality in relation to annual income

Income (Rs.)	*Pregnancies*	*Live births*	*Living children*	*Prenatal mortality*		*Postnatal mortality*		*Net survivorship ratio*
	No.	*No.*	*No.*	*No.*	*Rate*	*No.*	*Rate*	
<15,000	322	307	255	15	4.66	52	16.15	79.19
15,001-30,000	251	240	216	11	4.38	24	9.56	86.00
>30,001	226	218	200	8	3.54	18	7.96	88.50
Total	799	765	671	34	4.26	94	11.76	83.98

ranges from <12 to 16 years, with majority of girls attaining menarche at the age of 14 years. The mean age at menarche is found to be 14.14 ± 0.07 years. The data indicates that soon after attaining puberty they get married in about two years and this trend is seen in all age groups. This difference between menarche and marriage age reflects on fertility and mortality.

In the present study 12 and 13 years of age at menarche are considered as early menarche, while 16 years as late menarcheal age. The middle ages such as 14 and 15 years of age at menarche are viewed as normal range. Interestingly, the age at menarche is correlated strongly with the age at marriage. The girls of early menarche show their mean marriage age at 14.00 years, while girls of late menarche (i.e. 16+years of age) have their mean marriage at 18 years age. In the normal range of menarcheal age the mean marriage age is found to be around 16 years.

The above analyses of mean menarcheal and marriage age of women show interesting fertility and mortality behaviour. The early menarcheal women with relatively early marriages register overall less number of pregnancies (131), leading to less number of live births (121). The prenatal (7.58) and postnatal mortality rates (18.32) are found to be more among early menarcheal women. Women with moderate mean menarcheal age have lower prenatal (2.89 to 3.20) and postnatal (7.04 to 10.06) mortality rates. Thus, the net survivorship is seen high (87 to 89%) in women of normal middle range age at menarche followed by late age at menarche (83%) and low survivorship among women of early menarcheal age (74%). The frequency distribution of various fertility and mortality measures indicates that prenatal mortality rate accounts less (4.26) than the postnatal mortality rate (11.76).

The mean age at marriage for the women of present sample is 15.77 years (Table 5). The number of marriages in each year of age shows that more number of marriages have occurred in the 15-16 years (35%) followed by 14-15 (25%); 17-18 (25%) and 19-20 years (15%). Marriages below 16 years are considered as early marriage age in whom the prenatal mortality (8.39) rates are slightly lower than the marriages above 16 years, i.e., during 17-18 and 19-20+ years (9.01) ; while the postnatal mortality rates are high in below 16 years group of women (27.32) than the women of 16+ years (13.41). These rates differ when total sample taken into consideration, where prenatal mortality rate occurs only for 4.26 and postnatal mortality rate 11.76. The net survivorship ratio shows that the women whose mean marriage is below 16+ years have comparatively low (79 to 83) over women whose mean marriage is above 16+ years (88 to 90). The net survivorship for the total sample is however put at 84. Thus,

Table 4: Frequency distribution of fertility and mortality in relation to age at menarche

Age at menarche	*Sample size*	*Mean age at marriage*	*Pregnancies*	*Live births*	*Living children*	*Prenatal mortality*		*Postnatal mortality*		*Net survivorship ratio*
			No.	*No.*	*No.*	*No.*	*Rate*	*No.*	*Rate*	
<12	34	13.69	131	121	97	10	7.58	24	18.32	74.05
13	38	15.46	145	139	118	6	4.14	21	14.48	81.38
14	46	15.70	179	174	156	5	2.80	18	10.06	87.15
15	49	15.70	213	206	191	7	3.29	15	7.04	89.67
16+	33	17.51	131	125	109	6	4.58	16	12.21	83.21
Total	200	16.00	799	765	671	34	4.26	94	11.76	83.98

Table 5: Frequency distribution of fertility and mortality in relation to age at marriage

Age at menarche	*Sample size*	*Pregnancies*	*Live births*	*Living children*	*Prenatal mortality*		*Postnatal mortality*		*Net survivorship ratio*
		No.	*No.*	*No.*	*No.*	*Rate*	*No.*	*Rate*	
<14	51	258	244	206	14	5.43	34	13.18	79.84
15-16	74	304	295	253	9	2.96	43	14.14	83.22
17-18	49	151	144	134	7	4.46	13	8.86	88.40
19-20+	26	88	84	80	4	4.55	4	4.55	90.91
Total	200	799	765	671	34	4.26	94	11.76	83.98

age at marriage is an indirect factor which affects the rate of fertility.

CONCLUSION

The study population Setti Balija with moderately high fertility and mortality shows a picture of an expanding population. The economically poor and illiterate Setti Balija do not adopt birth-control methods and perform early marriages mostly with their relatives leading to high fertility, which in turn reflects in high mortality. Due to inadequate medical facilities in this area, most people fail to get treatment leading to death. In conclusion improving socio-economic conditions and medical facilities besides education can be empowered, so as to reduce the fertility and mortality.

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