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Reproductive Profile and Evidence of Reproductive Compensation among the Miju Mishmi of Arunachal Pradesh, India

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ABSTRACT Understanding the reproductive profile of a population is required for making and implementing various health policies. A plethora of studies on the behaviour of fertility and mortality across the globe have been reported. Very few studies have been reported from the population of Arunachal Pradesh, one of the states in northeast India. The present study aims to examine the reproductive profile of a small tribe of Arunachal Pradesh, namely, Miju Mishmi, inhabiting the Indo-Myanmar-China border area. Two hundred and ten households were surveyed to collect the information regarding fertility, mortality, and associated factors using a pretested schedule. Miju Mishmi is experiencing considerably high fertility and mortality. Many social and biological factors for fertility and mortality prevailing in this population were identified. The existence of reproductive compensation is also found in this population. However, unlike in many Indian societies, Miju Mishmi has no preference for a son and hence no impact on fertility.

INTRODUCTION

The structure and composition of a population are determined by fertility, mortality and migration. While the third one is more artificial and influenced by political and economic factors, the former are more biological and influenced by biological and social factors. These two are the natural course of action. As a biological being, humans have the natural potential for reproduction and are under the pressure of senescence. However, both fertility and mortality are under the influence of various biological and social factors. These factors are the responsible agents for variation in the fertility and mortality rates across the populations. There is a plethora of studies on these factors throughout the globe. Some of these factors have an effective impact on some populations and not on some other populations.

Many studies on different ethnic populations having diverse culture and environmental situations, have reported overabundances of biological and socio-cultural factors that influence fertility patterns, directly or indirectly. Factors like economic status, education, exposure to mass media, experience child death, age at marriage, menarche, age at first conceptions and number of pregnancy are considered to have an impact on fertility rate as a whole (Adhikari 2010; Chandoik et al. 2016; Kameih and Kshatriya 2016; Mazumder and Mukherjee 2018). Moreover, a low rate of contraception use (Dey and Goswami 2009; Mazumder and Mukherjee 2018; Pasupuleti and Pathak 2010) and boy child preference (Asghar et al. 2014) has also reported having influenced the fertility rate.

Similarly, mortality is also reported to be influenced by various social and biological factors. Factors like education, occupation, consanguinity, religion, use of contraceptives, antenatal checkup, income, age at marriage, and number of conceptions are studied among different populations and reported to be associated with mortality rate. Significant increases in pre-reproductive mortality among the children of the consanguineous marriage are reported (Khoury et al. 1987; Schull and Neel 1972).

Fertility and mortality are also interrelated. Mortality influences the overall fertility of a population and vice versa. High child mortality rate raises the fertility rate to compensate for the lost child (Asghar et al. 2014). Further, reproductive compensation is also reported among the inbreeding populations. The prenatal and pre-reproductive mortality is comparatively high (Overall et al. 2002; Ober et al. 1999) among these inbred populations. The adverse effect of inbreeding is

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well reviewed and presumed as a manifestation of homozygosity for recessive alleles, which are lethal to the offspring (Vogel and Motulsky 1997).

For maintaining a healthy population, good policies are required, and these policies will be effective if the reproductive profile of the population is properly understood. This is one of the critical reasons for a plethora of studies on the behaviour of fertility and mortality. Very few studies have been reported from the population of Arunachal Pradesh, one of the states in northeast India. Arunachal Pradesh is a border state sharing an international border with China, Bhutan and Myanmar. The objective of the present study is to examine the reproductive profile and reproductive compensation of a small inbreeding tribe of Arunachal Pradesh, namely, Miju Mishmi, inhabiting the Indo-Myanmar-China border area.

METHODOLOGY

Population

Miju Mishmi, also known as Kaman Mishmi, is one of the smaller tribes of Arunachal Pradesh. They primarily inhabited the district of Anjaw and also sparsely found in the Lohit district. According to the 2011 census, the total population of Miju Mishmis is about 9,400. There is no written history on their origin and migratory routes, but they claim to have migrated from the Kachin country of Burma and speak the languages of Tibeto-Burman. Initially, Miju Mishmis were animists, but few have recently converted to Christianity and Hinduism. Miju Mishmi practice tribe endogamy, which makes them an inbred population with a significantly less population size. Monogamy is the general practice of the people. Nevertheless, polygamy was very much prevalent, and some of them are still practising it. At the same time, the Miju Mishmi society also practices levirate and surrogate marriages.

Sampling and Data Collection

The study used quantitative and cross-sectional methods. The study was carried out in Anjaw, a district of Arunachal Pradesh in India, sharing an international boundary with China in the north and Myanmar in the east. The district is divided into seven circles, and each circle has many villages with thin populations. For the present study, three circles, namely, Walong, Hayuliang and Hawai were selected using stratified random sampling. Fifteen villages were further chosen for the collection of data. The villages from where the data are collected were Kheti, Yassong, Sarti, Barti, Halla, Bah, Yakung and Kalin in Walong circle, Ngi, Changung, Waala, and Watong in Hawai circle, and Khupa, Amiliang, and Nilang in Hayuliang circle. The researcher applied mixed sampling methods. Villages are selected using clustered random sampling. From the selected villages, the samples are selected purposively. Since these villages have significantly less populations, and hence every household in each selected village was considered for data collection. However, some households were left out because of unavailability of a key informant (married women) even after multiple visits during fieldwork.

A household survey was conducted among 210 households. Information was collected from every married woman in the household using a pretested research schedule. Each informant was made to understand the purpose and benefit of the study and proper consent was taken before starting the interview. Each informant was interviewed in isolation, maintaining privacy and a free-frank manner. The sex ratio of the present study population is 839 females per 1000 males, according to the 2011 census. With its total population of about 9,400, the female population is 4,289 (45.6% of the total population). The researchers do not have the age-sex-wise distribution data. However, if one presumes that half of the female population (2,144) are married, the sample (210) size represents 9.79 percent of the total female population. Statistical calculations were done using Microsoft Excel, and the significant level is tested at 0.05. This research work was conducted with approval from the Department Research Board.

RESULTS

The findings of the present study are shown in four tables. Table 1 illustrates the fertility profile and its determinants. In the present study, 811 conceptions were reported from 210 mothers, with 687 leading to live birth with 15.29 percent loss of conception. The mean conception per mother is 3.86, and the mean live births per mother is 3.27. The average age at menarche is found to be

13.9 years. The average age at marriage and first conception among the Miju Mishmi women are 18.5 years and 19.22 years, respectively. Though a small inbreeding tribal population in the border district, maximum Miju Mishmi woman are literate (64.29%) (Table 1). This figure is higher than the state female literacy rate (59.57%) of the 2011 census. In the present study, the number of homemakers outnumbered the working women. It is observed that 68.09 percent of Miju Mishmi women are confined to their houses as homemakers, and 31.90 percent represents the working group.

The birth control measures (BCMs) are an important social factor that determines the total fertility of a population. Women using none of the BCMs usually have higher pregnancy rates compared to regular users of any form of BCMs. In the present study, the users of birth control measures outnumbered the non-users. It is observed that 54.76 percent of Miju Mishmi women used some forms

Table 1: Fertility and its determining factors

Parameters	*No. of women*	*%*	*No. of conception*	*Mean no. of conception*	*No. of live birth*	*Mean no. of live birth*
Age at Menarche (in years)						
11	3	1.43	3	1.00	2	0.67
12	18	8.57	49	2.72	45	2.50
13	58	27.62	158	2.72	133	2.29
14	72	34.29	278	3.86	222	3.08
15	45	21.43	242	5.38	210	4.67
16	14	6.67	81	5.78	75	5.36
Age at Marriage (in years)						
≤14	11	5.24	64	5.82	48	4.36
15 - 19	132	62.86	517	3.92	446	3.38
20 - 24	52	24.76	186	3.58	157	3.02
25 - 29	13	6.19	43	3.31	35	2.69
30 ≤	2	0.95	1	0.5	1	0.50
Age at First Conception (in years)						
≤ 14	9	4.29	47	5.22	37	4.11
15 - 19	112	53.33	515	4.6	438	3.91
20 - 24	59	28.1	198	3.36	167	2.83
25 - 29	14	6.67	39	2.78	34	2.43
30 ≤	4	1.90	12	3	11	2.75
Mothers' Literacy						
Illiterate	75	35.71	429	5.72	379	5.05
Literate	135	64.29	382	2.83	308	2.28
p-value for t test				*< 0.00001**		
Mothers' Occupation						
House wives	143	68.09	576	4.03	495	3.46
Working	67	31.90	235	3.51	192	2.87
p-value for t test				*0.054961*		
BCMs Usage						
User	115	54.76	378	3.29	309	2.69
Non- user	95	45.24	433	4.56	378	3.98
p-value for t test				*0.00007**		
Consanguinity						
Consanguineous	46	21.9	237	5.15	210	4.56
Non- consanguineous	164	78.1	574	3.5	477	2.91
p-value for t test				*0.000031**		
Pooled	210	100	811	3.86	687	3.27

(*=statistically significant)

of BCMs for various reasons. Comparing users and non-users, both the mean conception (4.56) and the mean live birth (3.98) is higher among the non-user women. The difference is statistically significant with a p-value of 0.00007 (Table 1). Consanguineous marriage is reported from 21.9 percent of the couples. Both the mean conception and live birth are higher among the consanguineous marriages (5.15 and 4.56 respectively) compared to non-consanguineous marriages (3.5 and 2.91 respectively). The difference is statistically significant with a p-value of 0.000031.

Table 2 presented the mortality and its determinants. It is seen in the present study that maximum prenatal mortality is found in the form of a miscarriage. It is observed that out of 811 conceptions recorded, the case of prenatal mortality is 124 (15.29%). Of this, 48.39 percent are miscarriages, 29.84 percent are abortions, and 21.77 percent are stillbirths. Among the couples that did abortion, a maximum of them opt for maintaining a larger gap between the two children while some of them have done on medical grounds. The mean prenatal mortality per mother is 0.59, whereas the mean miscarriage, mean abortion and mean stillbirth are 0.29, 0.18 and 0.13, respectively (Table 2).

In this study, postnatal mortality is analysed by categorising into three groups of neonatal mortality (death within four weeks from birth), infant mortality (death after four weeks of birth but within one year), and child mortality (death after one year of

Table 2: Mortality and its determining factors

Parameters	*Prenatal mortality*			*Postnatal mortality*		
	Mean miscarriage	*Mean abortion*	*Mean still birth*	*Mean neonatal mortality*	*Mean infant mortality*	*Mean child mortality*
	N%	*N%*	*N%*	*N%*	*N%*	*N%*
Age at Marriage (in years)						
≤ 14	7 (0.64)	1 (0.09)	8 (0.73)	2 (0.18)	3 (0.27)	1 (0.09)
15- 19	37 (0.28)	22 (0.17)	14 (0.11)	46 (0.35)	17 (0.13)	24 (0.18)
20- 24	12 (0.23)	11 (0.21)	4 (0.07)	12 (0.23)	10 (0.19)	15 (0.29)
25- 29	4 (0.31)	3 (0.23)	1 (0.08)	6 (0.46)	2 (0.15)	(0)
30 ≤	(0)	0	(0)	(0)	(0)	(0)
Age at First Conception (in years)						
≤ 14	3 (0.33)	0	7 (0.78)	2 (0.22)	2 (0.22)	1 (0.11)
15 - 19	36 (0.32)	36 (0.23)	16 (0.14)	42 (0.37)	9 (0.17)	26 (0.23)
20 - 24	16 (0.27)	11 (0.19)	3 (0.05)	16 (0.27)	9 (0.15)	13 (0.22)
25 - 29	4 (0.28)	(0)	1 (0.07)	5 (0.36)	1 (0.07)	(0)
30 ≤	1 (0.25)	(0)	(0)	1 (0.25)	1 (0.25)	(0)
Mothers' Literacy						
Illiterate	25 (0.33)	8 (0.11)	17 (0.23)	48 (0.64)	24 (0.32)	29 (0.39)
Literate	35 (0.26)	29 (0.21)	10 (0.07)	18 (0.13)	8 (0.06)	11 (0.08)
p-value for t test	*0.182196*	*0.085094*	*0.019763**	*<0.00001**	*<0.00001**	*0.000276**
Mothers' Occupation						
House wife	44 (0.31)	15 (0.11)	24 (0.17)	55 (0.38)	28 (0.20)	33 (0.23)
Working	16 (0.24)	22 (0.33)	3 (0.04)	11 (0.16)	4 (0.06)	7 (0.10)
p-value for t test	*0.205999*	*0.002749**	*0.053504*	*0.025188**	*0.012286**	*0.084768*
Consanguineous Marriage						
Yes	15 (0.33)	8 (0.17)	5 (0.11)	26 (0.57)	14 (0.30)	23 (0.50)
No	45 (0.27)	29 (0.18)	22 (0.13)	40 (0.24)	18 (0.11)	17 (0.10)
p-value for t test	*0.29251*	*0487295*	*0.384932*	*0.00556**	*0.002099**	*0.000051**
Antenatal Check Up						
Never	23 (0.35)	2 0.03	16 (0.25)	37 (0.57)	19 (0.29)	22 (0.34)
Irregular	7 (0.20)	14 0.40	6 (0.17)	7 (0.20)	5 (0.14)	6 (0.17)
Regular	30 (0.27)	21 0.19	5 (0.05)	22 (0.20)	8 (0.07)	12 (0.11)
p-value for t test	*0.205442*	*0.455096*	*0.003324**	*0.003442**	*0.000388**	*0.010664**
Pooled	60 (0.29)	37 0.18	27 (0.13)	66 (0.31)	32 (0.15)	40 (0.19)

(*=statistically significant; figure in the parentheses indicate actual frequency)

Table 3: Relationship between fertility and mortality

No. of mortalities	*Prenatal mortality*		*Neonatal mortality*	
	No. of women	*Mean live birth*	*No. of women*	*Mean live birth*
	N%	*N%*	*N%*	*N%*
Nil	45 (56.25)	265 (5.89)	54 (67.50)	224 (4.15)
At least one	35 (43.75)	152 (4.34)	26 (32.50)	193 (7.42)
p-value for t test	*0.0098**		*<0.00001**	
1	19 (23.46)	75 (3.95)	14 (17.28)	92 (6.57)
2	9 (11.11)	48 (5.33)	6 (7.40)	46 (7.67)
3 and above	7 (8.64)	29 (4.14)	6 (7.40)	55 (9.17)

(*=statistically significant; figure in the parentheses indicate actual frequency)

birth but before 14 years of age). Of the 687 total live births recorded, 20.09 percent died before reproductive maturity (14 years). The highest number of postnatal mortalities is found in the form of neonatal mortality (47.83%), followed by child mortality (28.98%) and least in the form of infant mortality (23.19%). The mean postnatal mortality per mother (0.66) is higher than the mean prenatal mortality (0.59). The mean neonatal, infant and child mortality are 0.31, 0.15 and 0.19, respectively.

Fertility and mortality are interrelated to one another. Each one influences the other in many populations. To assess the impact of mortality on fertility, mothers with 35 years and above age were considered by assuming that they have completed their reproductive period. Out of the 210 mothers, 80 of them were found eligible for this analysis. Table 3 shows that 43.75 percent of Miju Mishmi women experience at least one prenatal mortality. Similarly, 32.50 percent of them also experience at least one neonatal mortality in their lifetime. The mean live birth for mothers with at least one neonatal mortality (7.42) is higher than the mothers without any neonatal mortality (4.15). The difference is also found to be statistically significant with a p-value less than 0.00001. The mean live birth increased with the increase in the number of neonatal mortalities. The mean live birth is 6.57 for mothers with one neonatal mortality and increased to 7.67, then to 9.17 with neonatal mortality of two children and three children, respectively. This indicates that couples experiencing neonatal mortality have a tendency for reproductive compensation and hence higher fertility. However, mean live birth is higher among the mothers without any prenatal mortality (5.89) compared to mothers with at least a prenatal mortality (4.34).

To determine the existence of a preference for sons in the present study, the mother with 35 years and above only are considered. The mean live birth is compared among the mothers who have no son (5.33), have a son (4.97), and have two sons (5.53) in their first two live births (Table 4), and it is found that no particular trend is followed. A similar situation is also observed while considering the daughter. The mean live birth of mothers with no daughter in their first two births is 5.05, and the mean live birth for mothers with one daughter is 4.89, and 5.83 for mothers with two daughters. This indicates that there is no preference for any gender in this study population.

DISCUSSION

Fertility and Its Determinants

The age of the woman is an important indicator of fertility, as reproductive capacity is limited to a certain period of her life span, and fertility changes quantitatively with age (Raymond 1936; Siddiqui 1996). The reproductive age starts with menarche

Table 4: Preference of child's gender and its impact on fertility

No. of sons in the first two live birth	*No. of mothers*	*Mean live birth N%*	*No. of daughters in the first two live birth*	*No. of mothers*	*Mean live birth N%*
0	27	144 (5.33)	0	19	96 (5.05)
1	36	179 (4.97)	1	37	181 (4.89)
2	17	94 (5.53)	2	24	140 (5.83)

Figure in the parentheses indicate actual frequency

and ends with menopause. The age at menarche varies across the populations. Age at menarche is considered a vital indicator of the quality of life for the population. It is influenced by environmental conditions, genetic factors and other socio-economic factors (Abelson 1976; Deb 2009; Dharmarha and Konda 2018; Prado et al. 1995). The average age at menarche in the study population is 13.9 years, with 27.62 percent and 34.29 percent of Miju women achieving menarche at 13 years and 14 years, respectively. Comparing with other populations from the same state, Miju Mishmi women have an almost similar average age at menarche with Galo (13.92 years) and Hills Miri (13.02 years) but higher than the Adi (12.3 years) (Asghar et al. 2016). Going by the general rule, the age at menarche has an inverse proportion with fertility, as early age at menarche leads to higher fertility. However, in the present study, it has a negative relation. Both mean conception and live birth increased with the increase in age at menarche (Table 1). This signifies that women with early age of menarche are not necessarily getting married at an early age, thereby suggesting age at menarche and age at marriage are independent of one another. Hence, the present study reveals that age at menarche and fertility are also independent of one another.

The average age at marriage in the study population (18.5 years) is lower than the Galo (20.18 year) and Adi (20.73 years) but higher than that of Hills Miri (17.33 year) tribal populations from the same state (Asghar et al. 2016). The legal age at marriage for a woman in India is 18 years. The average age of marriage amongst Miju Mishmi is above this legal age of marriage. However, many Miju Mishmi women (45.24%) are marrying before 18 years of age. The marriage among the Miju Mishmi woman starts as early as below 14 years, with 5.24 percent of them married at this age's cohort.

Age at marriage and fertility are closely linked, especially in societies where childbearing out of marriage is not socially accepted (Premchand 2011). Marrying at an early age gives a more extended period of reproduction. Therefore, the age of marriage has an inverse relation with fertility. The present study agrees with the general notion of the relationship between age at marriage and fertility. The fertility is highest among those who married at an early age and gradually decreases with increasing age at marriage (Table 1). Miju Mishmi women who married at the age of 14 years and below have the highest mean live birth (4.36). Then it gradually decreases, and the least is found at the age cohort of 30 years and above. This indicates that the mean age at marriage has a positive influence on fertility.

The average age at first conception in the study population (19.22 years) is lower than that of Galo (21.6 years) and Adi (22.09 year) but higher than that of Hills Miri (18.21 year) (Asghar et al. 2016). From Table 1, it is observed that more than half of the Miju women conceive for the first time in the age cohort of 15-19 years (53.33%). Age at first conception, and mean conception and mean live birth is inversely proportional in this study. Both mean conception and live birth decreased with an increase in age at first conception. The highest mean conception and live birth are found in the age cohort below 15 years. Then it gradually decreases with a slight increase in the age cohort of 30 years and above. This indicates that age at first conception is a significant factor that influences the fertility of the Miju Mishmi population.

Education and occupation of the mother are important social factors influencing fertility behaviours. Female literacy has become an essential component of the fertility analysis. The increasing level of mothers' education and working outside the home tends to reduce the fertility of the population (Dey and Goswami 2009). Generally, educated and working mothers opt for a lesser number of childbirths. Literate mothers are well aware of family planning, and moreover educated women usually prefer an educational career first and get married late. Similarly, the working mother has to balance both home and the working place, and usually preferred a small family. It is also found that both mean conception and live birth are higher among illiterate women compared to literate women (Table 1). The mean conception among illiterate women is 5.72 compared to 2.83 among literate women. Similarly, the mean live birth among the illiterate is 5.05 compared to 2.28 among literate women. The difference in live birth between literate and illiterate women is statistically significant with a p-value less than 0.00001. The illiteracy of females is usually leading to high fertility in many populations. The impact of a mother's education on fertility is quite visible in the present study also.

Occupation is also an important factor that influences fertility at a different level. Generally, workingwomen have lower fertility than homemakers. Women who engage in a higher status job

before marriage tend to marry late compared to non-working women. In addition, certain types of works provide exposure to the knowledge of contraceptives and the ideas and norms to discourage early marriage (Sathar and Kazi 1989). A similar trend is observed in this study also. Both mean conception (4.03) and mean live birth (3.46) are higher among the homemakers in comparison with working women (mean conception and live birth being 3.51 and 2.87, respectively). However, the difference is not statistically significant, with a p-value of 0.054961.

Mortality and Its Determinants

Similar to fertility, mortality is also influence by a number of socio-cultural and biological factors. Unlike fertility, the human cannot control mortality because it is an inevitable natural phenomenon. Mortality can be prenatal or postnatal. Further prenatal can be of three types, that is, miscarriage, abortion and stillbirth. Postnatal mortality before attaining reproductive maturity is considered a selective pressure in the population, as they are eliminated before their contribution to procreation. Both prenatal and pre-reproductive mortality are found in considerable frequency in this study (Table 2).

Regarding age at marriage as an important determinant for mortality, the present study found that mean miscarriage (0.64) and mean stillbirth (0.73) are highest among the women who married at 14 years and below but more or less similar in other age cohorts. This may be due to certain biological pressures in the mothers at a very young age, leading to a reduction in the viability of the offspring. The cases of abortion are increased with the late age of marriage. A similar trend is observed for age at first conception also.

The mean miscarriage is higher among the illiterate (0.33) than among literate women (0.26) in comparison between the two. On the other hand, abortion is higher among the literate (0.21) than illiterate women (0.11). In both cases, the difference is not statistically significant. The mean stillbirth, neonatal mortality, infant mortality and child mortality are all higher among the illiterate women (0.23, 0.64, 0.32, 0.39, respectively) compared to the literate women (0.07, 0.13, 0.06, 0.08, respectively). The difference is statistically significant with p-value of 0.0197, less than 0.0001, less than 0.0001 and of 0.00027, respectively. Literacy of the mother, in this study, is observed to be affecting both prenatal and postnatal mortality. It is conventionally accepted that literate mothers are in advantage of taking care during pregnancy and childrearing.

The frequency of abortion is higher among working mothers (mean abortion = 0.33) than homemakers (mean abortion = 0.11). The difference is statistically significant with a p-value of 0.00275. So, the present study agrees with earlier findings that women working outside their home tend to have a small family size (Dey and Goswami 2009). However, naturally caused prenatal mortality (miscarriage and stillbirth) is higher among homemakers than working mothers though the difference is not statistically significant. The cases of postnatal mortality are higher among working mothers compared to homemakers. The mean neonatal mortality, infant mortality and child mortality are respectively 0.38, 0.20 and 0.23 higher among homemakers compared to 0.16, 0.06 and 0.10, among working mothers. The difference is statistically significant for neonatal mortality and infant mortality with a p-value of 0.02519 and 0.01228, respectively.

Marrying between close relations is not advisable from a genetic point of view, as this will give a chance for the rear recessive lethal gene to come to a homogeneous state among the offspring, thereby reducing the viability (Vogel and Motulsky 1997). In the study population, consanguinity seems to have no influence on prenatal mortality in this study. However, mean neonatal mortality, infant mortality and child mortality are higher among consanguineous couples (0.57, 0.30 and 0.50, respectively) than non-consanguineous couples (0.24, 0.11 and 0.10, respectively). The difference is statistically significant with a p-value of 0.0055, 0.00209 and 0.000051, respectively.

More than half (55.56%) of the Miju Mishmi woman got regular check-ups during their pregnancies. However, 26.77 percent of them never got an antenatal check-up, while 17.68 percent got it but not regularly. The impact of this is observed in prenatal and postnatal mortality. The mean miscarriage (0.35) and stillbirth (0.25) is found to be higher among the mothers who never go for antenatal check-up compared with mothers who got regular check-ups (0.27 and 0.05, respectively). The t-test is calculated between regular check-up and irregular and no check-up combined. The difference is found to be statistically significant for

the cases of stillbirth with a p-value of 0.00332. A similar finding is observed for postnatal mortality as well. Mean neonatal mortality, infant mortality, and child mortality are higher among mothers who never go for an antenatal check-up (0.57, 0.29 and 0.34, respectively) than mothers who go for regular check-ups (0.20, 0.07 and 0.11, respectively). It is statistically significant with a p-value of 0.00344, 0.00039 and 0.01066, respectively.

Reproductive Compensation and Son Preference

The interrelation between fertility and mortality is revealed in the form of reproductive compensation in the study population. Reproductive compensation is understood as the natural tendency to have more offspring by the couples that experience offspring mortality either prenatal mortality or pre-reproductive mortality, or both. The presence of this phenomenon is reported from many populations (Gowaty et al. 2007; Gowaty 2008; Asghar and Achoubi 2016; Nobles et al. 2015; Asghar and Amung 2020). Among the inbred populations, there is a greater chance of finding reproductive compensation (Overall et al. 2002; Ober et al. 1999). In these populations, the probability of manifesting homozygosity for recessive alleles lethal to the offspring is high (Vogel and Motulsky 1997). The studied population practices tribe endogamy and clan exogamy. Consanguineous marriage is found to be practised among 21.9 percent of the population. Parallel cousins are considered incest, and it is a taboo. However, marriage between cross cousins, uncle-niece and aunty-nephew are socially permitted. Further, with a total population of only about 9,400 individuals and strict tribe endogamy, the study population can be considered an inbred population. These could be the possible explanations for the presence of reproductive compensation in the study population. The mean live birth for mothers with at least one neonatal mortality (7.42) is higher than that of mothers without neonatal mortality (4.15). The difference is statistically significant with a p-value less than 0.00001 (Table 3).

In many Indian societies, there is a preference for the male child over the female child. Studies have reported such existence in many population groups (Asghar et al. 2014, 2016; Chaudhuri 2012; Bulatao 1981; Vlassoff 1990; Friedman et al. 1994), citing the reasons for the important role of the male in economic, social and religious sectors. In the present study, no significant male child preference over a female child or vice versa is observed. A similar finding is reported among the Adi tribe of Arunachal Pradesh. However, such male child preference is reported among the Galo and Hills Miri tribes (Asghar et al. 2016) and Miji tribe (Asghar and Amung 2020).

CONCLUSION

The present study has brought out some baseline information regarding the reproductive behaviour of the Miju Mishmi of Arunachal Pradesh in India. The fertility of this tribe is similar to the few reported figures from the state. Age at marriage and age at first conception have a considerable influence on the outcome of fertility. The mother's literacy, birth control measures, and being in a consanguineous marriage have a statistically significant influence on fertility. Both prenatal and postnatal mortality before 14 years is also considerably high. Mothers' literacy, occupation, consanguineous marriage and antenatal check-up have shown a statistically significant influence on postnatal mortality. Though they seem to influence prenatal mortality considerably, these factors are not statistically significant except for stillbirth. Moreover, this study also reveals the existence of reproductive compensation. There are significant increases in fertility among mothers having neonatal mortality. Unlike in much of the Indian society, the Miju Mishmi have no preference for either a male or female child, and hence the impact of gender preference on fertility is not observed.

RECOMMENDATIONS

Miju Mishmi is under the pressure of both high fertility and mortality. Therefore, associated factors that are found in this study need to be addressed. Issues like lack of regular antenatal check-ups need to be addressed properly, as it leads to high mortality and further increases fertility. Though the literacy level of women and uses of birth control measures are considerably high, illiteracy and non-uses of birth control measures are causing high fertility and mortality. Consanguinity is also leading to more mortality and fertility. So, awareness at the community level involving community or village representatives through government and NGOs is suggested.

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