Population Composition of a High Altitude Population: The Tawang Monpa of Arunachal Pradesh

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ABSTRACT: Some aspects of population composition have been studied for a high altitude community, namely, the Tawang Monpa of Arunachal Pradesh. A sample of 500 households has been included. The age structure neither suggests a trend of progressive type population growth nor a trend of stationary type population growth. Mean live births among them was lower than that of the high altitude Sherpa of Nepal. High infant mortality in this population is reflective of low level of ante-natal as well as infant care.

KEY WORDS: Population structure. The Tawang Monpa. Tawang. Arunachal Pradesh**.

INTRODUCTION

The composition of population is the internal structure of a human population with respect to one or more demographic attributes or traits at a particular point of time. The word 'composition' in population literature is often used as a synonym of 'distribution' or 'structure'. To the demographers the study of population composition constitutes a basic and the most relevant field of study (Misra 1982). The study of population composition acts as an indicator of its current population dynamics (Chachra and Bhasin 1998).

Though the population composition has been studied widely in India in different areas (Basu 1969, Ghosh 1976, Talukdar 1979, Rao 1989, Narhari 1991, Reddy 1991, Adak and Gharami 2001 and many others), however, not many reports are available on this line on high altitude population (Gupta et. al.

1989). Hence an endeavor has been made in the present study to deal with certain aspects of population composition of the Tawang Monpa, a high altitude population of Arunachal Pradesh.

MATERIAL AND METHODS

A door to door survey was conducted using structured schedule during May-June, 2014. The Tawang Monpa are one of the sub-groups of the Monpa tribe. Dhar (1984) has stated that the Tawang Monpas call themselves Brahmi Monpa, who differ from rest of the Monpas with regard to their language and culture. Language of the Tawang Monpa belongs to the Tibeto-Burman family of languages. They inhabit the hilly terrain of the Tawang district. Their habitat is surrounded by dense evergreen coniferous forests. It experiences moderate to heavy rainfall, and in the winter it experiences frost and snowfall (Singh, 1995).

The Tawang Monpa society is patrilineal, but the neo-local mode of residence is also prevalent. They belong to the Lamaistic School of Tibetan Buddhism of the Mahayana sect. The Buddhism practiced by the Tawang Monpa is akin to that of Bhutan and Tibet. They are primarily agriculturists, and practice both shifting and permanent types of cultivation. They domesticate yaks, cows, horses, goats, sheep, pigs, donkeys, mules and fowls. The diet of the Tawang Monpas consists of pulses, fish, meat vegetables and *bung chung* (local beer brewed from maize, rice, millet, wheat or buckwheat). Distilled liquor known as *arrah* is also consumed by them. Millet is the staple food for the majority of the people. They take tea in typical Tibetan style, that is, tea mixed with butter and salt. The Tawang Monpa consume milk products like *churpi*, ghee and butter. They eat beef, pork, mutton and the meat of fowl and yak. The fruits consumed by them are oranges, peaches, pomegranates, apples and sugarcane (Singh, 1995).

For the sake of present study the Tawang Monpa residing in Tawang town and its surrounding areas were considered. The altitude of Tawang town is 9990 ft. Altogether 500 Tawang Monpa households were covered.

RESULTS

Age and sex distribution:

Populations differ greatly in the way their members are distributed in various age and sex categories. Age and sex distribution are the building blocks that construct the composition of a population. The age structure and sex distribution of Tawang Monpa people as on May, 2014 are presented in Table 1. Of the total population an excess of males relative to females is observed. The number of total males is 1077 and the number of females is 1005. As the age increases, the number of individuals gradually increases among the males from 0-4 years to 25-29 years age group. The number of individuals gradually decreases from 30-34 years age group in the same sex. Whereas, among the females the number of individuals gradually increases from 0-4 years to 20-24 years age group. The number of individuals gradually decreases from 25-29 years age group in this sex. It is interesting to note that while, 30 individuals is recorded among the males in 60-64 years only 7 individuals is recorded among the females in this age group.

Table-1: Distribution of population by age and sex: Tawang Monpa

Age group (in years)	Male		Female		Total		Sex Ratio
	No.	%	No.	%	No.	%	
0-4	62	5.76	62	6.17	124	5.96	1000.00
5-9	75	6.96	70	6.97	145	6.96	933.33
10-14	73	6.78	70	6.97	143	6.87	958.90
15-19	102	9.47	100	9.95	202	9.70	980.39
20-24	117	10.86	154	15.32	271	13.02	1316.24
25-29	141	13.09	136	13.53	277	13.30	964.54
30-34	86	7.98	72	7.16	158	7.59	837.21
35-39	90	8.36	94	9.35	184	8.84	1044.44
40-44	62	5.76	62	6.17	124	5.96	1000.00
45-49	74	6.87	89	8.85	163	7.83	1202.70
50-54	63	5.85	37	3.68	100	4.80	587.30
55-59	37	3.44	26	2.59	63	3.02	702.70
60-64	30	2.79	7	0.70	37	1.78	233.33
65-69	17	1.58	11	1.09	28	1.34	647.06
70-74	11	1.02	6	0.60	17	0.82	545.45
75-79	25	2.32	5	0.50	30	1.44	200.00
80-84	8	0.74	3	0.30	11	0.53	375.00
85-89	3	0.28	-	-	3	0.14	-
90 & above	1	0.09	1	0.10	2	0.10	492.31
Total	1077	100.00	1005	100.00	2082	100.00	933.15

Sex-ratio:

Misra (1982) says, "the study of sex-ratio in a population is important primarily because of two reasons: firstly, analysis of the sex-ratio can help in drawing several inferences regarding the dynamics of demographic phenomena; and secondly, it has bearing upon the marriage rate, death rate, birth rate and even on the rate of migration directly". The relative strength of the males and females in number in a population is commonly measured by sex-ratio. This is a basic measure in demography, genetics and epidemiology. In the present study the sex-ratio has been considered as the number of males per 100 females [(Males/Females) ×100]. In case of sex-ratio values an increasing trend is perceptible from 5-9 years to 20-24 years age group. However, from 50-54 years to 80-84 years age group a dismal picture is noticed. This might be due to small sample size in many age groups (Table 1).

Population pyramid:

The age structure of Tawang Monpa people neither suggests a trend of progressive type population growth nor a trend of stationary type population growth. This may readily be appreciated visually from the illustration portraying the age pyramid (Figure 1) of the population group. However, a constriction at the base of the population pyramid, suggests a recent fertility decline or increased infant mortality.

Fig.1: Population pyramid: Tawang Monpa
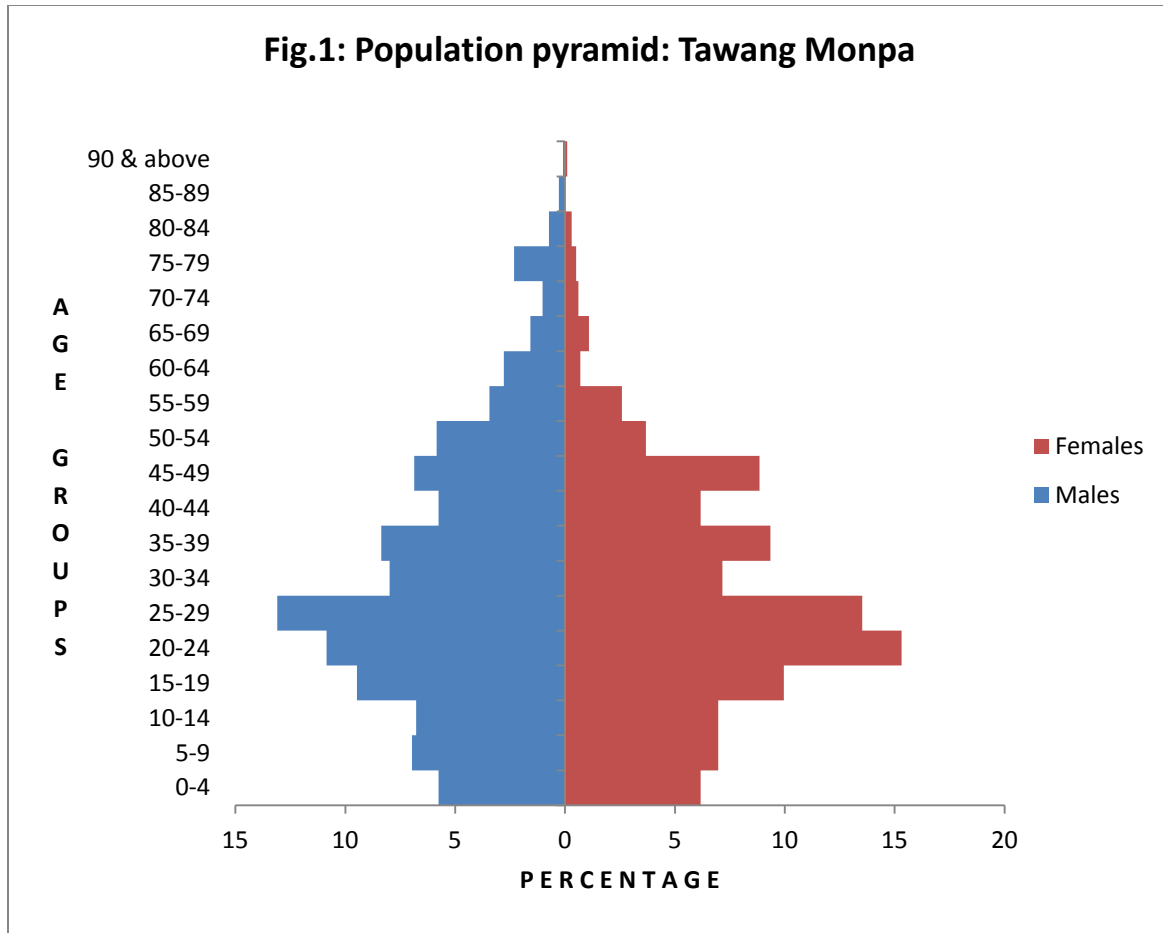
Sex-ratio in pre-reproductive, reproductive and post-reproductive age groups:

In Table 2 and Figure 2 the sex-ratio values in pre-reproductive (0-14 years), reproductive (15-49 years) and post-reproductive (50 years and above) age groups are presented. More than 66 percent of the individuals fall in reproductive (male: 62.40; female: 70.35) age group. The percentage of individuals is lowest in post-reproductive age group (male: 18.11; female: 9.55). While, pre-reproductive age group falls in between in this respect (male: 19.49; female: 20.10). A trend of gradual decline is noticed in sex-ratio from reproductive (1052.08) to post-reproductive (492.31) age groups. However, sex ratio value is found to be considerably lower in pre-reproductive age group (961.90) than reproductive age group.

Table-2: Distribution by age, sex and sex-ratio in pre-reproductive, reproductive and post-reproductive age-groups

Age-group (in years)	Male	Female	Total	Sex-ratio
Pre-reproductive (0-14)	210 (19.49)	202 (20.10)	412 (19.79)	961.90
Reproductive (15-49)	672 (62.40)	707 (70.35)	1379 (66.23)	1052.08
Post-reproductive (50 & above)	195 (18.11)	96 (9.55)	291 (13.98)	492.31
Total	1077 (100.00)	1005 (100.00)	2082 (100.00)	933.15

Figures in parenthesis indicate percentage values

Fig. 2: Sex-ratio in pre-reproductive, reproductive and post-reproductive age groups
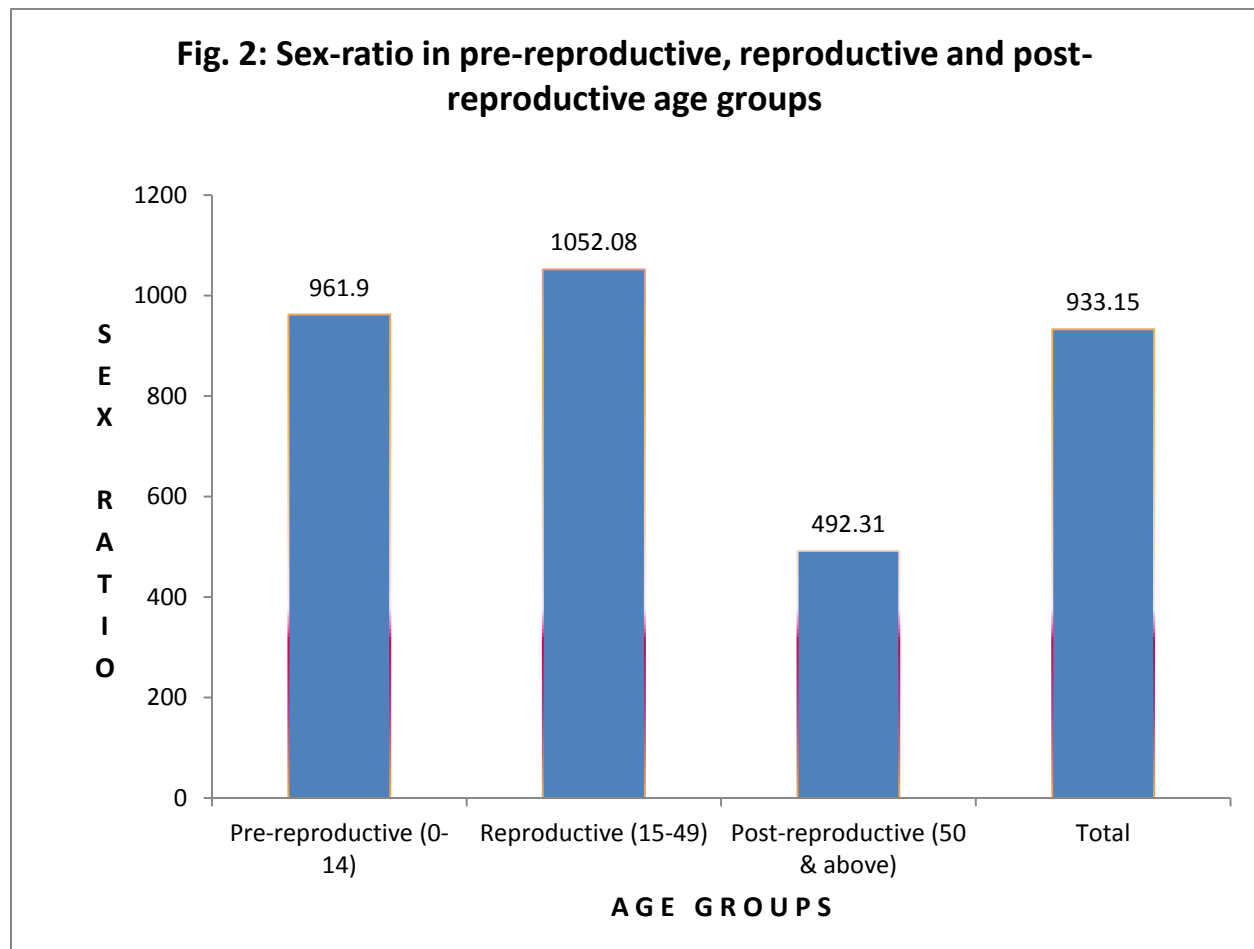
Population characteristics:

Some population characteristics of the Tawang Monpa are presented in table 3. It reveals a relatively high index of aging (31.07). This might be due to lower rate of mortality among the aged in this population. Child-women ratio among them is 17.54, suggesting a declining trend of fertility. Young dependency ratio is found to be 26.72, while old dependency ratio is 8.30.

Table-3: Some population indices among Tawang Monpa
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Index of aging: 31.07

Young dependency ratio: 26.72

Old dependency ratio: 8.30

Total dependency ratio: 35.02

Child women ratio: 17.54
_____

Age at marriage:

Misra (1982) says, age at marriage in India is showing an upward trend continuously. Still the age at marriage is quite low in India in comparison with other developing and especially with the developed countries. The social and health status of a woman is adversely affected by her low age at marriage. There are few factors involved in this matter. First, cohabitation and childbirth at immature age causes unfavourable physical effects and second, females married at early age with the males of older age imply higher proportion of widow. Table 4 and Figure 3 show the age at marriage in different age category among the Tawang Monpa population. Mean age at marriage among the males is 25.3 years; while among the females is 21.44 years. Highest frequency of marriages occurs in 20-24 years age group among the males (40.04%) and females (48.32%). More than 30 percent of the marriages occur below 20 years of age among the females and within 25-29 years among the males.
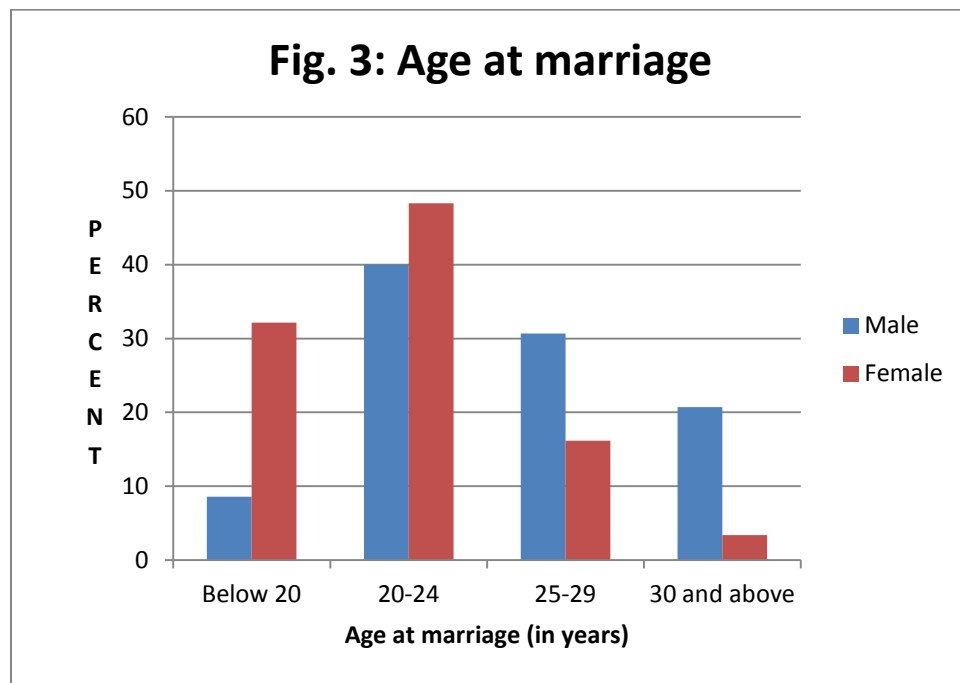
Table-4: Age at marriage

Age at marriage (in years)	Male		Female	
	No.	%	No.	%
Below 20	43	8.56	163	32.15
20-24	201	40.04	245	48.32
25-29	154	30.68	82	16.17
30 and above	104	20.72	17	3.35
Total	502	100.00	507	99.99

Mean age at marriage:
Male: 25.30 years

Female: 21.44 years

Fig. 3: Age at marriage

Marriage distance:

More than 23 percent of the marriages occur in the same area/village among this population. Highest percent (45.56) of marriages occur within 1-5 km. However, a good percent (16.17) of the marriages took place within 6-10 km. Next come the marriages within 11-15 km. In which 6.51 percent of the marriages took place. In other distance categories very low frequency of marriages occurred. Mean marital distance among the Tawang Monpa is 8.22 km (Table 5 and Figure 4)

Table-5: Marriage distance

Distance (in km)	No.	%
0	119	23.47
1-5	231	45.56
6-10	82	16.17
11-15	33	6.51
16-20	9	1.78
21-25	4	0.79
26-30	7	1.38
31-35	3	0.59
36-40	6	1.18
40+	13	2.57
Total	507	100.00

Mean distance: 8.22 km

Fig. 4: Marriage distance
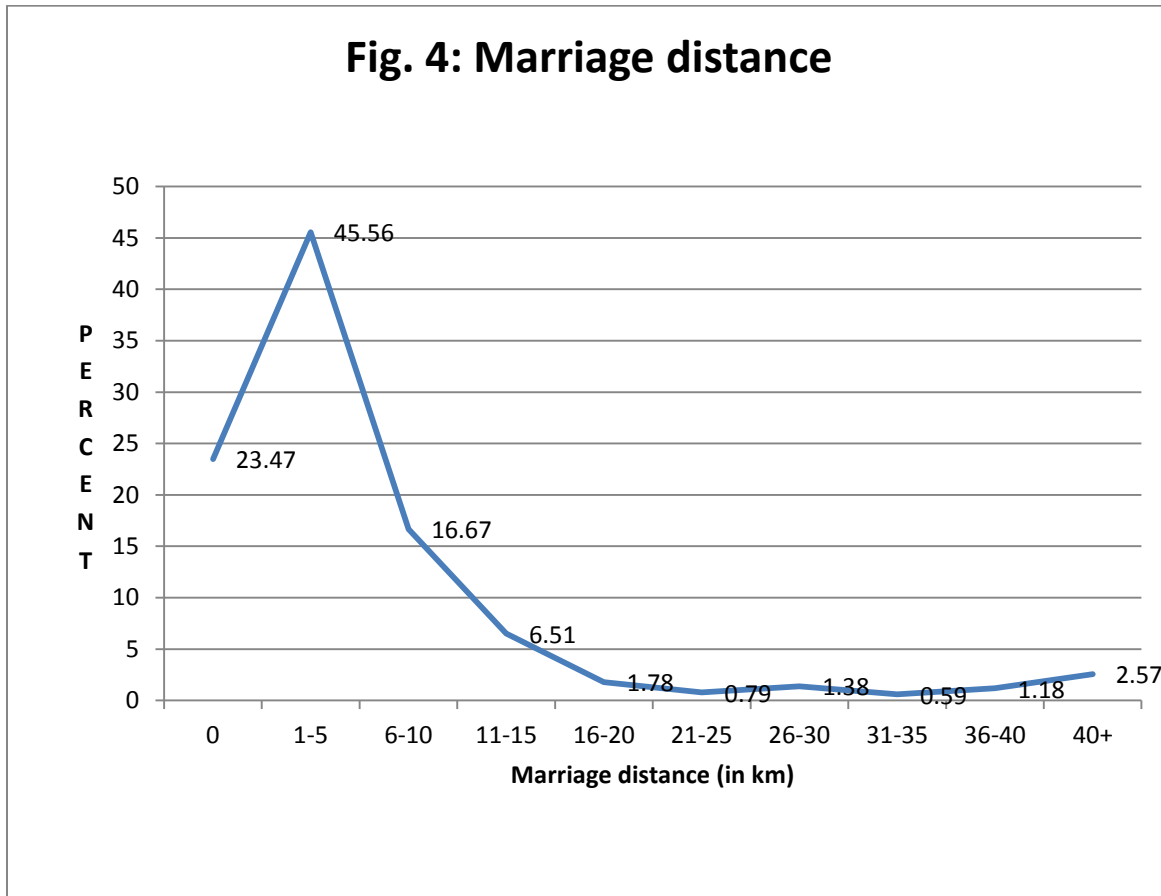
Reproductive performance:

In order to find out the completed family size, the Tawang Monpa women, who are aged 45 years and above, married once, and lived continuously in wedlock till attainment of 45 years of age, have been taken into consideration. Completed family size is shown in Table 6 for the studied population group. Completed family size among the Tawang Monpa is 4.16±0.08. It is further seen from Table 6 that the mean number of surviving children to those women is 3.84±0.08.

Table 6: Completed family size:

No. of mothers	No. of live births	No. of surviving children	Mean no. of live births per mother (±S.E.)	Mean no. of surviving childred per mother (±S.E.)
134	558	514	4.16±0.08	3.84±0.08

Mean number of live-births and surviving children of all married women by age groups has been furnished in Table 7. It is found that the mean number of live births per Tawang Monpa mother is 3.14±0.06. It is also noticed that mean number of live births increases with advancement of age. Mean number of live births increases from 0.67±0.21 for the mothers in the age group of 15-19 years to 4.00±0.12 for the mothers aged 50 years and above. Mean number of surviving children increases from 0.67±0.21 in the age group of 15-19 years to 3.64±0.12 for the women aged 50 years and above. Like mean number of live births in case of mean number of surviving children also the mean number increases with advancement of age. Number of live births and surviving children to all married women by age groups is shown in Figure 5.

Table 7: Number of live births and surviving children to all married women by age groups

Age groups (in years)	No. of married women	No. of live births	No. of surviving children	Mean no. of live births ± S.E.	Mean no. of surviving children ± S.E.
15-19	6	4	4	0.67±0.21	0.67±0.21
20-24	51	64	62	1.25±0.15	1.22±0.14
25-29	81	175	168	2.36±0.16	2.27±0.15
30-34	54	147	135	2.72±0.08	2.50±0.08
35-39	77	282	260	3.66±0.11	3.38±0.10
40-44	56	212	197	3.78±0.10	3.52±0.10
45-49	78	334	310	4.28±0.11	3.97±0.10
50+	56	224	204	4.00±0.12	3.64±0.12
Total	459	1442	1340	3.14±0.06	2.91±0.06

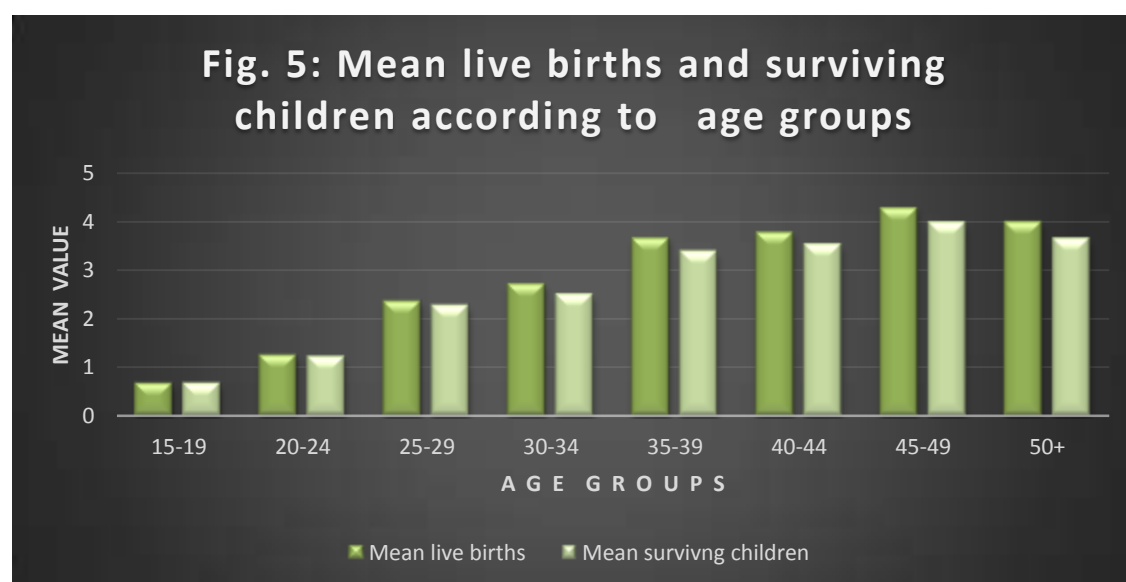Fig. 5: Mean live births and surviving children according to age groups

Table 8: Record of conception, pregnancy wastage and fertility

No. of mothers	No. of conception	No. of reproductive wastage	Mean reproductive wastage	No. of live births	Average live births
459	1469	32	0.07	1442*	3.14

*Inclusive of 5 twin births

Average live births among the Tawang Monpa is 3.14 per mother (Table 8). It can be mentioned that to calculate this value mothers of all ages are considered. However, mean of reproductive wastage is found to be 0.07 in this population.

Table 9: Infant and child mortality (1-4 years)

No. of mothers	No. of live births	No. of infant died (0-1 year)	No. of child died (1-4 years)	Index of infant mortality	Index of child mortality
459	1442	58	44	40.22	30.51

Infant and child mortality (Table 9) among the Tawang Monpa are 40.22 and 30.51 respectively. Both are quite high. Hence, infant mortality is found to be higher than that of child mortality.

DISCUSSION

The Tawang Monpa are one of the sub-groups of the Monpa tribe, who are high altitude people. They inhabit the hilly terrain of the Tawang district. The age structure of Tawang Monpa people neither suggests a trend of progressive type population growth nor a trend of stationary population growth. However, a constriction at the base of the population pyramid, suggests a recent fertility decline or increased infant mortality.

Physiological studies on humans to high altitude suggested reduction of sperm count and elevated number of abnormal spermatozoa in males, and delayed menarche as well as disturbances of the menstrual cycle in females and reduced birth weight. Early human studies on native high altitude populations, especially in the Andes, tend to correspond to the above mentioned observations by showing reduced fertility, higher neonatal and infant mortality, slower physical growth rate and higher haematological values compared to low altitude populations (Gupta et al. 1989).

The mean live births was lower among the Tawang Monpa (3.14) than that of the high altitude Sherpa (3.91) residing in Nepal (Table 10). The studied population show lower fertility than the Sherpas of low altitude too. However, the low altitude Sherpa of Mungpoo show a more or less similar mean live births with present population. But the Sherpa of Rangoo and Lava, both in Kalimpong show higher mean live births than that of the Tawang Monpa. Though the mean live births of the Tawang Monpa is lower than

high altitude Sherpa, mean surviving children is higher (2.91) than that of the said population (2.49). Like high altitude Sherpa the low altitude Sherpa of Mungpoo also show lower mean surviving children (2.69) than that of the Tawang Monpa. The Sherpa of Lava (4.22) show the highest mean of surviving children among all the population groups. Comparative data on fertility are shown in Figure 6.

Table 10: Fertility measures: comparative data

Population	Area	Altitude (m)	Mean no. of live births per women ($\bar{x} \pm S.D.$)	Mean no. of surviving children per women ($\bar{x} \pm S.D.$)	Source
Sherpa	Upper Khumbu, Nepal	3500-4050	3.91±2.09	2.49±1.82	Gupta et. al., 1989
Sherpa	Kalimpong, India	1000-1500	4.74±3.15	3.88±2.59	-do-
Sherpa	Rango, Kalimpong, India	-do-	5.16±3.33	3.90±2.41	-do-
Sherpa	Echhay, Kalimpong, India	-do-	3.67±2.76	3.14±2.34	-do-
Sherpa	Munsong, Kalimpong, India	-do-	4.53±3.15	3.60±2.60	-do-
Sherpa	Lava, Kalimpong, India	-do-	5.16±3.19	4.22±2.60	-do-
Sherpa	Labdah, Darjeeling, India	-do-	4.43±2.98	3.74±2.44	-do-
Sherpa	Mungpoo, Darjeeling, India	-do-	3.17±2.10	2.69±1.88	-do-
Lepcha	Kalimpong, India	-do-	4.12±2.70	3.63±2.51	-do-
Tawang Monpa	Tawang, Arunachal Pradesh, India	3048	3.14±0.06	2.91±0.06	Present study

Fig. 6: Fertility measures: comparative data
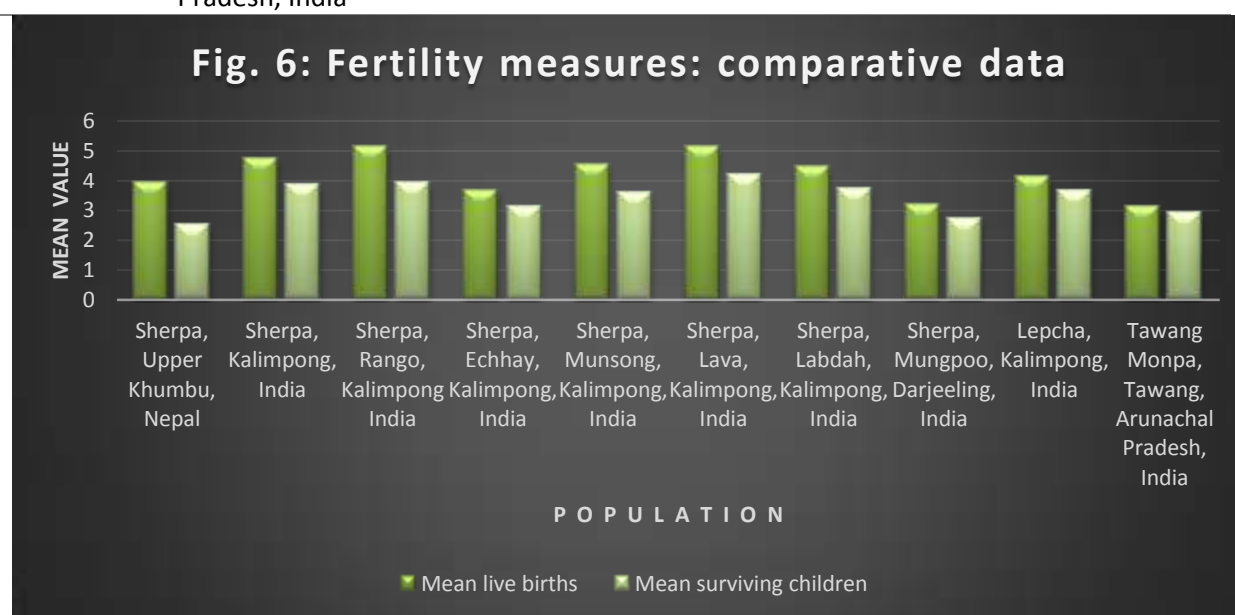
Both infant and child mortality are used as important indicators of health status as well as socio-economic development of a community or a particular region. High infant mortality among the Tawang Monpa is reflective of low level of ante-natal as well as infant care in this population. However, the effect of high altitude cannot be ruled out in this respect.

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