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Population Composition of Five Subgroups of Koch Populations of Meghalaya, India: An Anthropodemographic Study

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Anthropodemography uses anthropological methods to provide a better understanding of demographic phenomena. It refers to micro demography incorporating a fieldwork element. This study examines population composition of five subgroups (Chapra, Sanga, Satpari, Tintikiya and Wanang) of the Koch tribe of Meghalaya, India. According to Sundbarg's classification of population, Chapra population is of regressive type, Sanga, Satpari and Tintikiya are of stationary type. On the other hand, Wanang population is of progressive type. Overall sex ratio is more or less 1:1 among the Wanang, which is in favour of males in the case of Chapra. Among the Sanga, Satpari and Tintikiya, the sex ratio is low. Mean live births and surviving children both are found to be lowest among the Chapra and highest among the Tintikiya. On the basis of marriage pattern all the subgroups of Koch population are highly endogamous. Infant, child and juvenile mortality rates in the populations covered under the present study are fairly high. Side by side, the admixture rate, calculated according to Lasker (1952), is very high in all the subgroups of the present study. Coefficient of breeding isolation suggests that differentiation in allele frequency due to genetic drift is not so important in all the subgroups, excepting Satpari population. Opportunity for selection is very high among the Chapra, which is in moderate intensity in the Sanga and Satpari. On the other hand, it is mild among the Tintikiya and Wanang.

Keywords: *microdemography, sub-populations, reproductive performance, opportunity for selection*

Introduction

The study of population composition is considered by demographers to be the most fundamental and pertinent area of research. The internal organisation of a human population in relation to one or more demographic characteristics at a specific moment in time is known as the population composition. In population literature, "composition" is frequently used interchangeably with "distribution" or "structure" (Misra 1982).

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In actuality, the goal of anthropological demography is to gather specific population-level data for demographic studies (Rakshit 1976). This area of demography focuses on improving our understanding of demographic phenomena in both the present and historical populations by applying anthropological theory and methodology. Demographers employ proximal determinants to study and comprehend the positions of birth and death, while anthropologists use analytical notions like kinship, identification, and personhood. The human population is the common research object of both anthropology and demography. Demography, on the other hand, is more positivistic and focusses on a qualitative description of the institutional and behavioural factors that define these processes (Bernardi and Hutter 2007).

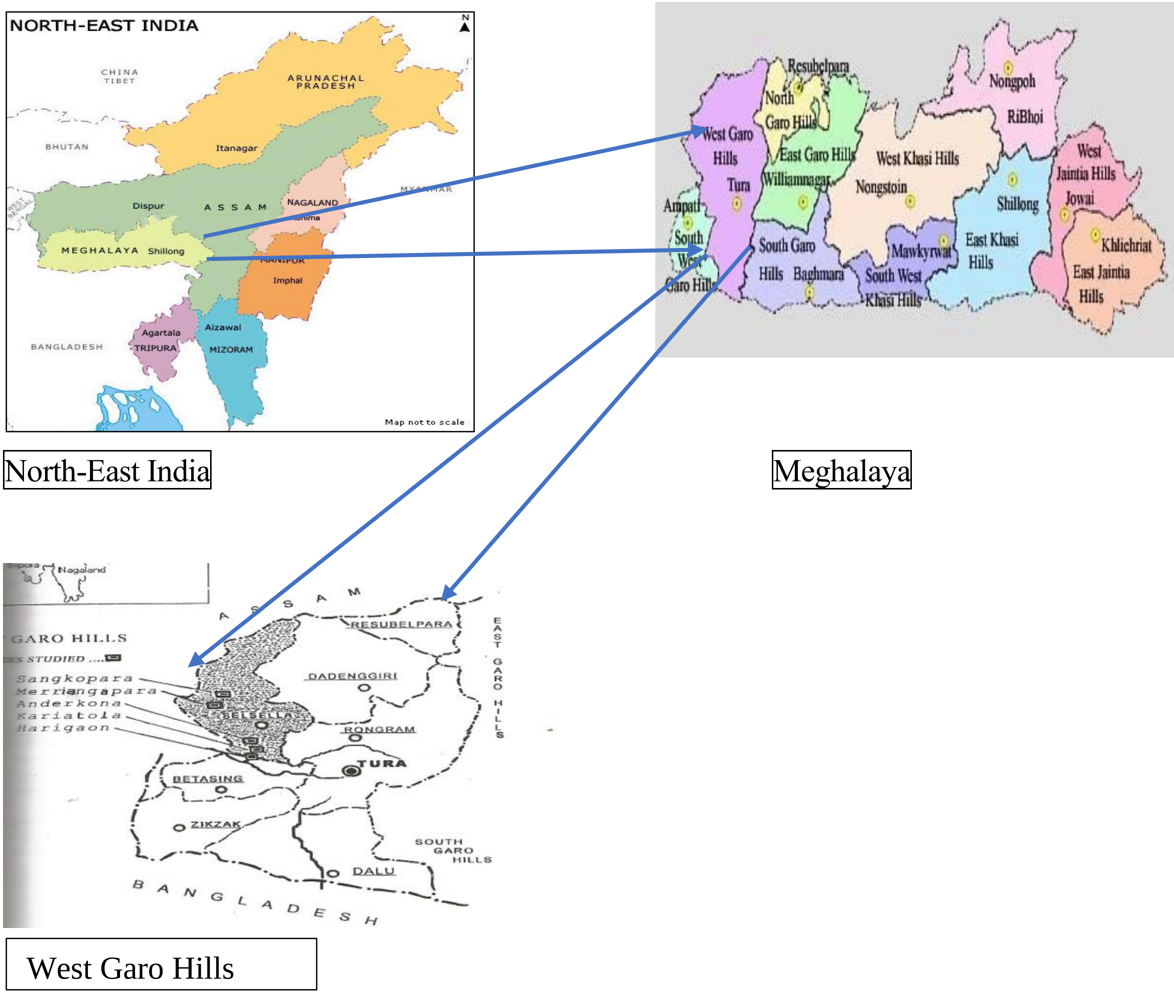
Population processes and sociocultural norms impact both large and small organisational levels. Demographers have found huge changes and complex patterns of variation that make it hard for anthropologists to closely look at the practices that are involved in important events and figure out how these local practices are connected to those that happen at the national and international levels. The various domains of meaning and practice that anthropologists describe challenge demographers to consider the cultural backgrounds of population processes. This often aims to gather data at the population level for demographic studies. Thus, we refer to micro demography with a fieldwork component as anthropological demography.

India, with numerous social, ethnic, linguistic, religious, and territorial groups, provides ample opportunities for anthropologists to examine mating patterns, kinship, reproductive behaviour, and identify issues related to the birth and death of populations (Adak et al. 2012). The study of a population composition acts as an indicator of its current population dynamics (Chachra and Bhasin 1998). Population composition has been studied widely in some areas in some populations in India (Basu 1969, Ghosh 1976, Talukdar 1979, Rao 1989, Narhari 1991, Reddy 1991, Panda and Satpati 1996, Bharali et al. 2022, and others). The Koch population of Meghalaya State of India seems to be interesting in this respect that are divided into several endogamous groups. This study examines the population dynamics of five Koch subgroups residing in Meghalaya.

Materials and Methods

The present study was carried out in five villages of West Garo Hills district, Meghalaya. This district is situated in the North-western part of Meghalaya (Figure 1).

Figure 1. *Study Area (not to scale)*



In view of operational feasibility, demographic data were collected from five Koch subgroups namely, the Chapra, Sanga, Satpari, Tintikiya and Wanang, instead of seven. To do so, five villages are selected for these five subgroups, where these populations are numerically dominant. The villages selected for the present study are Anderkona for the Chapra, Harigaon for the Sanga, Kariatola for the Satpari, Sangkopara for the Tintikiya and Marriangapara for the Wanang. To collect necessary data all the Koch households were surveyed in the respective villages for respective populations, therefore, no specific sampling technique was followed in this study.

The Koch

Scholars are of different opinions regarding ethnic affinity of the Koch. Some scholars hold that they are the Dravidians (Dalton 1872), while others are of the opinion that they belong to Mongoloid origin (Haddon 1924, Das 1962, Sengupta 1982). For the Koch of Garo Hills, Meghalaya, there are two stories regarding their original homeland. Some sections believe that their original home was in Arebela range of the central part of Garo Hills. Another legend says that Koch of Garo hills were migrated from Assam state.

Besides, Assam and Meghalaya, the Kochs are also found in Manipur, Tripura and North Bengal in India and Chittagong and Noakhali districts in Bangladesh. In Meghalaya, they are mainly distributed in western and south-western parts of West Garo hills district. Agriculture is the mainstay of the people and land is owned individually and monogamy is the general practice of marriage among them. They speak a language, belongs to the Tibeto-Burman origin (Gait 1905). Government of Meghalaya accorded Scheduled Tribe status to the Koch People. Khe Koch of Garo hills follow the matrilineal system of society. Their religion is a blend of tribal and Hindu religion. Each subgroup consists of several exogamous clans known as *nikiny*. They are believed to be one of the oldest inhabitants of Garo Hills.

For the present study a door-to-door survey was conducted. The households were selected without any specific sampling technique, but care was taken that each of them contained at least one ever married individual. Data were collected through in-depth interview with each of the married woman or head of the household, using household and fertility schedules, taking into consideration those demographic data as suggested by the World Health Organization (WHO 1964, 1968), which are as follows:

Individual Records: Individual records include information on name, age, sex, marital status, occupation, religion, community affiliation, place of birth, place of residence, clan, tribe, etc., were collected through structured household schedule.

The Reproductive History: Information on reproductive performance of each married woman was collected through fertility schedule and pedigree. Special attention was given to collect data on age at marriage, age at first child birth, number of pregnancies, number of live births, number of abortions (spontaneous and induced abortion), still-birth, birth order, age, sex and marital status of each offspring, if died –age at death, etc.

Age: Age of each member of the household was recorded. But in the present work we faced certain difficulty in collecting data on age of individuals especially those elderly individuals because they were not aware of their real age. Consequently, we had to estimate the age of individuals in certain cases with reference to some important local events.

Ethical consideration: This study is a part of Ph. D. study conducted by MK (Murali Kotal), who collected the data. North-Eastern Hill University, Shillong, Meghalaya, India approved this study. Apart from this each informant were described the purpose of this study. Respective data were collected after they consented.

Limitation of the study: This study is based on five subgroups of Koch population, instead of seven. Two subgroups of the Koch namely the Banai and Shankar were not taken into consideration in this study as they are relatively sparsely distributed in different villages of West Garo Hills District, Meghalaya.

Results

Age and Sex Structure

According to Sundbarg's classification of population, Table 1 shows that the Chapra population tends to be *regressive* in which the base of the population pyramid constricted (Figure 2) indicating the low fertility rates in the population. On the other hand, the Sanga, Satpari and Tintikiya populations are of *stationary types* of population (Figure 2), which are by and large an indication of low fertility rates that may be due to either adoption of family planning methods or high infant and child mortality rates. On the other hand, the Wanang population approaches to be of *progressive type*, which is characterized by high fertility rates. The population pyramid (Figure 2) shows that the base is broad, although it tends to be constricted in the case of females, i.e., it indicates to a certain extent that infant and child mortality rates are higher in females than in males among the Wanang.

Table 1 also shows that the overall sex ratio (i.e., the number of males per 100 females) is more or less according to the ideal sex ratio of 1:1 among the Wanang (101.02) and it is in favour of males in the case of Chapra (106.67), though it is not significant (χ^2 =0.32, df=1, P>0.05). Among the Sanga (81.65), Satpari (96.75) and Tintikiya (93.84), the sex ratio is low, especially in the former. However, the Chi-square values indicate the sex ratios do not deviate significantly from the ideal sex ratio of 1:1 in all the three populations, namely the Sanga (χ^2 =2.93, df=1, P>0.05), Satpari (χ^2 =0.07, df=1, P>0.05) and Tintikiya (χ^2 =0.41, df=1, P>0.05). Also, the differences in sex ratio between populations are found to be statistically insignificant (χ^2 =3.04, df=4, P>0.05). In comparison with the sex ratio among the War Khasi (109) of Meghalaya (Khongsdier and Ghosh 1994), the overall sex ratio is lower in each of these Koch subgroups. In fact, it indicates that male mortality is higher than female mortality in the Sanga (81.65), Satpari (96.75) and Tintikiya (93.84).

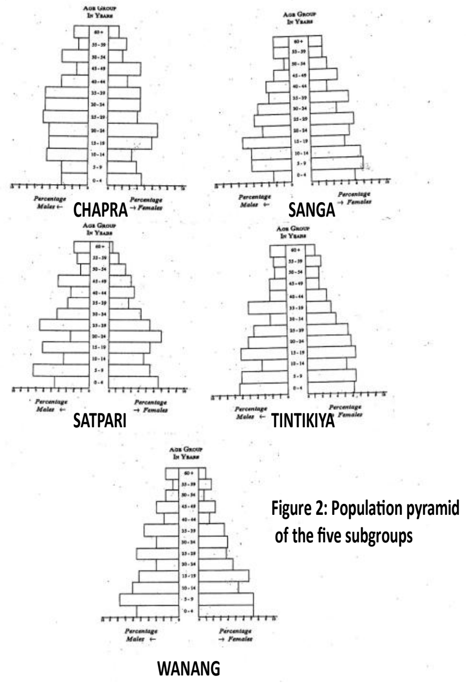
In the age group 0-14 years, the sex ratio is high among the Chapra (108.33), but it is lower in the Wanang (97.47), Tintikiya (90.28), Satpari (92.50) and Sanga (66.07), although the Chi-square values indicate that the deviation from the ideal sex ratio of 1:1 is not statistically significant for all populations (P>0.05), except for the Sanga where the sex ratio is significantly low (χ^2=3.88, df=1, P<0.05). It is also found that the differences in sex ratio between populations are not statistically significant (χ^2 =3.05, df= 4, P>0.05). In the middle age group 15-49 years, the sex ratio among the Wanang (101) and Chapra (103) is more or less according to the ideal sex ratio, but it is again lower in the Sanga (89), Satpari (95) and Tintikiya (94), although it is not significant (P>0.05).

Table 1. *Total Population of the Five Koch Subgroups by Age and Sex*

Age group (years)	Chapra		Sanga		Satpari		Tintikiya		Wanang	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0-4	11	14	7	17	11	16	26	25	22	29
5-9	11	12	15	20	18	13	25	26	31	29
10-14	17	10	15	19	8	11	14	21	24	21
0-14	75		93		77		137		156	
%	24.19		32.40		31.82		33.50		39.39	
SR	108.33		66.07		92.50		90.28		97.47	
χ^2	0.12		3.88*		0.12		0.36		0.03	
15-19	16	18	18	13	15	13	25	26	21	26
20-24	16	20	11	15	6	17	21	24	12	18
25-29	19	12	14	17	16	13	18	22	22	15
30-34	18	13	12	10	10	10	9	16	12	16
35-39	18	13	8	15	7	6	21	13	18	14
40-44	8	8	9	7	6	8	9	11	8	6
45-49	5	13	6	11	10	7	9	7	12	9
15-49	197		166		144		231		209	
%	63.55		57.84		59.50		56.48		52.78	
SR	103.09		88.64		94.59		94.12		100.96	
χ^2	0.05		0.60		0.11		0.12		0.01	
50-54	8	6	2	4	3	5	6	7	7	3
55-59	4	7	6	5	4	3	7	8	3	7
60+	9	4	6	5	5	1	8	5	7	4
50+	38		28		21		41		31	
%	12.26		9.76		8.68		10.02		7.83	
SR	123.53		100.00		133.33		105.00		121.43	
χ^2	0.42		2.29		0.43		0.03		0.29	
Total	160	150	129	158	119	123	198	211	199	197
Persons	310		287		242		409		396	
%	100.00		100.00		100.00		100.00		100.00	
SR	106.67		81.65		96.75		93.84		101.02	
χ^2	0.32		2.93		0.07		0.41		0.01	

SR = Sex ratio
*= Significant at 5% level of probability

Figure 2. *Population Pyramid of the Five Subgroups*



Population Characteristics

Some population characteristics among the five subgroups are shown in Table 2. It reveals a relatively lower index of aging, ranges between 7.05 (Wanang) and 17.33 (Chapra). This might be due to higher rate of mortality among the aged among them. Much variation is noticed in case of young dependency ratio in these populations. Lowest value of which is noticed among the Chapra (33.78) and highest is noticed among the Wanang (68.12). Child women ratio is also considerably lower among them, which ranges between 13.97 (Chapra) and 27.13 (Wanang) suggest a declining trend of fertility. Thus, young dependency ratio and child women ratio both are highest among the Wanang and lowest among the Chapra.

Table 2. *Some Population Indices Among Five Subgroups of the Koch*

Indices	Chapra	Sanga	Satpari	Tintikiya	Wanang
Index of aging	17.33	11.83	7.79	9.49	7.05
Young dependency ratio	33.78	50.82	48.43	52.89	68.12
Old dependency ratio	5.85	6.01	3.77	5.02	4.80
Total dependency ratio	39.63	56.83	52.20	57.91	72.92
Child women ratio	13.97	16.11	21.26	14.42	27.13

Frequency of Never-pregnant Women

Table 3 shows the frequency of never-pregnant women at the time of survey in all the subgroups of the Koch population. It is seen that about 15.48%, 7.58%, 10.53%, 4.49% and 12.24% of the married women are never pregnant in the Chapra, Sanga, Satpari, Tintikiya and Wanang respectively. Although it shows that there are variations between subgroups, the chi-square value indicates that the differences are not statistically significant (χ^2 =5.74, P>0.05).

Moreover, most of the never-pregnant women are in lower age groups, who may still have the chance to reproduce. The Table shows that among the Tintikiya and Wanang, there are no women who are never pregnant in the age group 44 years and above. But in the Chapra, Sanga and Satpari, the frequency of never-pregnant women in the age group 44 years and above is found to be 6.67%, 8.00% and 5.26%, respectively. Thus, from this point of view, it may be suggested that number of never-pregnant women is more in the Chapra, Sanga and Satpari when compared with Tintikiya and Wanang.

Table 3. *Ever-Pregnant and Never Pregnant Women by Age Groups*

Pregnancy Status	Age groups of married women				Total
	<24years	24-33 years	34-43 years	≥ 44 years	
Chapra					
Ever-pregnant	4	20	19	28	71
Never- pregnant	6	4	1	2	13
Total	10	24	20	30	84
% of neverpregnant	60.00	16.67	5.00	6.67	15.48
Sanga					
Ever-pregnant	6	14	18	23	61
Never- pregnant	0	2	1	2	5
Total	6	16	19	25	66
% of neverpregnant	0.00	12.50	5.26	8.00	7.58
Satpari					
Ever-pregnant	6	13	14	18	51
Never- pregnant	2	3	0	1	6
Total	8	16	14	19	57
% of neverpregnant	25.00	18.75	0.00	5.26	10.53
Tintikiya					
Ever-pregnant	9	24	22	30	85
Never- pregnant	1	1	2	0	4
Total	10	25	24	30	89
% of neverpregnant	10.00	4.00	8.33	0.00	4.49
Wanang					
Ever-pregnant	12	27	23	24	86
Never- pregnant	10	2	0	0	12
Total	22	29	23	24	98
% of neverpregnant	45.45	6.90	0.00	0.00	12.24

Mean Age at First Childbirth

The mean age at first childbirth is given in Table 4. Differences in mean age at first birth between the different divisions of Koch subgroups are found to be significant for both males ($F=4.59$, $P< 0.05$) and females ($F=5.72$, $P< 0.05$). Among males, the mean age at first child birth is highest In the Tintikiya (27.60± 0.61 years) followed by the Chapra (27.34± 0.57 years) and the Sanga (26.60± 0.50 years), whereas the Satpari (25.37± 0.69 years) and Wanang males (25.03± 0.43 years) are more or less similar in mean age at first child birth. Both Satpari and Wanang males differ significantly from the other subgroups except the Sanga and Satpari ($t=1.46$, $P> 0.05$).

In the case of females, the ANOVA indicates that there are significant differences between the Koch subgroups in mean age at first child birth ($F=5.72$, $P < 0.05$). The mean age at first child birth is highest in the Satpari (21.02± 0.41 years) followed by the Chapra (20.08± 0.40 years) and Tintikiya (19.40± 0.42 years). The Satpari and Wanang females are found to be more or less similar in mean age at first childbirth.

Table 4. *Mean Age at First Child Birth (Years)*

Population	Male			Female		
	Number	Mean	SE	Number	Mean	SE
Chapra	56	27.34	0.57	71	20.08	0.40
Sanga	47	26.60	0.50	62	21.02	0.41
Satpari	43	25.37	0.69	50	18.70	0.50
Tintikiya	65	27.60	0.61	85	19.40	0.42
Wanang	72	25.03	0.43	85	18.68	0.34
F-ratio	4.59, P< 0.05			5.72, P< 0.05		

Fertility

The mean number of live births and surviving children to all married women increases with the rise in age group of the mothers for all populations. Table 5 shows that the mean number of live births per married women varies from 3.30±0.28 in the Chapra to 4.24±0.29 in the Tintikiya. The mean number of surviving children is also found to be lowest among the Chapra (2.32± 0.21) and highest among the Tintikiya (3.39±0.25). The ANOVA test indicates that the differences are statistically significant for both the live births (F=3.11, P<0.05) and surviving children (F=2.59, P<0.05). In comparison with other populations of Assam and Meghalaya, the mean number of live births per married women of all ages in each of these Koch subgroups is lower than that among the Pnars (6.04) of Jaintia hills (Khongsdier 1992), Christain (4.81) and Non Christain (4.66) War Khasis (Khongsdier 2001), Dalus (5.83) of West Garo hills (Patra and Kapoor, 1996), Hajongs (4.94) of West Garo hills (Barua, 1983), Brahmins (4.86), Kalitas (5.11), Kaibartas (4.39) and Ahoms (4.47) of Assam (Das and Das 1992).

Table 5. *Live Births and Surviving Children by Age Groups of All Married Mothers*

Population	≤24yrs	25-29 yrs	30-34yrs	35-39 yrs	40-44 yrs	≥ 45 yrs	Total
Chapra							
No. mothers	12	11	11	13	9	28	84
Live births	11	23	25	42	30	146	277
Mean± SE	0.92±0.30	2.09± 0.49	2.27±0.53	3.23±0.50	3.33±0.70	5.21±0.50	3.30±0.28
Surviving	9	14	20	24	23	105	195
Mean± SE	0.75±0.24	1.27±0.29	1.82±0.48	1.85±0.32	2.56±0.42	3.75±0.41	2.32±0.21
Sanga							
No. mothers	8	8	8	12	6	25	67
Live births	11	12	14	50	24	128	239
Mean± SE	1.38±0.30	1.50±0.35	1.75±0.23	4.17±0.68	4.00±1.33	5.12±0.48	3.57±0.32
Surviving	8	9	14	41	20	99	191
Mean± SE	1.00±0.25	1.13±0.21	1.75±0.23	3.42±0.72	3.33±1.07	3.96±0.39	2.85±0.27
Satpari							
No. mothers	9	9	9	6	6	18	57
Live births	8	18	34	33	31	88	212
Mean± SE	0.89±0.25	2.00±0.63	3.78±0.64	5.50±1.02	5.17±0.86	4.89±0.52	3.72±0.34
Surviving	7	17	26	26	24	63	163
Mean± SE	0.78±0.26	1.89±0.60	2.89±0.46	4.33±0.90	4.00±0.75	3.50±0.58	2.86±0.30
Tintikiya							
No. mothers	11	13	14	12	11	27	88
Live births	20	29	53	61	46	164	373
Mean± SE	1.82±0.40	2.23±0.39	3.79±0.59	5.08±0.57	4.81±0.76	6.07±0.50	4.24±0.29
Surviving	17	25	43	46	36	131	298
Mean± SE	1.55±0.32	1.92±0.30	3.07±0.47	3.83±0.48	3.27±0.78	4.85±0.50	3.39±0.25
Wanang							

No. mothers	24	14	15	15	6	23	97
Live births	22	45	57	93	37	137	391
Mean± SE	0.92±0.24	3.21±0.55	3.80±0.61	6.20±0.49	6.17±0.80	5.96±0.48	4.03±0.29
Surviving	15	37	47	62	34	100	295
Mean± SE	0.63±0.16	2.64±0.42	3.13±0.46	4.13±0.38	5.67±0.93	4.35±0.45	3.04±0.23

F Ratio: F=3.11, P<0.05 for live births; F=2.59, P< 0.05 for surviving children

Mortality

Table 6 shows the infant, child and juvenile mortality rates in the populations covered under the present study are fairly high. It is found that the percent of infant mortality rates, that is, the number of deaths before 1 year of life per 100 live births, are 10.83%, 5.44%, 3.77%, 4.02% and 7.16% in the Chapra, Sanga, Satpari, Tintikiya and Wanang respectively. Thus, it indicates that the infant mortality rates in the present populations are high especially among the Chapra and Wanang. The differences between populations in respect of infant mortality rates are also found to be significant (χ^2=13.86, df=4, P<0.01), which may be associated with the differences in socio-economic conditions of the populations as has been pointed out in the case of the differences in fertility rates. Of course, it warrants further studies to understand the determinants of infant mortality in these populations. Like in the case of infant mortality rate, the child mortality, i.e., number of child deaths aged between 1 and 4 years of life per 100 live births, is found to be very high among the Wanang (13.81%) and Chapra (13.72%), and it is followed the Sanga (8.37%), Satpari (7.55%) and Tintikiya (8.58%). The chi-square value indicates that these inter-population differences in child mortality rates are significant (χ^2=9.56, df=4, P<0.05). With regard to juvenile mortality rate i.e., number of child deaths aged between 4 and 14 years of life per 100 live births, it is found to be highest among the Satpari (9.91%) and lowest among the Wanang (3.58%). Thus, it indicates that there is a wide variation between populations in juvenile mortality as well, although it is not significant (χ^2=8.91, df=4, P>0.05).

Table 6. *Infant, Child and Juvenile Mortality Rates*

Parameters	Chapras	Sanga	Satpari	Tintikiya	Wanang
Number of mothers	84	67	57	88	97
Number of live births	277	239	212	373	391
Number of infant deaths (death <1 year of life)	30	13	8	15	28
Number of child deaths (deaths between 1 and 4 years of life)	38	20	16	32	54
Juvenile deaths (deaths between 5 and 14 years of life)	17	15	21	27	14
Infant mortality rate (%)	10.83	5.44	3.77	4.02	7.16
Child mortality rate (%)	13.72	8.37	7.55	8.58	13.81
Juvenile mortality rate (%)	6.14	6.28	9.91	7.24	3.58

Reproductive Wastage

The reproductive wastage (abortions and still births) for the Koch populations of the present study is given in Table 7. It is seen that the rate of reproductive wastage is fairly high in the present populations, although it is lower in the Wanang (4.00%) and Sanga (4.05%). It is highest among the Chapra (8.42%), followed by the Satpari (6.19%) and Tintikiya (5.57%). These differences in reproductive wastage is found to be insignificant (χ^2=6.83, df=4, P>0.01). The abortion rates are found to be 4.71%, 1.21%, 4.87%, 3.54% and 2.00% in the Chapra, Sanga, Satpari, Tintikiya and Wanang, respectively. The frequencies of still births to these populations are found to be 3.70%, 2.83%, 1.33%, 2.03% and 2.00% respectively. Thus, it indicates that the still birth is higher than the abortion rate in the Sanga, and it is more or less same in the case of the Wanang. In other populations, the abortion rate is higher than the still birth rate. It has been observed that all the subgroups are characterized by high tendency of village exogamy.

Table 7. *Reproductive Wastage*

Parameters	Chapra	Sanga	Satpari	Tintikiya	Wanang
Number of mothers	84	67	57	88	97
Number of pregnancies	297	247	226	395	400
Number of live births	277	239	212	373	391
Number of abortions	14	3	11	14	8
Number of still births	11	7	3	8	8
Abortion Rate (%)	4.71	1.21	4.87	3.54	2.00
Still birth Rate (%)	3.70	2.83	1.33	2.03	2.00
Reproductive wastage (%)	8.42	4.05	6.19	5.57	4.00

Village Endogamy

Table 8 shows the frequency of village endogamy in terms of the number of marriages taking place within the village and outside the village. The Table shows that the frequency of marriage outside the village, i.e., one of the spouses is from outside the village, is more than 50% in all the subgroups, and it is very high among the Chapra (72.94%), Wanang (71.72%) and Tintikiya (56.67%). This variation in village exogamy between the subgroups is highly significant (χ^2 =10.88, df=4, P<0.001), i.e., it varies from 53% for the Satpari to 73% for the Chapra. The Chi-square values for each subgroup indicate that village exogamy is significantly higher than village endogamy in the Chapra (χ^2=17.89, df =1, P<0.001), Sanga (χ^2=4.31, df =1, P<0.05) and Wanang (χ^2=18.68, df =1, P<0.001). In case of the Satpari and Tintikiya, there is no difference between village endogamy and village exogamy, i.e., about 50% of the marriages in these two groups may be considered as taking place within village, although village exogamy is higher than village endogamy. Nevertheless, it is obvious from the present findings that village endogamy is very low in comparison with other populations of Meghalaya like the War Khasi (Khongsdier 2001). As such it is expected that the genetic variation between these populations should be low as there should be a continuous gene flow among them.

Table 8. *Marriage within and Outside the Village*

Marriage	Chapra	Sanga	Satpari	Tintikiya	Wanang
Within village %	23	25	27	39	28
	27.06	37.31	47.37	43.33	28.28
Outside village %	62	42	30	51	71
	72.94	62.69	52.63	56.67	71.72
Total	85	67	57	90	99
Chi-square value	17.89**	4.31*	0.16	1.60	18.68**

Chi-square value=10.88, df=4, *P<0.05, **P <0.001

Admixture Rate

In fact, Table 9 shows that the admixture rate, calculated according to Lasker (1952), is very high in all the Koch subgroups of the present study. It varies from 28.72% among the Satpari to 45.20% among the Wanang. It may be mentioned that the high admixture rate (Table 9) was based on the number of individuals migrated from one village to another village within and between the Koch subgroups through marital relationship. The marital relationship with other populations like Garo, Hajong, Rabha, Dalu, Mann etc., is found to be 11.76%, 7.46%, 3.51% and 4.04% in the Chapra, Sanga, Satpari, Tintikiya and Wanang, respectively. Thus, it clearly indicates that most of the marriages take place within and between the Koch Subgroups only.

Table 9. *Admixture Rate Between Villages*

Marriage	Chapra	Sanga	Satpari	Tintikiya	Wanang
Both parents from the same village	128	133	133	206	109
One of the parents from another village	120	112	79	152	216
Both of the parents from another villa8ge	62	42	30	51	71
Total number of persons	310	287	242	409	396
Admixture Rate (%)	39.35	34.15	28.72	31.05	45.20

Genetic Drift

From the evolutionary point of view, changes in gene frequencies due to random genetic drift or random sampling are considered to be important in small isolated population. In the present study we have calculated the variance due to genetic drift according to Wright (1931, 1943), which is as follows:

$$V^2dq = \{q\ (1\text{-}q)\}\ /2N_e$$

where V^2dq is the variance due to drift, q stands for the gene frequency (here taken as 0.5), and N_e is the effective population size.

Following the above method, the results are presented in Table 10. There exist differences in different variables in different populations.

Table 10. *Breeding Size, Effective Population Size, Coefficient of Breeding Isolation and Variance due to Genetic Drift*

Population	Breeding size (N)	Effective population size (N_e)	Coefficient of breeding isolation (N_eM)	Variance due to genetic drift (where q=0.5)
Chapra	121	100.10	39.3894	0.001249
Sanga	105	75.70	25.8524	0.001651
Satpari	86	55.20	15.8530	0.002265
Tintikiya	149	94.33	29.2887	0.001325
Wanang	151	97.26	43.6903	0.001285

Selection Intensity

Natural selection is one of the most powerful evolutionary forces, which brings about changes in the genetic composition of a population. It is operating in human populations through differential fertility and mortality. Assuming that some phenotypic variation in reproduction has a genetic basis and fitness is heritable, Crow (1958) has proposed an index which is known as Index of Total Selection Intensity (now called the Index of Opportunity for Selection), taking into consideration the differential fertility and mortality. In the present study, we have followed the method suggested by Crow (1958) for calculating the total selection intensity. We have also followed the modified version suggested by Johnston and Kensinger (1971).

Table 11 shows the parameters used in calculating the index of selection intensity. It may be noted that for calculating this index, we have taken into consideration only those mothers who are aged 40 years and above since fertility declines drastically when the mothers reach this age. It may be noted that this has been observed in other populations as well (Das and Ghosh1988, Khongsdier 2001). Table 11 shows that the mean number of live births per mother varies from 4.76 among the Chapra to 6.00 among the Wanang, whereas the proportion of child deaths (i.e., deaths before reproductive age) varies from 0.2048 for the Tintikiya to 0.2727 among the Chapra. The proportion of embryonic deaths is found to vary from 0.0318 among the Sanga to 0.0708 among the Tintikiya.

On the basis of these parameters, we have calculated the selection intensity according to the methods suggested by Crow (1958) and Johnston and Kensinger (1971). Table 12 shows that the index of total selection intensity (I), calculated according to Crow's formula, varies from 0.4776 among the Wanang to 0.7999 among the Chapra. It indicates that the differential mortality contributes more towards the total selection intensity among the Chapra (0.3749), Satpari (0.3678), Tintikiya (0.2575), and Wanang (0.2985), but in the case of Sanga it is differential fertility which contributes more towards total selection intensity. Nevertheless, it indicates by and large that differential mortality contributes more towards selection intensity in the Koch population as generally observed in the other Indian populations (Reddy and Chopra 1990).

Table 11. *Parameters Used in Calculating Index of Selection Intensity*

Parameters	Chapra	Sanga	Satpari	Tintikiya	Wanang
Number of mothers aged 40 yrs and above	37	31	24	38	29
Number of conceptions	186	157	126	226	180
Number of live births	176	152	119	210	174
Number of embryonic deaths	10	5	7	16	6
Mean number of live births per women aged 40yrs and above ($\bar{X}$)	4.7568	4.9032	4.9583	5.5263	6.0000
Variance in number of live births due to fertility (V_f)	6.9949	6.9261	4.7899	7.4072	4.9655
Proportion of child deaths (i.e., deaths before 15 yrs of age P_d	0.2727	0.2171	0.2689	0.2048	0.2299
Proportion of survivors, birth to reproductive age (P_s=1-P_d)	0.7273	0.7829	0.7311	0.7952	0.7701
Proportion of embryonic deaths (P_{ed})	0.0538	0.0318	0.0556	0.0708	0.0333
Proportion of survivors, birth to reproductive age (P_b=1-P_{ed})	0.9462	0.9682	0.9444	0.9292	0.9667

Table 12 also shows the index of total selection intensity calculated according to the method suggested by Johnston and Kensinger (1971). It is seen that, like in the case of Crow's formula, the value of I varies from 0.5284 among the Wanang to 0.9022 among the Chapra. It indicates that the I value according to Johnston and Kensinger's method are higher than those calculated according to Crow's formula for all the Koch subgroups of the present study. This may be due to the fact that in the modified version of Johnston and Kensinger, we have taken into account the embryonic deaths, i.e., reproductive wastage which includes abortions and still births.

Table 12. *Indices of Opportunity for Selection*

Population	According to Crow (1958)			According to Johnston and Kensinger (1971)			
	I_m	I_f	I	I_{me}	I_{mc}	I_f	I
Chapra	0.3749	0.3091	0.7999	0.0569	0.3749	0.3091	0.9022
Sanga	0.2773	0.2881	0.6453	0.0328	0.2773	0.2881	0.6993
Satpari	0.3678	0.1948	0.6343	0.0589	0.3678	0.1948	0.7305
Tintikiya	0.2575	0.2425	0.5625	0.0762	0.2575	0.2425	0.6815
Wanang	0.2985	0.1379	0.4776	0.0344	0.2985	0.1379	0.5284

Discussion

It has long been suggested that the biological variation between and within human populations is due to the cumulative effect of various evolutionary forces like mutation, selection, genetic drift and gene flow over a period of time. On the basis of demographic data, the present study reveals that the Chapra population tends to be regressive characterized with low fertility rates on the other hand, the Sanga, Satpari and Tintikiya populations are of stationary type characterized with low fertility rates or due to the adoption of family planning, while the Wanang population appears to be of progressive type characterized by high fertility rates. The overall sex ratio is lower in these Koch subgroups, which is indicative of higher mortality in males than in females among the Sanga, Satpari and Tintikiya.

It is found that about 94% of the marriages took place within the Koch subgroups only i.e., only 6% of the total marriages took place with other populations. This clearly shows that the Koch populations of West Garo Hills are highly endogamous.

Number of never-pregnant women is more in the Chapra, Sanga and Satpari than that of the Tintikiya and Wanang. Side by side, young dependency ratio and child women ratio both are highest among the Wanang and lowest among the Chapra. Mean number of live births to women of all ages living in wedlock varies between 2.08±0.24 for the Chapra and 3.42±0.33 for the Wanang, and the mean number of surviving children varies from 1.41±0.17 among the Chapra to 2.75±0.26 among the Tintikiya. These differences in live births and surviving children between the Koch subgroups may be due to the differences in socioeconomic status and adoption of family planning methods among them. There exists statistically significant difference in respect of infant and child mortality between the populations. This again may be due to the differences in socio-economic conditions of the populations.

It may however be noted that variances shown in Table 10 are based on the assumption that all the Koch subgroups of the present study are endogamous. But we have already seen that the admixture rates between and within the Koch subgroups are fairly high. Thus, drift may not play much role in these Koch subgroups of Garo hills. In fact, Wright (1931) has clearly pointed out the importance of migration in neutralizing the effect of genetic drift in human populations. According to Wright (1940), the differentiation in gene frequency due to genetic drift depends on the coefficient of breeding isolation, i.e., the product of effective population size and admixture rate. In a population with an allele frequency of 0.5, genetic differentiation due to drift is very great where N_eM is less than 0.5, genetic differentiation is still important where N_eM is less than 5, but differentiation due to genetic drift is slight where N_eM is greater than 50. In the present study, the coefficient of breeding isolation varies from 16 among the Satpari to 44 among the Wanang. Thus, it suggests that differentiation in allele frequency due to genetic drift is not so important in all the Koch subgroups of the present study, although it may still important in the Satpari population.

Having reviewed the values of I calculated according to Crow's formula it is likely that opportunity for selection is very high among the Chapra; it is in moderate intensity in the Sanga and Satpari. On the other hand, the opportunity for natural selection seems to be mild in the case of Tintikiya and Wanang.

Conclusions

Anthropodemographic study is conducted among five subgroups of Koch population (Chapra, Sanga, Satpari, Tintikiya and Wanang) residing in Meghalaya. The subgroups mainly marry within their own group practicing endogamy. The populations are characterized with lower persons in old age groups. As these subgroups vary in terms of socio-economic conditions differences exist among themselves in mean number of live births and surviving children. Similarly, these subgroups also vary in terms of infant, child and juvenile mortality. Allele frequency differentiation is not much due to genetic drift among them. Selection intensity in these groups vary from mild to very high. In fine, this study warrants further study on different factors affecting population dynamics among these subgroups of Koch population.

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