A COMPARATIVE MICRODEMOGRAPHIC STUDY OF TWO COMMUNITIES IN COASTAL MIDNAPORE DISTRICT, WEST BENGAL

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Summary. The results of a demographic study of two occupationally distinguishable caste communities inhabiting the neighbouring settlements of Balaramchak and Bamanchak in the Geonkhali region, coastal Midnapore district, West Bengal, are reported. Although there is no significant difference in mortality between the two settlements, fertility is generally higher in Balaramchak than in Bamanchak. Further, fertility seems to have declined over time in both the settlements, with the decline commencing earlier in Bamanchak. Possible explanations for the inter-settlement and temporal differences in terms of occupation and family planning practices, as well as the possible genetic consequences of these differences, are discussed.

Introduction

The demographic characteristics of fertility, mortality, migration and population growth are generally known to differ among different geographical and ecological regions and communities (Pearl, 1939; Lorimer *et al.*, 1954; Bogue, 1969; Kammeyer, 1975; UN, 1973; Mitra, 1978), as also with time. Similar demographic differences in relation to physical and cultural environmental factors, and to time sequence, have also been found in small scale studies. For instance, fertility differences in relation to altitude have been shown by Abelson (1976), Gupta (1980) and others, to the economic value of child labour by Nag, White & Peet, (1978), to land ownership and need for agricultural labour by Mamdani (1972), and to educational opportunity by Stanhope & Hornabrook (1974). The importance to fertility of the position of a population in the time sequence is shown by Roberts' (1971) study of the population of Tristan da Cunha and Zodgekar's (1975) Maori analysis in a period of rapid urbanization, reduction of infant mortality, and increase in the level of education.

While formal demographic studies generally involve large scale data and the application of sophisticated statistical techniques, it is increasingly appreciated that small scale, intensive, anthropological studies can provide useful indications of trends, notwithstanding their inherent risk of large sampling fluctuations.

Macfarlane (1976) believes that 'microdemography can combine some meaningful estimates of general demographic trends with intensive study of the social and economic correlates of such trends, and can still make a very useful contribution to population studies'.

In the light of these arguments, the differences in age-specific fertility rates between older and younger women recently observed in Mirpur, a Christian village in the Geonkhali region, West Bengal (Basu, Gupta & Bhattacharya, 1980), prompted a study, in two communities adjacent to Mirpur, of the possibilities of (a) fertility and mortality differences in relation to occupational differences; (b) fertility differences in time sequence; and (c) the genetic consequences of such differences, if any.

Materials and methods

The demographic data were collected from the Namasudras, a scheduled caste community, in Balaramchak, and the Mahishyas, an agricultural caste community, in Bamanchak.

No statistical sampling of villages or settlements in the Geonkhali region, or households within each settlement, was attempted. Instead, two settlements having known occupational differences, and adjacent to Mirpur as well as to each other, were purposely selected and within each settlement all households belonging to the specified caste were surveyed.

Balaramchak and Bamanchak being adjacent settlements of the same village (Natsal), both the communities live essentially under similar physical environmental stresses, but there is a difference in one important cultural environmental factor, occupation; most of the household heads in Balaramchak are labourers, agricultural or otherwise, while in Bamanchak they are agriculturists. Demographic information from 89 households in Balaramchak, and 150 households in Bamanchak was collected using household and fertility questionnaires. The former were completed to give information on age, sex, marital status and place of birth of all household members, and primary occupation of the head of the household collected from the head of each household, or in his absence, from other elderly members of the household; the latter were completed using information from married females on their reproductive performance, including live births, dead children, and reproductive wastages. Subsequent cross-checking of the data, especially those on age, was done from several sources. In the absence of written records of age and date of birth in most households, ages were estimated by reference to important local events, or to the ages of a few individuals for whom age records existed. The data on reproductive wastages have not been utilized in this analysis, because of the possibility of under-reporting.

Results

From the age, sex and marital status of the populations in the two villages, shown in Table 1 and Figure 1, it appears that 43·4, 43·6 and 13·0% in Balaramchak, and 38·4, 47·8 and 13·8% in Bamanchak, are in the age groups 0–14, 15–49 and 50+

Table 1. Total population by age, sex and marital status

Age group (years)	Balaramchak								Bamanchak							
	Unmarried		Married		WDS*		Total		Unmarried		Married		WDS*		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0–4	35	41					35	41	58	63					58	63
5–9	35	42					35	42	65	47					65	47
10–14	35	31		1			35	32	58	50					58	50
15–19	31	5	2	17			33	22	43	21	1	15			44	36
20–29	26		18	30	3	1	47	31	54	6	28	66	1		83	72
30–39	2		18	23			20	23	14		46	47		6	60	53
40–49	1		25	15	1	3	27	18	6		43	18		9	49	27
50–59	1		19	5		9	20	14			25	17	1	16	26	33
60–69			7	2	1	9	8	11	1		18	6	2	11	21	17
70+			3		1	9	4	9			10	1	2	12	12	13
0–14	105	114		1			220		181	160					341	
15–49	60	5	63	85	4	4	221		117	27	118	146	1	15	424	
50+	1		29	7	2	27	66		1		53	24	5	39	122	
Total	166	119	92	93	6	31	264	243	299	187	171	170	6	54	476	411

* Widowed, divorced, separated.

years respectively, a distribution that suggests a relatively greater growth potential of the former. Unlike typically growing populations, the base of the pyramids (0–4 years age group) is not the broadest (except in Bamanchak females), suggesting a fertility decline, especially in Balaramchak. In Balaramchak and Bamanchak respectively, 93·4 and 87·6% of unmarried males are aged below 25 years, and 100 and 96·79% of the unmarried females are below 20 years; in both the settlements most of the males aged 25+ years and females aged 20+ years are already married, a situation conducive to high fertility. The overall sex ratio is 52·1 ± 2·22 in Balaramchak and 53·7 ± 1·67 in Bamanchak. The child:woman ratio is high (80·9) in Balaramchak and moderate (64·4) in Bamanchak, compared to two high fertility populations, namely Hutterites and Dinka (Eaton & Mayer, 1953; Roberts, 1956).

Only 10·3% of married females in Balaramchak and 6·1% in Bamanchak had never been pregnant, and the percentage of never pregnant women past the reproductive age (45+ years) is also higher in the former (Table 2). In conformity with the higher child:woman ratio in Balaramchak, no infertile (never pregnant) female was found in the age groups 25–34, 35–39 years, while there were four in these age groups in Bamanchak. The apparently lower completed family size in Balaramchak (Table 3), which seems to contradict the higher fertility suggested by the other measures, is not significantly so. The mean numbers of live births to females aged below 25 years are very similar in the two settlements, but in age groups 25–34 and 35–44 years the number is higher in Balaramchak and the
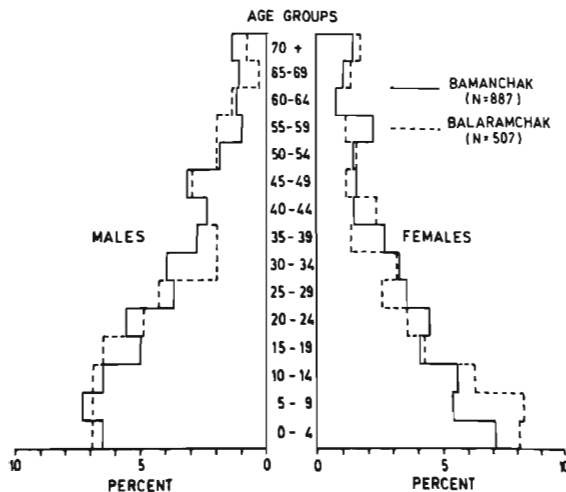
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Fig. 1. Population pyramid: Balaramchak and Bamanchak.

Table 2. Numbers of married women never pregnant and
pregnant at least once, by age group

	Age group (years)				
	<25	25–34	35–44	45+	Total
Balaramchak					
Never pregnant	10	0	0	2	12
Pregnant at least once	25	29	19	31	104
Total	35	29	19	33	116
% never pregnant	28·57	0	0	6·06	10·34
Bamanchak					
Never pregnant	8	3	1	1	13
Pregnant at least once	41	57	36	68	202
Total	49	60	37	69	215
% never pregnant	16·33	5·00	2·70	1·45	6·05

Table 3. Live births to married women living in wedlock, by age group

Age group (years)	No. of females		No. of live births						
			Mean		SD				
	Balaramchak	Bamanchak	Balaramchak	Bamanchak	Balaramchak	Bamanchak	t	df	P
<25	35	49	1·26	1·41	1·18	1·03	0·62	82	>0·05
25–34	29	57	4·31	3·21	2·00	1·55	2·81	84	<0·05
35–44	18	30	6·61	5·20	2·16	2·33	2·09	46	<0·05
45+	11	28	5·82*	7·00*	3·76	2·66	1·11	37	>0·05

* Completed family size.

differences are significant. The average numbers of surviving children and of live births in the two settlements (Table 4) are also very similar. The total fertility rate is, however, higher in Balaramchak (6·28) than in Bamanchak (5·32) (Table 5). Both Table 5 and Figure 2 show that age-specific fertility among the married females now aged 45+ years in Balaramchak was generally lower than in Bamanchak, indicative of lower fertility performances in the former throughout their reproductive career (except the last two age periods, in which sample sizes are very small). The fertility in both settlements (last column Table 5) reaches its peak in the age period 25–29 years then declines gradually, although at different rates. Considering married females of all ages, instead of females 45+ years, it appears

**Table 4.** Numbers of married women, by surviving and total sibship size

No. of surviving children	Balaramchak		Bamanchak		No. of live births	Balaramchak		Bamanchak	
	No.	%	No.	%		No.	%	No.	%
0	14	12·07	18	8·37	0	12	10·34	14	6·51
1	21	18·10	33	15·35	1	15	12·93	25	11·63
2	20	17·24	42	19·53	2	16	13·79	35	16·28
3	11	9·48	36	16·74	3	15	12·93	28	13·02
4	17	14·66	24	11·16	4	10	8·62	25	11·63
5	12	10·34	27	12·56	5	6	5·17	18	8·37
6	11	9·48	16	7·44	6	15	12·93	19	8·84
7	4	3·45	9	4·19	7	6	5·17	15	6·98
8	6	5·17	6	2·79	8	7	6·03	15	6·98
9	0		3	1·40	9	6	5·17	12	5·58
10	0		1	0·47	10	7	6·03	5	2·33
11	0		0		11	1	0·86	1	0·47
12	0		0		12	0		3	1·40
Total	116	99·99	215	100·00		116	99·97	215	100·02
Mean no. per female	3·06		3·26			4·18		4·25	

t = 0·78, df = 329, P > 0·05   t = 0·20, df = 329, P > 0·05

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Table 5. Live births during each 5-year period to married women living in
wedlock, by present age

Age period (years)	<25		25–34		35–44		45+		All ages	
	Bl* (35)	Bm† (49)	Bl (29)	Bm (57)	Bl (18)	Bm (30)	Bl (11)	Bm (28)	Bl (93)	Bm (164)
≤19	0·83	0·90	1·07	0·68	0·83	1·10	0·36	0·82	0·85	0·85
20–24	0·88	0·74	1·62	1·53	1·72	1·70	0·82	1·32	1·36	1·34
25–29			1·35	0·83	1·72	1·27	1·55	1·79	1·50	1·17
30–34			0·50	0·23	1·50	0·87	1·18	1·43	1·07	0·86
35–39					0·72	0·27	1·09	1·18	0·86	0·71
40–44					0·18	0	0·55	0·46	0·36	0·35
45+							0·27	0·04	0·27	0·04
Total fertility rate							5·818	7·036	6·275	5·315

No. of women in parentheses.
* Balaramchak; † Bamanchak.
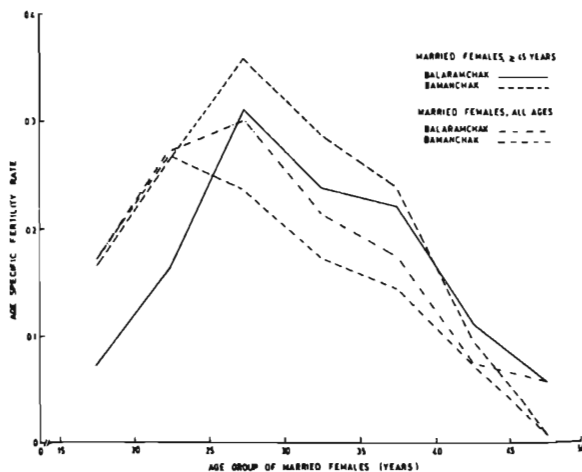
Fig. 2. Age-specific fertility rates: Balaramchak and Bamanchak.

that the fertility of married females in the two earlier age groups is similar in the two settlements, but thereafter Balaramchak has consistently higher rates (Fig. 2). Fertility of married females of all ages reaches its peak in the age period 25–29 years in Balaramchak and in 20–24 years in Bamanchak, suggesting an earlier onset of fertility decline in the latter. Comparison of the age-specific fertility rates among the four 10-year age cohorts (Table 5, Fig. 3) reveals that decline in the fertility pattern with age commenced in different age periods in the two settlements. In Bamanchak it started in age period 25–29 years and has continued since, while in Balaramchak it started in the age period 35–39 years and likewise has continued ever since (with a few exceptions in each settlement). Such decline may explain the discrepancy in these populations between completed family size and total fertility rates which, with unchanging fertility schedules, should be very similar.

The differences (Table 6) between Balaramchak and Bamanchak in infant mortality rate (13·4 and 13·3%) and adolescent mortality rate (23·5 and 21·9%) are not significant by the binomial test of equality of proportions, except for the adolescent mortality rate in the offspring of females aged 25–34 years.
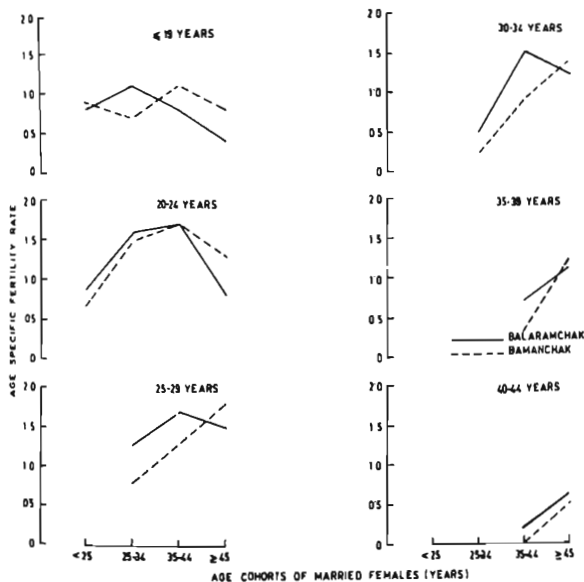

Fig. 3. Fertility decline, by 5-yearly age periods: Balaramchak and Bamanchak.

Table 6. Number of surviving and dead children of married women and age at death of children, by present age of married women

			No. of children				
				Dead, by age at death		Mortality rate	
Age of women (years)	No. of women	Total live births	Surviving	<1 year	<15 years	Infant*	Adolescent†
Balaramchak							
<25	35	44	38	5	6	11·36	13·64
25–34	29	125	99	15	26	12·00	20·80
35–44	19	121	89	21	31	17·36	25·62
45+	33	195	138	24	51	12·31	26·15
All ages	116	485	364	65	114	13·40	23·51
Bamanchak							
<25	49	69	57	9	12	13·04	17·39
25–34	60	194	171	15	23	7·73	11·86
35–44	37	180	136	29	43	16·11	23·89
45+	69	470	336	68	122	14·47	25·96
All ages	215	913	700	121	200	13·25	21·91

Significance of difference between Balaramchak and Bamanchak							
<25						0·0168 ± 0·0636	0·0375 ± 0·0706
25–34						0·0427 ± 0·0334	0·0894 ± 0·0414
35–44						0·0124 ± 0·0438	0·0173 ± 0·0506
45+						0·0216 ± 0·0294	0·0020 ± 0·0374
All ages						0·0015 ± 0·0191	0·0160 ± 0·0234

* Deaths <1 year and † <15 years, per 100 live births.

Table 7 shows that the mortality component (I_m) of Crow's (1958) index of maximum opportunity for selection is higher than the fertility component (I_f) in Bamanchak and lower in Balaramchak. Both components and the total index (I) are higher in Balaramchak, using mortality among children of females of all ages to estimate p_d. Since fertility has been shown to change over time in both the settlements, and mortality may change similarly, p_d and p_s were also estimated using mortality among children of females aged 45+ years. The re-calculation yielded essentially similar results, although values of the components changed somewhat.

Table 7. Selection intensity in Balaramchak and Bamanchak; estimates using reproductive histories of women aged 45 and over, and all women

	Balaramchak		Bamanchak	
	Based on women of all ages	Based on women aged 45+	Based on women of all ages	Based on women aged 45+
N_i No. of females aged 45 and over	11		28	
$\bar{X}$ Average no. of live births per female	5·82		7·00	
V_f Variance in progeny no. due to fertility	14·15		7·08	
N_3 Total no. of live births	485	195	913	470
p_d Premature deaths before reproductive age	0·235	0·262	0·219	0·260
I_m Mortality component	0·307	0·355	0·280	0·351
I_f Fertility component	0·418		0·144	
I Index of maximum opportunity for selection	0·853	0·921	0·464	0·546

Discussion

Since both the settlements have similar infant and adolescent mortality rates, their slight cultural differences appear to have little effect on mortality, similar to the findings of Gupta (1979) elsewhere in India.

Fertility, on the other hand, is higher in Balaramchak than in Bamanchak in respect of most of the measures employed. There is no evidence that this difference is related to settlement exogamy, which is very similar in the two communities (Table 8). Bamanchak has a considerably higher frequency of household heads

Table 8. Exogamy rate by age group of married women

Age group of married women (years)		Both spouses from the settlement		One from the settlement, other from outside		Both from outside the settlement		Total	
		Bl*	Bm†	Bl	Bm	Bl	Bm	Bl	Bm
<25	No.	0	8	35	41	0	0	35	49
	%		16·33	100·00	83·67			100·00	100·00
25–34	No.	3	2	26	55	0	0	29	57
	%	10·34	3·51	89·66	96·49			100·00	100·00
35–44	No.	4	7	14	22	0	1	18	30
	%	22·22	23·33	77·78	73·33		3·33	100·00	99·99
45+	No.	5	4	6	24	0	0	11	28
	%	45·45	14·29	54·55	85·71			100·00	100·00
All ages	No.	12	21	81	142	0	1	93	164
	%	12·90	12·80	87·10	86·59		0·61	100·00	100·00

* Balaramchak; † Bamanchak.

cultivating their own land (39% as compared to 13%), and Balaramchak a higher frequency of agricultural labourers (46% as compared to 11%), suggesting that Bamanchak is economically better off, and this would be consistent with its lower fertility, if the frequently noted inverse relationship between economic condition and fertility holds here. Certainly a greater acceptance of family planning practices is noticeable in Bamanchak than in Balaramchak (Table 9). The temporal decline in fertility, which apparently began earlier in Bamanchak, may be ascribable to earlier acceptance there of both sterilization and temporary birth control measures.

Table 9. Family planning practices by age group of married women*

Age group of married women (years)		Sterilized†		Practising birth control†		Not practising birth control		Total	
		Bl‡	Bm§	Bl	Bm	Bl	Bm	Bl	Bm
<25	No.¶	0	2	0	1	35	46	35	49
	%		4·08		2·04	100·00	93·88	100·00	100·00
25–34	No.	1	18	1	2	27	37	29	57
	%	3·45	31·58	3·45	3·51	93·10	64·91	100·00	100·00
35–44	No.	3	8	7	12	8	10	18	30
	%	16·67	26·67	38·89	40·00	44·44	33·33	100·00	100·00
45+	No.	0	1	0	1	0	0	0	2
	%		50·00		50·00			0·00	100·00
All ages	No.	4	29	8	16	70	93	82	138
	%	4·88	21·01	9·76	11·59	85·36	67·39	100·00	99·99

* Excluding 11 women in Balaramchak and 26 in Bamanchak who have reached menopause and were not interviewed for family planning practices.
† Either or both spouses.
‡ Balaramchak.
§ Bamanchak.
¶ No. of couples.

The potential for selection, as measured by Crow's index, is determined by differential fertility and mortality (Fisher, 1930; Bajema, 1971; Spuhler, 1976). The present study shows that the potential for selection is sensitive not only to major cultural differences as shown by Spuhler (1962), but also to microcultural differences such as occur between Balaramchak and Bamanchak. It will be interesting to trace the genetic consequences of the declining fertility in the two settlements by ongoing studies.

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