J. biosoc. Sci. (1980) **12**, 227–234

A DEMOGRAPHIC STUDY OF MIRPUR: A VILLAGE IN COASTAL MIDNAPORE DISTRICT, WEST BENGAL

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Summary. Mirpur is a small village of 320 individuals in coastal Midnapore district, West Bengal, the inhabitants of which claim partial Portuguese ancestry. The demographic data collected in Mirpur are reported here. The age structure of the population suggests a growing population trend, but a constriction at the base of the pyramid indicates a recent decline of fertility. The completed family size, net reproductive index and total fertility rate are also compatible with high growth rate, but the age-specific fertility rates are lower in the younger than in the older women. The infant mortality rate is low in general, and is lower in the offspring of the younger women. The Mirpurians suffer from protein–calorie malnutrition and heavy intestinal parasitic load. The possible relationships among high fertility, malnutrition and high parasitic load are discussed.

Introduction

Mirpur is a small village near Geonkhali in Midnapore district, West Bengal.

According to oral tradition prevailing in Mirpur and to published reports (O'Malley, 1911; Campos, 1919; Basu, 1939; Ghosh, 1957; Karan, 1958), Rani Janaki of the Mahisadal Raj brought in twelve Portuguese gunmen in the mid/late 1700s to protect her estates from Maratha raiders. These gunmen were eventually given rent-free land, married local women and settled down to found the contemporary population of Mirpur, which therefore claims partial Portuguese ancestry, however much it might have been diluted by successive generations of inter-marriage with neighbouring populations.

A bio-medical study of Mirpur was started in early 1976. This report describes the demographic characteristics of the Mirpur population, and considers them in the context of its parasitic load (Bhattacharya, 1980) and nutritional level.

Material and methods

On all the 56 households in Mirpur, in early 1976, information was collected, by questionnaire, from household heads on age, sex and marital status of all members, and from married females on their reproductive performance, i.e. live births, dead children, and reproductive wastage. The data were cross-checked from several sources and on subsequent visits, wherever possible. A quantitative diet survey (3 consecutive days) was conducted on 48 households.

Results

At the time of our survey Mirpur had a total population of 320 individuals, including five adult males who were seamen and generally away from home for several months at a time, and several others who worked in Calcutta and came home at weekends. Table 1 shows that 39·1%, 47·2% and 13·8% of the population are in the 0–14, 15–49 and over-50 year age groups respectively, which suggests a potentially growing population trend. There is a constriction, however, at the base of the pyramid (Fig. 1) suggesting a recent fertility decline. The child-woman ratio

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

Age (years)	Unmarried		Married		DWS		Total		
	M	F	M	F	M	F	M	F	M + F
0–4	19	18					19	18	37
5–9	19	19					19	19	38
10–14	30	20					30	20	50
0–14	68	57					68	57	125
15–19	13	22		4			13	26	39
20–24	16	5	2	7			18	12	30
25–29	2		9	14		1	11	15	26
30–34			3	11		2	3	13	16
35–39			5	5			5	5	10
40–44	1		9	5			10	5	15
45–49	1		4	8	1	1	6	9	15
15–49	33	27	32	54	1	4	66	85	151
50–54			5	2		3	5	5	10
55–59	1		6	2		1	7	3	10
60–64	2		3		2	2	7	2	9
65–69			1	1		6	1	7	8
70+			2		3	2	5	2	7
50+	3		17	5	5	14	25	19	44
Total	104	84	49	59	6	18	159	161	320

M, male; F, female; DWS, divorced, widowed, separated.

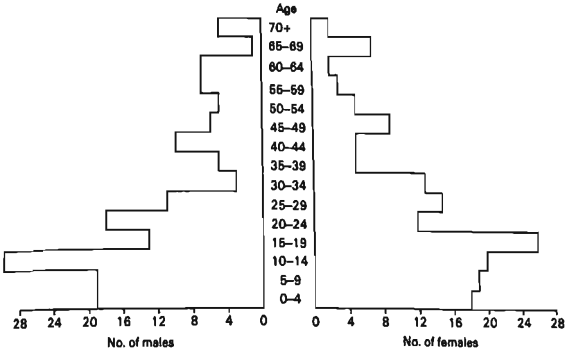

Fig. 1. Population pyramid, Mirpur. Total population, 320; male, 159; female, 161.

is 43·5, indicating moderate fertility, and the sex ratio is 49·7. The completed family size and net reproductive index of 7·31 and 3·69 respectively (Table 2), however, suggest high fertility of, at least, the older women. A comparison between younger and older women with respect to age-specific fertility rates at the 5-yearly age periods of 15–19 and 20–24 years shows that fertility has indeed declined in recent years, i.e. it is lower in women aged 25 years or below than in those aged 25+ years (Table 3).

Table 4 shows that infant mortality rate is 6·2% and adolescent mortality (mortality between 1 and 15 years) is 12·9%. Unlike fertility, infant mortality is low in Mirpur compared to that in West Bengal and in India in general, i.e. 8·1% and 11·5% respectively (Mitra, 1978). Adolescent mortality is a measure for which

Table 2. Completed family size and net reproductive index, married women aged 45+ ($n = 13$*)

	Male	Female
Live born children		
Surviving	38	41
Dead	9	7
Totals	47	48
M + F	95	
Average no. of live births/woman	7·31	
Net reproductive index	3·69	

* Includes one woman who never had any children.

Table 3. Age specific fertility rates: comparison of younger and older married women

Age group	Present age of married women		
	⩽25 years	>25 years	All ages
15–19	0·38	0·88	0·72
20–24	1·20	1·85	1·67
25–29		1·50	1·26
30–34		0·86	0·86
35–39		0·73	0·73
40–44		0·09	0·09
45+		0	0
Total ferility rate			5·33

Table 4. Number of surviving and dead children, by present age of married woman and age at death of children

Age of woman (years)	Total live births	No. of children				
			Dead, by age at death‡		Mortality rate	
		Surviving	⩽1 year	>1 year, ⩽15 years	Infant*	Adolescent†
⩽25	25	24	1	0	4·00	0
>25	300	233	19	42	6·33	14·00
All ages	325	257	20	42	6·15	12·93

* Deaths ⩽1 year and † >1 year, ⩽15 years, per 100 live births.
‡ Six children who died over the age of 15 years are not included.

comparative data are scarce, but compared to most other samples for which data are available (Basu, 1967; Ghosh, 1970; Talukdar, 1971; Talukdar, unpublished; Basu, 1972; Barua, 1976; Gupta, 1980), it is also low. The overall low values of infant and adolescent mortalities may be a recent phenomenon as a comparison between young and old mothers in these respects shows (Table 4).

These findings have important evolutionary implications, for they indicate considerably reduced opportunity for selection to occur in the Mirpur population. The index of total selection, *I* (Crow, 1958) is the lowest compared to other Indian populations for which data exist (Table 5). A second genetical demographic characteristic, the coefficient of breeding isolation (the product of effective population size by admixture rate) at 24·4 (Table 6) is also moderately low, so random drift may have had an appreciable effect on the genetic constitution of this

Table 5. Selection intensity in Mirpur and some other Indian populations

Population	Mortality component (I_m)	Fertility component (I_f)	Index of total selection (I)	Source
Mirpur	0·164	0·180	0·374	Present study
Sherpa				
High altitude	0·152	0·300	0·498	Gupta (1980)
Low altitude	0·206	0·173	0·415	
Pahira				
NP	0·815	0·175	1·133	Basu (1967)
SPI	0·529	0·137	0·788	
SPII	0·484	0·137	0·687	
Kota	0·445	0·638	1·367	Ghosh (1970)
Bagdi				
12 villages	0·266	0·393	0·763	Talukdar (1971)
9 villages	0·250	0·386	0·732	
Kota	0·79	0·83	2·25	Basu (1972)
Varendra				
Brahmin	0·182	0·378	0·629	Talukdar (unpublished)
Kayastha	0·169	0·360	0·590	
Tilli	0·199	0·316	0·578	
Jele	0·218	0·310	0·596	
Muslim				
Consanguineous			0·919	Barua (1976)
Non-consanguineous			0·737	

Table 6. Breeding size (N), effective population size (N_e), admixture rate (m), variance due to drift (σd_q^2) and coefficient of breeding isolation ($N_e m$)

N	N_e	m*	σd_q^2 ($q = 0{\cdot}5$)	$N_e m$
120	56·8	0·429	0·0022	24·4

* Calculated according to Lasker (1952).

population. For when this measure is less than 5, changes in allele frequency due to random genetic drift are likely to be marked; when it is between 5 and 50 the changes will still be appreciable, but when it is greater than 50 drift will be slight (Roberts, 1956; Lasker, 1960).

Demography and nutrition

In many tropical areas, large family size is synergistic with malnutrition, and malnutrition with several forms of morbidity, including high parasitic load

(Scrimshaw, Taylor & Gordon, 1968; Alleyne *et al.*, 1977; Haas & Harrison, 1977; Gopalan *et al.*, 1971; Gopalan & Naidu, 1972).

In view of these general relationships, and in view of the high fertility found in Mirpur, data on dietary intakes were considered to ascertain whether the population was malnourished. The dietary data show that malnutrition, as measured by dietary dificiencies, does occur in Mirpur compared to the recommended allowances of the ICMR, with respect to calorie, protein, and most vitamin and mineral intakes (Table 7). This concurrence of malnutrition and high fertility is similar to that found in a recent study in Africa (Hiernaux, 1977) conducted under the auspices of the IBP.

Table 7. Average daily consumption of various nutrients (±SD) in Mirpur

	Intake	SD	Recommended allowances*
Calories	2,106	±562	2,800
Protein (g)			
Animal	5·2	±5·9	55
Vegetable	46·1	±14·8	
Fat (g)	15·6	±11·4	
Calcium (mg)	336	±156	400–500
Iron (mg)	34·6	±12·6	20
Vitamins			
A (iu)	1,957	±2,052	3,000
B_1 (mg)	1·5	±0·5	1·4
B_2 (mg)	0·6	±0·3	1·5
Nicotinic acid (mg)	21·2	±5·6	19
C (mg)	70	±54	50

* Indian Council of Medical Research, 1968.

Hiernaux's (1977) study, however, also suggests that poor dietary intakes may be related not only to high fertility but also to high mortality. The latter relationship does not seem to occur in Mirpur, since mortality in Mirpur is lower than in West Bengal, and India as a whole. However, the fact that infant mortality is higher among offspring of older than of younger women in Mirpur, may indicate that reduction of mortality is a recent phenomenon, corresponding to a recent reduction of fertility. Alternatively, it is possible that the very small number of women available in the younger maternal age groups, and a correspondingly small number of offspring born to them, have led by chance to a distorted estimate of mortality—a possibility which cannot be ruled out in demographic studies of small populations (Howell, 1973).

Since infection is known to cause malnutrition in various ways, e.g. loss of appetite, increased urinary nitrogen loss, reduced nutrient absorption (Haas & Harrison, 1977), the high parasitic load in Mirpur—about 90% of the population

suffers from one or more intestinal parasitic infections as reported by Bhattacharya (1980)—must have lowered the nutritional level further than is indicated by the dietary intake data, with its consequent adverse effects on demographic traits.

It may be argued that malnutrition leading to higher susceptibility to infection, and infection to further malnutrition, may operate in a vicious circle, and affect the demographic parameters of fertility and mortality so as to threaten the very existence of the community. Comprehensive time series data are not available to discover whether the existence of the community has ever been so threatened, but the risk cannot be ruled out. There was actually a drastic reduction in population size in Mirpur between 1891 and 1911 from which the population took more than 20 years to recover, as even the very imcomplete data compiled from various sources show (Table 8). Our ongoing survey in Mirpur records the emigration of individuals

Table 8. Population size fluctuation in Mirpur

Year	Population	Source
1891	232	Karan, 1958
1911	129	
1921	174	Basu, 1939
1931	182	
1976	320	Present study

and families from Mirpur in search of a better fortune, as also the births and deaths that occur, but the chances of extinction of the population cannot yet be conjectured.

The assocation of demography and nutrition seen in this population still requires to be analysed at the individual level. But it appears from the gross study so far that the population may indeed be in a precarious state.

Acknowledgments

We are indebted to the authorities of the Geonkhali High School for providing us with accommodation; to the Archdeacon of Calcutta and the parish priest of the Roman Catholic Church in Mirpur for their generous help and co-operation; to the district authorities, Midnapore district, Government of West Bengal, for introducing us in Mirpur; to the Indian Statistical Institute for financial support; to Shri Subhas Datta for typing the manuscript; to Shri Pravash C. Kumar for preparing the diagram; and to the inhabitants of Mirpur for their unhesitating help and co-operation since the inception of the project.

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Received 23rd March 1979