MECHANISMS UNDERLYING THE DIFFERENCES IN FERTILITY PATTERNS OF BENGALEE WOMEN FROM THREE SOCIO-ECONOMIC GROUPS

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1. INTRODUCTION

AN enquiry entitled "The Reproductive Patterns of Bengalee Women" was undertaken during 1947–1949 under the auspices of the Indian Council of Medical Research, by Dr. C. Chandrasekaran and Dr. (Mrs.) Muktha Sen of the All-India Institute of Hygiene & Public Health, Calcutta. The objects of the enquiry were:

(1) to obtain a picture of the reproductive patterns of Bengalee women in selected urban and rural areas,
(2) to study the economic and social factors that affect the fertility of Bengalee women, and in particular the extent to which the practice of voluntary family limitation causes fertility differentials, and
(3) to examine the significance of the differences in reproductive patterns on the health and growth of the population.

The full report of the enquiry has not been published, although some of its important findings have been quoted in literature.[2]

After this study was undertaken, a large number of surveys have been conducted in different parts of India with a view to assess the levels of fertility and the attitudes of various population groups to the practice of family planning methods. Interest in these fields has grown considerably in the last few years, primarily because of the emphasis that the Planning Commission has placed on the necessity for a reduction in the rate of growth of India's population if the plans for economic and social development that are being made should succeed in

[1] From the Demographic Training and Research Centre, Bombay, India.
[2] Kingsley Davis, THE POPULATION OF INDIA AND PAKISTAN, (Princeton University Press, 1951), p. 71 and pp. 227–228.

raising the levels of living of the people. The acceptance of family planning as a national policy by the Government of India and the pursuance of a program of action to popularize family planning among various sections of the population has tended to increase the awareness of the people of the availibilty of different methods for the limitation of births. At the policy level, as yet, there is no uniformity of opinion as to the ways and means by which birth rates can be rapidly reduced. Since family planning is a state subject in India, each state is attempting to outline procedures which seem most satisfactory to it. The Madras State, for instance, has given great emphasis to the popularization of sterilization of the male and female, and has provided incentives to those who would subject themselves to the surgical operation. The example of Madras State is being followed by Kerala and the program in Bombay State also leans heavily towards the support of large-scale sterilization. In contrast to this, many other states are advocating widespread use of family planning methods which would help couples not only to limit the number of children born to them but also to space them judiciously.

While the different approaches may each have its justification, any procedure, if it is to yield enduring results, cannot fail to take into account the desires and needs of the public. While the public support or dislike of a specific program can often be gauged rapidly enough after its initiation, it would in general be prudent and more economical to develop them so as to be in consonance with future public demand. In this context, past behaviour of contrasting socio-economic groups of population may to some extent be indicative of the requirements of any particular group when it reaches the social-cum-economic scale of the other. The differences in family size between urban and rural groups with similar cultural background and the mechanism by which such differences have been brought about can to some extent reflect the types of changes in behavior which urbanization can bring about in that cultural setting. Similarly, a comparison between groups of urban

population at different levels of economic status may help to presage some of the differences in fertility patterns which may be expected with economic advancement.

Data for such demographic studies are by no means plentiful in India and most of the sample surveys that have been conducted have not been undertaken with the specific object of understanding the mechanism by which fertility differentials have been produced. The enquiry into the reproductive patterns of Bengalee women did obtain a fair amount of information which can be of value in a consideration of the problem at least in one part of India. It must, however, be recognized that this enquiry was carried out more than 12 years ago as part of public health research and with several objectives in view. After the lapse of so many years, it is not practicable to plan a complete retabulation of the information collected and as such any analysis undertaken now would need to be based largely on tabulations already made. In spite of these limitations, it has appeared to us that it would be useful to examine the data to see how differences in fertility patterns have been brought about. The results of the study are presented in this paper. The findings would appear to be particularly important, as the enquiry was undertaken before government policy in regard to family planning had been enunciated; they would reveal changes that had occurred with no organized propaganda or stimuli.

2. Data Available for Present Study

(a) Areas covered

For the enquiry on the reproductive patterns of Bengalee women, Bengalee women from four areas—three in Calcutta City viz. Ballygunje, Beniatola and Park-Circus, and the Singur Health Centre, a rural area situated about 20 miles from Calcutta—had been selected. Two women workers who were graduates of the Calcutta University were recruited for field work and were given training in survey techniques before they were sent to the field. These workers made house to house visits in

the selected areas and were asked to survey all Bengalee women between 12 and 50 years of age living in them.[3]

There were two main considerations in selecting these four areas for study. The first was that these areas would provide marked contrasts in social and economic conditions. The other was that as each of these areas was being served by a maternity and child welfare center, the staff of these centers could introduce the two field workers to women in these areas and ensure their cooperation.

In the three areas, Ballygunje, Beniatola and Singur all Bengalee women irrespective of their religion were surveyed; the non-Hindus formed a small minority. In the Park-Circus area only Muslim women were surveyed. For purposes of the present analysis, only Hindu women from Ballygunje, Beniatola and Singur were considered. The chief social and economic characteristics of the population of these three areas were as follows:

Ballygunje. This area, situated in the south of Calcutta City was bound by Lansdowne Road on the west, Rash Bihari Avenue on the south, Gariahat Road on the east and Hazra Road on the north. It was composed mainly of Hindu upper class population. Literacy among the women was almost universal as only 3 per cent of the married women were "illiterate." Thirteen per cent of the married women had gone through college education. The economic status of women from this area was the best among all the areas surveyed, as a fair proportion of the husbands were reported to have occupations relating to public administration, medicine, law and teaching.

Beniatola. This area, situated in the central part of Calcutta, was bound by College Street on the west, Harrison Road on the south, Amherst Street on the east and Keshab Sen Street on the north. The population in this area was mostly Hindu and of lower middle class. Illiteracy among the married women

[3] As the proportion of unmarried women was high in the Ballygunje area, the schedules for unmarried women below the age of 14 years were not filled in this area, after a certain number of them had been covered.

was higher in this area than in Ballygunje; 16 per cent of the women were reported as such. Few women had studied up to college level, and only about 30 per cent had secondary or high school education. The chief occupations of the husbands of the women included from this area were clerical and trade.

Singur. The Singur Health Centre area is the rural demonstration and practice field attached to the All-India Institute of Hygiene and Public Health. The population is largely Hindu. Most of the married women in this area (about 89 per cent) were illiterate. The people were largely agricultural and their economic condition was poor.

(b) INFORMATION AVAILABLE

The enquiry had obtained information on (1) social and economic characteristics such as province of origin, urbanization, literacy, occupation of the woman and of her husband; (2) marital history including present marital status, age at marriage of wife and of husband, age at cohabitation, number of times married, duration of married life; (3) detailed pregnancy history including results of pregnancy and intervals between terminations; (4) live births during 1945 and 1946, the two years preceding the enquiry; (5) attempt at family limitation and if attempted, method used; (6) extent of knowledge of contraception and (7) attitude towards family size.

For the present analysis, the following tabulations, made earlier, have in the main been used.

(a) Distribution of currently married women according to:

(1) age of the woman at the time of survey (referred to henceforth as present age) and the number of live births she had borne;

(2) present age of the woman and the number of terminations she had, and

(3) age at the termination of first, second, third, etc. pregnancies.

(b) Distribution of ever-married women of age groups 25–34 years and 35 years and over by:

(i) age at cohabitation

(ii) ages at successive terminations, viz. first and second, second and third, etc.

(c) NUMBER OF WOMEN SURVEYED

The total number of ever-married women covered in the three areas was 5,023 (Singur, 1,868, Beniatola 1,541 and Ballygunje 1,614). The distributions of these women by marital status in the three areas are given in Table 1.

TABLE 1. NUMBER OF EVER-MARRIED WOMEN SURVEYED ACCORDING TO CURRENT MARITAL STATUS.

Current Marital Status	*Ballygunje*	*Beniatola*	*Singur*
Currently Married	1461	1324	1640
Widowed	146	198	213
Separated	7	19	15
Total	1614	1541	1868

The percentage of these women who had been married for a second time was less than half a per cent (none in Ballygunje, 7 in Beniatola and 4 in Singur). Remarriages of women are not therefore likely to create difficulties in the interpretation of data.

3. QUALITY OF DATA

The accuracy with which data were obtained on the ages of the women, the number of terminations and the ages at which the terminations occurred is crucial to the present study. As the enquiry obtained a detailed pregnancy history of each woman, it is to be expected that the age data obtained in this enquiry will suffer less from inaccuracies arising from digit preference or negligent reporting, which have been a common feature in the age-data obtained in censuses and surveys. It is

also to be expected that the obtaining of such history would have improved the quality of the data on the number of terminations and the ages at which they occurred.

The fact that only two field workers were used and that the field work in the several areas was equally divided amongst them would have tended to reduce the 'interviewer bias' which would otherwise have vitiated the comparison between the areas.

Inaccuracy in the present data was assessed as follows:

Data on present age. Data on the ages of currently married women were available by single year of age. The age distributions for the three areas, Ballygunje, Beniatola and Singur are shown in Fig. 1. As explained above the age data were not likely to suffer much from inaccuracies as they were tallied with information given by pregnancy histories. Further, in Beniatola and Ballygunje most of the women interviewed were literate and could be expected to furnish correct information on age. In Singur the age data would be expected to be relatively less accurate.

As can be seen from Fig. 1, there has been in general a deficit in the reporting of ages ending in odd digits and a preference for ages ending in even digits. Since the analysis in this paper will mainly make use of the data on age in 5 year groups, the accuracy of age recording in quinquennial groups is the major interest. The following method of smoothing was used to examine this point.

If W_0, W_1, W_2 denote the recorded numbers at three consecutive ages and S_0, S_1 and S_2 are the smoothed values, S_1 is given by the formula

$$S_1 = \frac{W_2 + 2W_1 + W_0}{4} \qquad [1]$$

This formula assumes that the pattern of error in age recording is the same as that described above, viz. that alternate ages gain in numbers while there adjoining ages lose in numbers.[4]

[4] This formula was suggested by Dr. K. V. Ramachandran of the Demographic Training and Research Centre, Bombay.

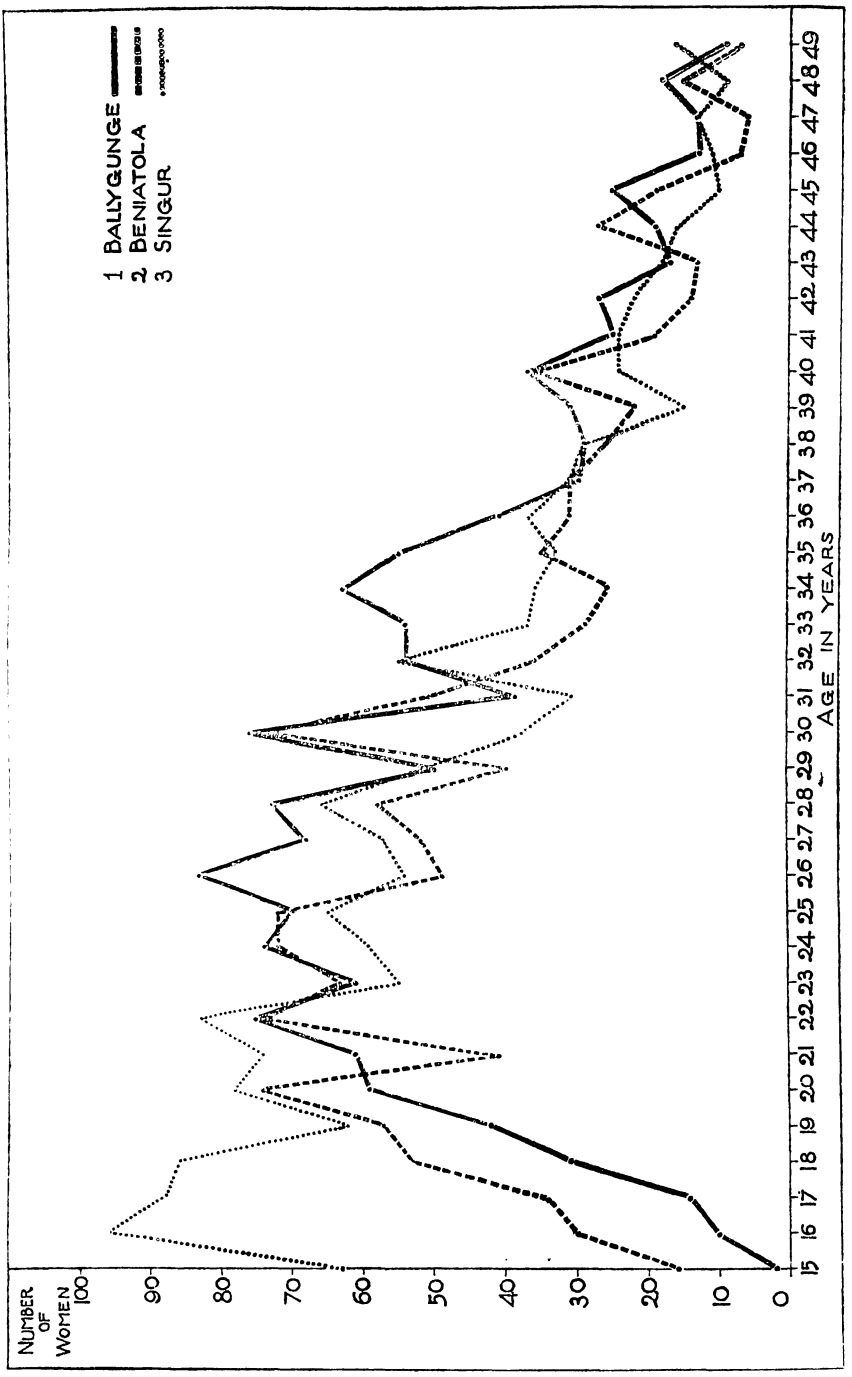


Fig. 1. Age distribution of currently married women.

Present Age of Woman (Years)	Observed Number	Expected Number	Difference Expected − Observed	Difference × 100 Expected Number
		Ballygunje		
15–19	99	102	3	2.9
20–24	330	325	−5	−1.5
25–29	344	351	7	2.0
30–34	286	277	−9	−3.2
35–39	186	189	3	1.6
40–44	125	125	—	—
45–49	78	79	1	1.3
All Ages	1,448	1,448		
		Beniatola		
15–19	190	193	3	1.6
20–24	324	321	−3	−0.9
25–29	271	279	8	2.9
30–34	215	209	−6	−2.9
35–39	145	147	2	1.4
40–44	109	104	−5	−4.8
45–49	54	55	1	1.8
All Ages	1,308	1,308		
		Singur		
15–19	395	396	1	0.3
20–24	349	347	−2	−0.6
25–29	293	290	−3	−1.0
30–34	197	201	4	2.0
35–39	145	148	3	2.0
40–44	104	102	−2	−2.0
45–49	59	58	−1	−1.7
All Ages	1,542	1,542		

Table 2. Age distribution of currently married women, observed and expected.

The estimates for single years as obtained by applying this formula were used to obtain the expected numbers in the quinquennial age groups, which are presented in Table 2. The differences between the expected and observed numbers are small. Some shifting between consecutive age groups appears to have occurred due to errors in age reporting but its magnitude is such

as not likely to affect the conclusions drawn by using the actual ages reported.

Data on number of terminations. The proportions of abortions[5] and stillbirths recorded in the enquiry shown in Table 3 indicate that the field workers could not elicit complete information on such terminations. The abortion rate of 22 per 1,000 pregnancies terminated in the Singur area is certainly on the low side, although the experience of health workers in the area does not suggest a rate higher than 40 or 50 per 1,000 pregnancies. The abortions in other areas may also have been underestimated to the same extent. In regard to the stillbirths, the rate of about 20 per 1,000 live births in all the areas suggests that probably only half the number of stillbirths were recorded.

The error in the recording of live births would be expected to be much smaller than in the case of stillbirths or abortions. Assuming that live births were completely recorded, the total number of terminations given by the survey can be estimated (assuming that fifty per cent of stillbirths and abortions only have been recorded) as about 94 per cent of the actual.[6]

Table 3. Abortion rates and still birth rates as obtained from the reproductive histories of ever-married women.

Termination	Ballygunje	Beniatola	Singur
Number of Abortions	287	252	135
Number of Stillbirths	111	93	113
Number of Live Births	4,975	4,779	5,922
Number of Pregnancies Terminated*	5,331	5,073	6,108
Number of Abortions per 1,000 Pregnancies Terminated	54	50	22
Number of Stillbirths per 1,000 Live and Stillbirths	22	19	19

* Number of pregnancies terminated do not add to the sum of the numbers of abortions, stillbirths and live births because of the occurrence of multiple births.

[5] In the survey, data on the length of gestation were obtained and abortions were defined as terminations occurring before 28 weeks of gestation.

[6] In the Mysore Population Study conducted jointly by the United Nations and the Government of India the accuracy with which live births were recorded in pregnancy histories was extremely high. The number of live births as given by such histories for women aged 18 to 33 years was 99 per cent of the "true" value.

4. Fertility Differences

Differences in the fertility patterns can be gauged by working out (1) the average number of children ever born and (2) the average number of terminations, for women in the different age groups. The relevant data for currently married women are presented in Table 4 for the three areas, Ballygunje, Beniatola and Singur.

The Table shows that fertility was highest in Singur and lowest in Ballgunje, with Beniatola occupying an intermediate position. The average number of children ever born per woman, standardized for age of woman, was 3.8 for Singur, 3.1 for Beniatola and 2.7 Ballygunje.[7] The average number of terminations also shows a similar picture. The pattern of the highest fertility in Singur and lowest in Ballygunje is observed in all quinquennial ages from 20 to 49 years. In the age group 17–19 years the difference in the average number of live births or terminations between Ballygunje and Beniatola is small, although the average for these two areas is lower than that for

Table 4. Average number of children ever born and average number of terminations per currently married women by age groups and area.

Present Age of Woman (Years)	Children Ever Born			Pregnancy Terminations		
	Ballygunje	Beniatola	Singur	Ballygunje	Beniatola	Singur
Under 15	—	0.1	—	—	0.1	—
15–16	0.5	0.4	0.2	0.5	0.4	0.2
17–19	0.6	0.6	0.8	0.6	0.7	0.9
20–24	1.4	1.6	2.1	1.5	1.8	2.2
25–29	2.5	3.2	4.0	2.6	3.5	4.0
30–34	3.8	4.3	5.5	4.1	4.5	5.7
35–39	4.5	5.3	6.4	4.9	5.6	6.5
40–44	5.4	5.6	7.5	5.6	6.0	7.7
45–49	5.7	6.6	6.9	6.2	7.0	7.2
50 and Over	6.5	11.0	8.0	6.9	12.0	7.5
All Ages	3.1	3.2	3.3	3.3	3.4	3.4
Average Standardized for Present Age[1]	2.7	3.1	3.8	2.9	3.3	4.0

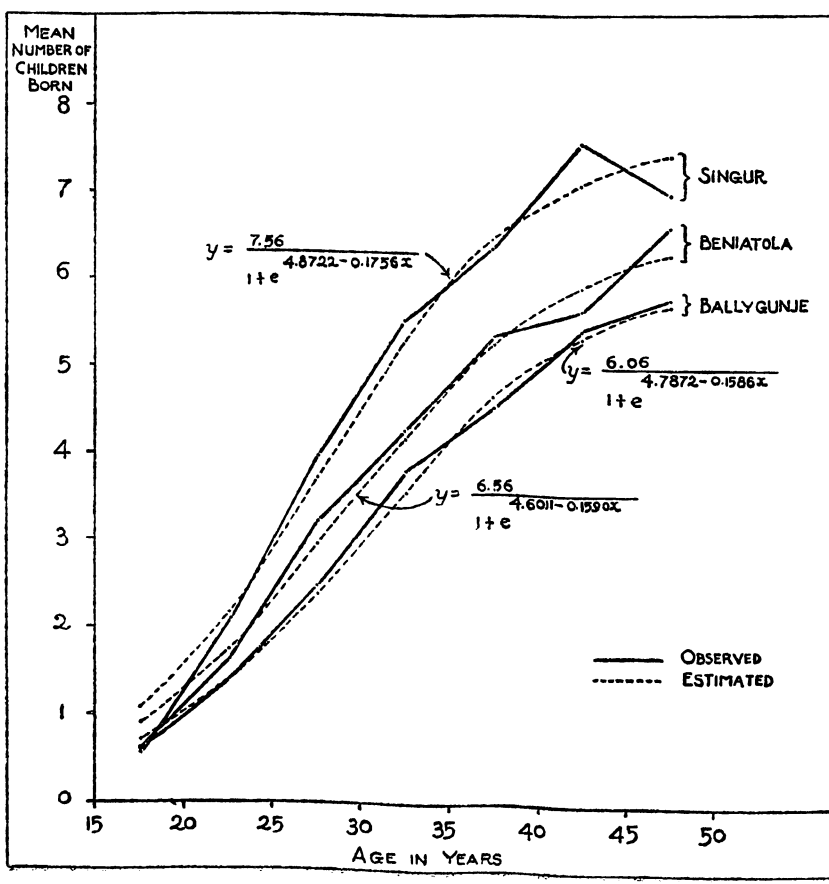
[1] The combined age distribution of currently married women in the three areas was used as the standard.

[7] The age distribution of currently married women for all the three areas combined was used as the standard.

Singur. In the age group 15–16, the average for Singur is the lowest.

For the purpose of studying the trend in fertility with increasing age of women it was found necessary to smooth the averages for the different age groups by fitting a suitable exponential curve. It was felt that the logistic curve $y = \frac{d}{1 + e^{k+lx}}$ where y is the mean number of children born for women aged x years, should give a good fit for the following reasons, viz., that in all the three areas: (i) the data for the average number of children ever born followed an $\int$ type curve; (ii) the means and the standard deviations of the number of children

Fig. 2. Mean number of children born to currently married women by age.



ever born calculated for the different age groups were positively correlated and (iii) the first differences of the reciprocals of the averages in the different quinquennial age groups were found to be changing by almost a constant percentage of the average of the two consecutive first differences.

The constants d, k and l of the curve were obtained by using the method of three points so selected that the whole range of observations was more or less covered. The geometric means of the three pairs of averages of number of children ever born viz., of the age groups 20–24 and 25–29, 30–34 and 35–39, 40–44 and 45–49 were taken as the three values of y, viz., y_1, y_2 y_3.

Then

$$d = \frac{2y_1 y_2 y_3 - y_2^2 (y_1 + y_3)}{y_1 y_3 - y_2^2} \qquad [2]$$

$$k = \log_e \frac{d - y_1}{y_1} \qquad [3]$$

and, if the origin is taken at 25 years:

$$1 = \frac{1}{10} \log_e \frac{y_1 (d - y_2)}{y_2 (d - y_1)} \qquad [4]$$

The value of d obtained from the data will give an idea of the ultimate numbers of children ever born.

The graphs of the fitted curves and the observed values are given in Fig. 2. The estimated averages for the different age groups are shown in Table 5.

Table 5. Average number of children ever-born per currently married women of different age groups obtained by fitting a logistic curve.

Present Age of Woman (Years)	Ballygunje	Beniatola	Singur
15–19	0.7	0.9	1.1
20–24	1.4	1.7	2.2
25–29	2.4	2.9	3.7
30–34	3.6	4.2	5.3
35–39	4.6	5.2	6.4
40–44	5.3	5.9	7.0
45–49	5.7	6.2	7.3

The average number of live births for women of completed fertility as estimated by the logistic curve for the three areas was found to be 7.3 for Singur, 6.2 for Beniatola and 5.7 for Ballygunje. Ballygunje had the lowest value for all age groups while Singur had the highest. The difference in the averages between Ballygunje and Beniatola was 0.3 in the age group 20–24 years and was practically at level of 0.5 for age groups 25–49 years. The difference in the averages between Singur and Beniatola was 0.5 for the age group 20–24 years; 0.8 for the age group 25–29 years and was practically 1.1 for ages 30 to 49 years.

5. Reasons for Fertility Differences

Having established the existence of fertility differentials in the three areas, it is of interest to enquire as to how these differentials have been produced. In seeking such an explanation, attention will be given to the following three factors:

(i) *average age at marriage,* as a higher age at marriage will tend to reduce the span of reproductive life;

(ii) *average interval between terminations,* as a longer interval between terminations will tend to reduce the total number of pregnancies and *vice versa,* and

(iii) *limitation of the total number of pregnancies,* as prevention of further pregnancies after a certain number of pregnancies have occurred will tend to reduce the total number of pregnancies.

(i) *Average age at marriage.* Data on the average age at which women had been married are given in Table 6 for groups

Table 6. Average age at marriage of women classified according to the duration of marriage.

Area	Duration of Marriage (Years)				
	0–4	5–9	10–14	15–19	20 and Over
Ballygunje	19.3	18.7	16.6	15.6	13.3
Beniatola	16.8	16.1	14.4	12.9	11.5
Singur	13.7	12.6	12.0	11.0	10.3

of women classified according to the duration of marriage. A progressive increase in the age at marriage had occurred in the 20 years prior to the survey in all the three areas surveyed—Singur, Beniatola and Ballygunje. In Singur the average age at marriage was 10.3 years for those married 20 years or over prior to the survey and 13.7 years for those married within five years prior to the survey. The comparative figures were 11.5 and 16.8 years for Beniatola and 13.3 and 19.3 years for Ballygunje. There are limitations in using the data as in Table 7 to study trends in the average age at marriage arising primarily from the fact that the averages are based on the data of the survivors of those married at different durations prior to the survey and would not therefore represent the actual situation that existed at different durations. Such limitations are likely to be of less importance in using the data to compare the trends in the three areas.

The trend in the age at marriage has been such as to increase the differentials in fertility. While 20 or more years ago, a high proportion of women in all the three areas married before they attained the reproductive age, few did so in Beniatola and Ballygunje in the years more recent to the survey. In Singur a high proportion still continued to do so. The full implications of the effect of the differences in the age at marriage as a con-

Table 7. Average age at termination for ever married women aged 25-34 years and 35 years and over, by order of termination.

Order of Termination	Women Aged 25–34 Years*			Women Aged 35 Years and Over		
	Ballygunje	Beniatola	Singur	Ballygunje	Beniatola	Singur
First	19.5	18.0	16.6	17.8	17.2	16.5
Second	21.6	20.2	19.2	20.3	20.1	19.5
Third	23.0	22.2	21.6	22.8	22.7	22.2
Fourth	24.3	23.8	23.7	25.0	25.2	25.0
Fifth	25.6	25.2	25.3	27.0	27.3	27.6
Sixth				28.9	29.1	29.5
Seventh				30.6	30.7	30.9
Eighth				31.9	32.3	32.6
Ninth				33.1	33.5	34.0

* In view of the restricted age-range, it has not been considered advisable to give averages for terminations higher than the fifth order.

tributory factor of the differences in fertility observed in the three areas cannot be gauged without taking into account important cultural considerations. In India, even if marriages are performed at an early age, the consummation of marriage is often delayed until the girl attains puberty. In addition, it is not infrequent for young couples to live separately for fairly long periods in the first years after marriage, especially if they are married young.

The average age at consummation of marriage was 12.6, 14.7 and 16.9 years respectively for all the women surveyed in Singur, Beniatola and Ballygunje and points to the possibility of fertility differentials arising from this cause. The average age at the termination of the first pregnancy also brought out the effect which age at marriage or more rightly the age at consummation of marriage had introduced. This average when calculated for ever-married women aged 35 years and over was found to be 16.5 years in Singur, 17.2 years for Beniatola and 17.8 years for Ballygunje. The maximum difference in the average age at termination of first pregnancy was between Singur and Ballygunje and was 1.3 years for this age group. It is apparent that the difference in the average age at marriage does not produce as much effect on the reproductive span as may at first be suspected. By the time the women have their first termination, the significance of the difference is considerably reduced. Data on the average age at termination for different orders of termination for ever-married women aged 35 years and over given in Table 7 show that by the third or fourth termination, the average practically became the same in all the three areas.

Similar data for ever-married women aged 25–34 years also given in Table 8 show the same pattern of a narrowing in the differences between the average ages at different terminations in the three areas, as the order of termination increased. For women in this age group the average age at first termination was about the same as that for ever-married women aged 35 years and over in the Singur area but were higher by 0.8 years

and 1.7 years in Beniatola and Ballygunje respectively. As such among the three areas there were larger differences in the average age at first termination among ever-married women aged 25–34 years than among ever married women age 35 years and over. For this reason, it was only by the fifth order of termination that the average age at termination became practically the same in the three areas.

(ii) *Average interval between terminations.* Table 8 gives the average interval between successive terminations for Singur, Beniatola and Ballygunje for the two cohorts of ever-married women, viz., (a) those aged 35 years and over, and (b) those aged 25–34 years at the time of survey. The average interval between successive terminations, viz. first and second, second and third, etc. was worked out by ascertaining the interval for each woman and then averaging the values of these intervals. In working out the average interval between the first and second terminations, only women who had recorded at least a second termination were considered. Similarly in working out the interval between the second and third termination women who had recorded at least three terminations were taken and so

Table 8. Average interval (in years) between successive terminations for ever-married women aged 25–34 years and 35 years and over.*

Intervals Considered	Women Aged 25–34 Years**			Women Aged 35 Years and Over		
	Ballygunje	Beniatola	Singur	Ballygunje	Beniatola	Singur
First Cohabitation and 1st Termination	2.3	3.6	5.2	3.4	4.9	5.5
1st and 2nd Termination	2.6	2.7	2.7	2.8	3.0	3.1
2nd and 3rd Termination	2.5	2.5	2.8	3.0	2.8	3.0
3rd and 4th Termination	2.4	2.4	2.7	2.9	2.9	2.9
4th and 5th Termination	2.2	2.4	2.5	2.8	2.7	2.9
5th and 6th Termination				2.7	2.6	2.7
6th and 7th Termination				2.8	2.4	2.6
7th and 8th Termination				2.5	2.4	2.6
8th and 9th Termination				2.4	2.3	2.7
9th and 10th Termination				2.4	2.1	2.4

* These intervals are based on the histories of women who had both the terminations to which the average interval refers. For instance, women who had at least two terminations were considered in working out the interval between the first and the second, and so on. As such, the average intervals given by this table may be different from those which may be derived from the data given in Table 7 where no such restriction was made.

** In view of the restricted age-range, it has not been considered advisable to give intervals for terminations higher than the fifth order.

on. The average interval between first cohabitation and the first termination is also given in Table 8.

For the cohort aged 35 years and over, the interval between successive terminations, viz., between first and second, second and third, etc. is of similar magnitude and remains practically the same even for higher order terminations in all the three areas. It is only in the case of the interval between cohabitation and first termination that a marked difference can be seen. The interval was 3.4 years in Ballygunje, 4.9 years in Beniatola and 5.5 years in Singur. The difference is in keeping with the previous finding that the average age at termination differs much less among the three areas than the average age at marriage or at cohabitation.

For the cohort aged 25–34 years, the interval between cohabitation and first termination reveals the same feature as was observed among the cohort aged 35 years and over, being highest in Singur and least in Ballygunje. The intervals between successive terminations were practically of the same order in the three areas. There were minor differences and in general the values of the intervals were least in Ballygunje and highest in Singur.

The apparent inconsistency in the conclusions reached above from the data given in Tables 7 and 8 has to be investigated further. It was pointed out on the basis of the data given in Table 7 that the bulk of the difference in the reproductive span introduced by the difference in the ages at cohabitation in Singur, Beniatola and Ballygunje was made up by the time women from those areas had their first termination. Still there was a difference in the average ages at first termination of about 1.3 years between ever-married women aged 35 years and over in Ballygunje and Singur, that of Ballygunje being higher. By the time the third or fourth termination occurred even this difference was fully made up. How is this conclusion to be reconciled with that reached from Table 8, viz. that the spacing between terminations was practically of the same order in the three areas?

The data on spacing given in Table 8 deal with all women who furnished information on two successive terminations. For instance, the spacing given between the first and second terminations is an average of the different values calculated for all women with first and second terminations irrespective of whether they had only two terminations or continued to have three, four or even more. It is this average spacing which is reckoned to be of similar magnitude in the three areas. The figures in Table 7, on the other hand, relate to the average ages at the first, second, etc. terminations of women, irrespective of whether or not they have subsequent terminations. Since according to these figures, for ever-married women aged 35 years and over, the average age at third or fourth termination was practically the same in the three areas, the obvious conclusion is that women who continued to have more terminations had probably smaller spacing in Ballygunje or Beniatola than in Singur while those who stopped with fewer terminations had probably a larger spacing. A similar reasoning will also indicate that the spacing of births among women aged 25–34 years who continued to have at least six terminations was probably narrower in Ballygunje than in Singur.

As the data on spacing were not tabulated separately for women with a maximum of two, three, etc. terminations, it has

Table 9. Average ages at termination for ever-married women aged 35 years and over by order of termination: (a) when it was the highest recorded, (b) when it had been followed by another, and (c) the difference between these ages.

Order of Termination	(a) When the Order of Termination Was the Highest Recorded			(b) When the Order of Termination Had Been Followed by Another			(c) Difference Between the Ages Recorded in (a) and (b)		
	Ballygunje	Beniatola	Singur	Ballygunje	Beniatola	Singur	Ballygunje	Beniatola	Singur
First	21.0	18.8	17.6	17.5	17.1	16.4	3.5	1.7	1.2
Second	24.7	22.2	22.8	19.8	19.9	19.3	4.9	2.3	3.5
Third	26.1	26.2	25.8	22.2	22.3	22.1	3.9	3.9	3.7
Fourth	29.5	28.7	28.7	24.2	24.6	24.7	5.3	4.1	4.0
Fifth	30.7	30.9	32.0	26.2	26.5	26.8	4.5	4.4	5.2
Sixth	32.3	32.6	34.0	27.8	28.2	28.3	4.5	4.4	5.7
Seventh	33.7	33.7	34.4	29.4	29.9	30.0	4.3	3.8	4.4
Eighth	34.5	34.9	35.6	30.7	31.2	31.2	3.8	3.7	4.4
Ninth	36.7	36.1	36.4	32.0	32.4	32.7	4.7	3.7	3.7

not been possible to check these conclusions more directly. Some further evidence of the difference in the ages at termination between women who ceased to have further pregnancies and women who continued to do so is provided by the data in Table 9. A higher average age at termination for women who did not record further pregnancies as compared with that for

Table 10. Percentage distribution of currently married women of specified age group according to number of terminations.

Number of Terminations	Present Age of Woman							
	Under 15	15–19	20–24	25–29	30–34	35–39	40–44	45 and Over
(a) BALLYGUNJE								
Zero or More	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One or More	—	48.5	79.4	88.7	93.0	93.6	94.4	96.6
Two or More	—	10.1	40.3	69.5	84.6	87.1	90.4	90.9
Three or More	—	2.0	18.5	47.7	66.8	78.5	83.2	83.0
Four or More	—	—	7.3	30.8	50.0	63.4	71.2	78.4
Five or More	—	—	2.7	15.7	38.1	51.6	61.6	68.2
Six or More	—	—	1.2	7.6	29.0	40.9	52.0	56.8
Seven or More	—	—	0.3	3.2	21.3	29.0	36.8	53.4
Number of Women on Which Percentages Are Based	3	99	330	344	286	186	125	88
(b) BENIATOLA								
Zero or More	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One or More	6.7	47.4	80.9	95.2	95.8	90.3	91.7	96.4
Two or More	—	12.1	54.3	80.8	89.8	89.0	84.4	94.5
Three or More	—	—	25.6	64.9	80.0	82.1	80.7	90.9
Four or More	—	—	9.9	46.5	66.5	77.2	72.5	81.8
Five or More	—	—	4.0	26.2	51.1	64.8	62.4	76.4
Six or More	—	—	1.5	17.7	32.6	50.3	52.3	63.6
Seven or More	—	—	0.3	9.6	20.9	37.9	45.0	50.9
Number of Women on Which Percentages Are Based	15	190	324	271	215	145	109	55
(c) SINGUR								
Zero or More	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One or More	1.0	44.3	91.7	97.6	96.9	97.9	96.2	93.4
Two or More	—	11.9	69.3	92.8	93.9	95.2	95.2	91.8
Three or More	—	2.0	39.3	82.3	91.3	89.7	93.3	90.2
Four or More	—	1.0	14.3	67.9	85.2	89.7	90.5	85.3
Five or More	—	—	2.9	36.2	71.9	82.1	86.7	77.1
Six or More	—	—	0.9	19.8	54.6	70.3	79.1	68.9
Seven or More	—	—	—	6.1	36.2	52.0	66.7	59.0
Number of Women on Which Percentages Are Based	96	395	349	293	197	145	104	61

women who did so, was recorded for all orders of termination in all the three areas studied. The differences between the two average ages were more marked in Ballygunje than in Singur, for the earlier orders of termination. Those for Beniatola were more similar to the ones for Singur than to those for Ballygunje.

In the light of the above discussion, the relative proportions of women in Ballygunje, Beniatola and Singur who cease to have further pregnancies after they have had a certain number of them assume importance in contrasting the fertility differentials among the three areas. This aspect of the problem will now be considered.

(iii) *Limitation of the number of pregnancies.* The distribution of women according to the number of terminations is provided in Table 10 for currently married women of the different age groups. The higher order terminations were fewest in Ballygunje and highest in Singur with Beniatola occupying an intermediate position. The following figures of the percentage of women with six or more terminations in the different age groups among those aged 25 years and over abstracted from Table 10 are illustrative of such differences.

Percentage of currently married women with six or more terminations in the different age groups among those aged 25 years and over.

Area	Age				
	25–29	30–34	35–39	40–44	45 and Over
Ballygunje	7.6	29.0	40.9	52.0	56.8
Beniatola	17.7	32.6	50.3	52.3	63.6
Singur	19.8	54.6	70.3	79.1	68.9

In the light of the discussion on spacing made above, the lower percentage of women with higher parities in Ballygunje and Beniatola as compared with Singur would be indicative of a limitation of pregnancies after a certain age by which time the required number of pregnancies have either occurred or been exceeded. The data on the average age at last termina-

Present Age of Woman (Years)	Ballygunje	Beniatola	Singur
15–19	17.5	17.2	16.7
20–24	20.6	20.6	20.4
25–29	24.2	24.2	25.1
30–34	27.6	27.5	28.4
35–39	30.0	30.8	32.6
40–44	32.7	33.1	35.4

Table 11. Average age at last termination for currently married women of different age groups.

tion for currently married women of different age groups given in Table 11 for Ballygunje, Beniatola and Singur show a lower average age for Ballygunje and Beniatola as compared with Singur for women in the age groups 25 years and over. This difference is more marked in the higher age groups. For the age group 40–44 years, the average age at last termination was 32.7 years for Ballygunje, 33.1 years for Beniatola and 35.4 years for Singur. A slightly higher average for Beniatola as compared with Ballygunje can also be noticed.

Data on the average interval between last termination and present age are given in Table 12 and bring out more directly the evidence of an attempt to prevent pregnancies after a certain age. For women aged 25 years and over the average interval was highest in Ballygunje and lowest in Singur. The difference was more marked as women reached higher ages. For women in the age group 35–44 years the average interval between the last termination and the present age was 8.0 years

Table 12. Average interval (in years) between last termination and present age for currently married women of different age groups.

Present Age of Woman (Years)	Ballygunje	Beniatola	Singur
15–19	0.5	0.6	0.9
20–24	1.5	1.6	1.5
25–29	2.7	2.7	1.9
30–34	4.5	4.4	2.5
35–39	6.8	6.1	4.1
40–44	9.1	6.7	6.6

Parity Progression	Ballygunje	Beniatola	Singur
1 to 2 Parity	88.1	91.6	96.6
2 to 3 Parity	81.0	88.3	94.8
3 to 4 Parity	77.1	83.4	90.4
4 to 5 Parity	75.2	76.2	78.5
5 to 6 Parity	75.5	73.4	77.7
6 to 7 Parity	72.3	71.6	68.5
7 to 8 Parity	64.2	68.3	70.9
8 to 9 Parity	66.9	65.2	65.3

Table 13. Parity progression ratios for currently married women aged 25–49 years.

in Ballygunje 6.4 years in Beniatola and 5.5 years in Singur.

In passing, it may also be noticed that the average interval between last termination and present age increased in length with advancing age in all the three areas including Singur. This finding coupled with the earlier observation based on Table 9 that the interval between successive terminations remained practically the same for all orders of termination would imply that in all the three areas there was a tendency for higher order terminations to become more infrequent.

An attempt to prevent higher order pregnancies can also be studied by calculating the parity progression ratios[8] which indicate the extent to which women have progressed from one parity to the next. This ratio for a parity n (say) is obtained by calculating the proportion of women with n terminations who had become pregnant for the $n+1^{st}$ time. Such ratios based on the data of terminations available in the present study are given in Table 13 for currently married women aged 25–49 years. Significant differences are found in the parity progression ratios in the three areas in the case of earlier parities. The differences are marked in the parity progression ratios between the first and second parities, second and third parities and third and fourth parities which have the lowest values for Ballygunje and the highest in Singur. In the case of the ratio

[8] Wilson H. Grabill, Clyde V. Kiser & Pascal K. Whelpton: The Fertility of American Women (New York: John Wiley & Sons, Inc., 1958), pp. 165, 214 and 350. [Note: Grabill *et al.* used the term 'parity progression ratio' with reference to live births only. We have used the expression in considering all terminations.]

between the 5th and 6th parity, the value is highest in Singur but the difference between Beniatola and Ballygunje does not follow the pattern of earlier terminations. After the sixth parity no consistent differences are found among the three areas.

Such a pattern of parity progression ratios suggests that sizable proportions of women of Ballygunje and Beniatola attempted family limitation starting even from the first parity. As the ratios in Ballygunje are lower than in Beniatola, the proportion of couples attempting family limitation should have been either higher in Ballygunje than in Beniatola or the methods used in Ballygunje should have been more effective. It is not possible at this stage to state whether or not family planning methods were practiced in the Singur area. However, it may be presumed that even if they had been practiced, the practice was not of a magnitude to affect the parity progression ratios to the extent they had been in the Ballygunje and Beniatola areas.

It was observed above that the parity progression ratios were similar in magnitude in Ballygunje, Beniatola and Singur for the higher order parities. This similarity may presumably be due to the higher parities occurring among women who do not use family planning methods in all the three areas. In such circumstances, barring the occurrence of natural or induced sterility, the rate of reproduction would be expected to be the same in the three areas.

6. Practice of Family Limitation Methods

During the enquiry, currently married women were asked whether they had made any attempts at limiting the size of family. Women who had not reported any attempt at family limitation were asked further questions to enable their being classified into two groups, 'desired but did not' and 'did not desire.' For those who had attempted, the method used was asked and coded into the following categories: continence, safe period, coitus interruptus, husband uses, wife uses, induced abortion and others. It is true that the categories "hus-

band uses" and "wife uses" do not give an exact idea of the particular method used, but such broad categories were used because at the time the survey was undertaken, it was doubtful whether the public would be willing to discuss these matters in greater detail. However, it may be assumed that the code "husband uses" stood for condom, while "wife uses" would have denoted one of several methods such as diaphragm and jelly, foam tablets, sponge or douche. Continence as used here may be assumed not to refer to total abstinence but only to infrequent coitus. Safe-period implied regulated abstinence during a menstrual cycle but not necessarily the use of the scientific method.

In Singur only 4 out of 1,455 currently married women or 0.3 per cent reported to have attempted family limitation. In Ballygunje 551 out of 1,453 or 37.9 per cent of currently married women reported to have so attempted while in Beniatola 167 out of 1,264 or 13.2 per cent of currently married women reported to have made such an attempt. There were a few women in all the three areas who desired but did not attempt family limitation. Such women formed 1.7 per cent of those currently married in Ballygunje, 7.0 per cent in Beniatola and 4.1 per cent in Singur.[9]

Table 14. Distribution of women according to family-planning methods used, by area.

Methods	Ballygunje	Beniatola	Singur
Continence	130	56	4
Safe Period	237	17	—
Coitus Interruptus	235	32	—
Husband Uses	251	100	—
Wife Uses	37	7	—
Induced Abortion	—	—	—
Others	13	3	—
No Information	7	3	—
Total*	551	167	4

* Since some women have used more than one method, the total numbers of women given in the columns for Ballygunje and Beniatola do not tally with the totals obtained by adding the numbers for specific methods.

[9] In the calculation of these percentages, women for whom information on attempt or desire to attempt family limitation was not available were excluded. The number of such women was 8 in Ballygunje, 60 in Beniatola and 185 in Singur.

Present Age of Woman	Terminations						
	Zero	One	Two	Three	Four	Five and Over	All Terminations
(a) Ballygunje							
	Per cent who used a method						
15–19	23.5	18.4	12.5	—	—	—	20.2
20–24	26.5	45.0	31.9	24.3	46.7	22.2	35.5
25–29	35.9	53.0	37.3	46.6	38.5	20.4	39.2
30–34	20.0	29.2	54.9	45.8	44.1	19.3	33.9
35–39	8.3	33.3	50.0	46.4	31.8	20.9	28.5
40–44	—	20.0	44.4	33.3	8.3	15.6	18.4
15–44	24.9	40.9	39.8	40.4	37.0	19.1	32.5
	Number of currently married women in the sample						
15–19	51	38	8	2	—	—	99
20–24	68	129	72	37	15	9	330
25–29	39	66	75	58	52	54	344
30–34	20	24	51	48	34	109	286
35–39	12	12	16	28	22	96	186
40–44	7	5	9	15	12	77	125
15–44	197	274	231	188	135	345	1370
(b) Beniatola							
	Per cent who used a method						
15–19	5.0	6.0	4.4	—	—	—	5.3
20–24	8.1	11.6	14.0	17.7	5.3	23.1	12.7
25–29	—	20.5	14.0	2.0	9.1	15.5	11.4
30–34	11.1	7.7	14.3	17.2	12.1	10.0	11.6
35–39	—	—	—	14.3	—	11.7	8.3
40–44	—	—	—	—	—	7.4	4.6
15–44	5.3	10.7	11.9	11.0	7.4	11.5	9.9
	Number of currently married women in the sample						
15–19	100	67	23	—	—	—	190
20–24	62	86	93	51	19	13	324
25–29	13	39	43	50	55	71	271
30–34	9	13	21	29	33	110	215
35–39	14	2	10	7	18	94	145
40–44	9	8	4	9	11	68	109
15–44	207	215	194	146	136	356	1254

Table 15. Percentage of currently married women of specified age group and termination, who had used family planning methods other than continence and safe period.

The distributions of women in Ballygunje, Beniatola and Singur according to the methods used are given in Table 14. In Ballygunje, condom, coitus interruptus and safe period were equally popular and had been used either singly or in combination by about 50 per cent of the couples who had practiced family limitation. In Beniatola condom was the most popular method and had been used in the case of two-thirds of the couples who had attempted family limitation.

The data presented in Table 15 on the percentage of currently married women who had reported use of family planning methods other than continence and safe period show that in Ballygunje the use of such methods was not only more frequent than in Beniatola but that such usage started earlier both in terms of the age of the women and the number of terminations that had occurred. It may also be seen from these data that in Ballygunje, the practice of such methods was adopted by a fair percentage of couples even before the wife was 20 years of age or before she had even one termination.

The available data cannot indicate definitely whether the practice of family limitation in Ballygunje and Beniatola has been of long standing, but there is evidence that even among the older women of the current generation such attempt was not infrequent. The practice of family limitation was apparently becoming more widespread.

It is interesting to compare the average number of terminations among those who had attempted family limitation with those who had desired to do so but did not. The averages standardized for age of women are presented in Table 16. Women who had attempted family limitation had an average of 2.5 terminations in Ballygunje and 3.5 in Beniatola while those who desired but did not attempt family limitation had an average of 3.7 and 4.9 respectively in these two areas.

The lower averages for those who had attempted family limitation as compared with the averages for those who had desired but did not, may be taken as evidence of the effectiveness of the methods used in reducing the number of pregnancies.

The lower average for the number of terminations in Ballygunje as compared with Beniatola among women who had reported use of family limitation may be ascribed to earlier or more effective use in Ballygunje. It is also interesting to note that the average number of terminations for Beniatola was higher than for Ballygunje among those who desired but did not attempt family limitation. One reason for this difference in the average was that the proportion of women aged 35 years and over in this group was significantly lower in Ballygunje than in Beniatola. Such a difference in the age distributions of women in Ballygunje and Beniatola who desired but did not attempt

Table 16. Average number of terminations per currently married woman by age groups and family limitation.

Age Group (Years)	Attempted		Desired But Did Not		Not Desired	
	Ballygunje	Beniatola	Ballygunje	Beniatola	Ballygunje	Beniatola
	Average number of terminations					
Below 15	—	1.0	—	—	—	—
15–19	0.5	0.8	—	1.4	0.6	0.6
20–24	1.4	2.0	2.3	3.0	1.6	1.7
25–29	2.3	3.6	3.8	4.6	2.9	3.3
30–34	3.4	4.1	7.8	6.5	4.3	4.3
35–39	4.2	6.4	11.0	7.6	5.2	5.3
40–44	5.0	7.4	—	9.0	5.9	5.7
45 and Over	4.5	6.0	—	11.0	6.6	7.0
All Ages	2.7	3.5	5.0	5.2	3.6	3.3
Averages* Standardized	2.5	3.5	3.7	4.9	3.0	3.2
	Number of women in the sample**					
Below 15	—	1	—	—	3	5
15–19	24	11	2	7	70	154
20–24	140	47	3	15	193	247
25–29	162	46	8	28	171	189
30–34	118	37	11	22	157	153
35–39	62	17	1	14	117	111
40–44	31	7	—	1	91	99
45 and Over	14	1	—	1	75	51
All Ages	551	167	25	88	877	1009

* The combined age distribution of the three areas, Ballygunje, Beniatola and Singur was taken as the standard.

** For 8 women in Ballygunje and 60 women in Beniatola information on the attempt at family limitation was not available.

family limitation would indicate that most of the women of Ballygunje belonging to this group at the time of the survey would probably begin attempting family limitation before they get much older.

It is also interesting to compare the averages given in Table 16 for women who had not desired family limitation with those for women who had desired but did not attempt it. The average standardized for age was 3.0 for Ballygunje and 3.2 for Beniatola for women who had not desired as compared with 3.7 and 4.9 respectively for women in these two areas who had desired but did not attempt family limitation. The lower averages for those who did not desire family limitation as compared with the averages for those who desired but did not would suggest that the desire for family limitation tended to increase with increase in the rate of reproduction.

7. Summary of Findings

The above analysis has shown that marked differentials in fertility were present among the Hindu Bengalee women living in the three areas, Ballygunje, Beniatola and Singur in 1947–49 and had existed among them for at least two decades. Currently married women aged 45–49 years were estimated to have borne 5.7 children in Ballygunje, 6.2 in Beniatola and 7.3 in Singur. The average number of children born was the highest in Singur and lowest in Ballygunje in all age groups for currently married women from age 17 onwards. Such differences may be reckoned against the socio-economic background of the population of the three areas. While Singur is rural, Beniatola and Ballygunje are parts of Calcutta City, the Ballygunje population enjoying a higher social and economic status than that in Beniatola.

The role of three factors, viz., the average age at marriage of women, the average interval between terminations and the limitation of the total number of pregnancies were studied with a view to understanding the mechanism by which fertility differences had resulted among women in the three areas. The

average age at marriage was highest in Ballygunje and lowest in Singur, but the differences were not found to have much influence on the total number of children. In fact, the bulk of the difference in the reproductive span introduced by differences in the average age at marriage had disappeared by the time women in the three areas had their first termination and this was more true for the older cohort of women among whom the difference in the age at marriage was not great. The average interval between successive terminations was of the same magnitude in the three areas and did not differ significantly as between earlier and later parities showing that those who continued to bear further children did so with about the same spacing in all the three areas. The major difference in regard to the fertility pattern in the three areas was due to the limitation of pregnancies. The higher order parities were definitely fewer in Ballygunje then in Beniatola and were most frequent among women in Singur. The parity progression ratios gave definite evidence that a smaller proportion of women in Ballygunje and Beniatola as compared with those in Singur went on to have another pregnancy after they had a certain number of them and that such a tendency was evident even after the women had only one termination.

The limitation of pregnancies in Ballygunje and Beniatola had been achieved by use of contraception, condom and coitus interruptus being the most favored methods. The practice of abstinence and safe period, which did not necessarily conform to the scientific method, was also reported in a fair proportion of cases from Ballygunje. The use of family planning methods began early enough in Ballygunje as reckoned both by the age of women or the number of terminations; 24 per cent of women with not even one termination at the time of the survey having reported the used of methods other than abstinence or safe period. The proportion of women who had used methods other than abstinence and safe-period any time prior to the survey attained was 53 per cent for those aged 25–29 years and with one termination, and 55 per cent for women aged 30–34

years and with two terminations at the time of survey. In contrast, the use of methods of family limitation was virtually absent in the rural area. Although no direct evidence was obtained in the study, the role of sterilization as a factor in limiting the pregnancies can be considered of no importance.

The mechanism of fertility decline as has been demonstrated in Ballygunje and Beniatola is reminiscent of what happened in many western countries towards the end of the nineteenth and the beginning of the present century. By the use of relatively simple methods of contraception married couples in these areas had succeeded in reducing the number of children born to them to a substantial extent. The evidence is clear that in Indian settings too, the complex economic and social forces of highly urbanized life has led to changes in reproductive behaviour similar to those observed in western countries. More significant is the fact that the major means used for limitation of births were either non-appliance methods or the use of an appliance which could be readily procured without assistance from clinics or physicians. Such a pattern of behavior, at a time when family planning had not become a national campaign, may well have lessons for shaping our policy in this field.

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