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Fertility Differentials in Andhra Pradesh-1961

FERTILITY studies conducted in India and in other countries have shown that differentials do exist in the fertility performance of women belonging to different groups. These differentials are traced to various social, economic and cultural factors prevailing in the communities, such as literacy, income level or standard of living, occupation, age at marriage, preference for sons, mortality conditions and attitude towards family planning etc. In this regard, many studies have been undertaken in the country. So far, no in-depth study regarding the variations in fertility performance for the districts of Andhra Pradesh has been carried out. This paper makes such an attempt to analyse the differentials at the district level for this State.

The objectives of the study are as under : (1) to study the fertility differentials at district level; and (2) to throw some light on the relationship between fertility and socio-economic factors.

Data and Methodology

The data used in this study are drawn mainly from the 1961 census, the N.S.S., the Sample Registration Scheme fertility survey (1971-72) and Shad Nagar Standard Fertility Survey (1972). Main limitations of the data are the non-availability of district-wise age breakups of the population for the 1971 census. Also the adjusted population tables at district level are not available for 1961

and 1971 censuses. Therefore, an attempt has been made to compute the rates of fertility differentials at district level for 1961. Data on religion-wise decadal growth rate for 1961 census are also not available.

Fertility indices at district level for 20 districts of Andhra Pradesh have been computed for 1961. These rates have been calculated for the districts of Andhra Pradesh from the adjusted State level (smoothed) data of 1961 census on the assumption that the difference between the adjusted non-adjusted data for the districts is the same for each district. For the computation of C.B.R. and G.R.R., Rele's methods have been used. While computing these rates, the *eg* was taken 40 years as same value of *eg* was estimated for the State for 1961. The method of multiple regression analysis was applied for finding out the interrelations between fertility and some of the socio-economic factors.

The population of Andhra Pradesh was 36.0 million in 1961 and 43.5 million in 1971 censuses. It has an area of 274,676 sq. kms, forming nearly 8.4 per cent of the total land of the country with 8% of the country's population. The decennial population growth rate for 1951-61 and 1961-71 were 15.65 and 20.9 respectively, which are lower than the corresponding figures for the country as a whole. It comprised 20 districts in 1961 which are spread over in three broad regions viz., Andhra (Srikakulam, Visakapatnam, East Godavari, West Godavari, Krishna, Guntur, and Nellore districts). Rayal Seema (Chittoor, Ananthapur, Cuddapah, and Kurnool), and Telengana (Mahabub Nagar, Hyderabad, Medak, Nizamabad, Adilabad, Karim Nagar, Warangal, Kammam, and Nalgonda).

Fertility Levels

The fertility levels in Andhra Pradesh as measured through different indices viz. C.B.R., GFR, TFR and Age Specific Fertility rates were generally higher in 1961 as compared to 1971. The values of ASFR among the age groups (30-49) have, however, been lower in 1961 as compared to 1971 (rural). The decadal changes in ASFR might be due to the changes in the marriage patterns, postponement of births and effect of contraceptives.

It is observed from the Table 2 that all the fertility indices are lowest for Andhra Region when compared with the remaining two regions. Fertility levels have been found to be higher for the Telangana Region as compared with the

TABLE 1—FERTILITY LEVELS IN ANDHRA PRADESH

Year	Crude Birth Rate	G.F.R.	G.R.R.	T.F.R.	Age Specific Fertility Rates						
					15-19	20-24	25-29	30-34	35-39	40-44	45-49
1961 ²	40.12	N. A.	2.58	5.311	206.9	256.8	261.3	154.8	86.2	32.4	7.7
1970 ³ (Rural)	N.A.	155.9	2.46	4.98	154.9 147.8	251.3	230.9	178.7	112.7	49.2	17.8
1971 ³ (Rural)	35.6	150.9	2.36	4.37		283.0	212.0	160.6	105.1	37.0	8.7
1971 ³ (Urban)	31.3	126.6	1.80	3.84	74.6	204.1	231.0	135.3	105.1	18.2	—

SOURCE : 1. NSS Report No. 89.

2. Computed through Rele's method.

3. SRS Bulletin Vol. IX, No. 3 based on Fertility Survey 1971-72.

NOTE : N. A. = Not Available.

TABLE 2— FERTILITY LEVELS OF ANDHRA PRADESH BY REGION (RURAL)— 1971 (ESTIMATED RATES)

State/Natural	Crude	Gen.	Total	GRR	Child	Age Specific Fertility Rates						
						15-19	20-24	25-29	30-34	35-39	40-44	45-49
Div	Birth Rate	Fertility Rate	Fertility Rate		Woman Ratio C (0 - 4) W (15-49) X 1000							
A. P.	35.7	151.3	4.79	2.34	607	148.9	253.7	220.7	168.8	103.7	46.6	15.1
Royal Seema	37.2	160.2	5.08	2.48	644	157.2	288.9	247.9	167.0	99.7	46.5	8.4
Andhra	33.0	137.1	4.36	2.13	553	142.1	218.7	196.3	157.7	97.3	46.1	15.4
Telangana	38.0	165.1	5.18	2.53	657	153.9	280.1	236.1	184.4	114.8	47.4	18.8

SOURCE : Sample Registration Scheme Bulletins.

Royal Seema. However, in the age groups (15-29), the ASFRs are lower for the Tefangana than for the Royal Seema region.

The fertility rates (CBR, GRR) computed for the year 1961 at district level and for the state as a whole are given in Table 3. The estimated crude birth

TABLE 3—SOME OF THE FERTILITY RATES, CRUDE BIRTH RATES, GROSS REPRODUCTION RATES AND CHILD-WOMEN RATIOS OF ANDHRA PRADESH BY DISTRICTS—1961

<i>Name of the State/ Districts</i>		<i>G.R.R.</i>	<i>Crude Birth Rate</i>
<i>Andhra Pradesh</i>		633	2.58
1.	Srikakulum	584	2.39
2.	Visakapatnam	526	2.15
3.	East Godavari	582	2.38
4.	West Godavari	590	2.41
5.	Krishna	628	2.56
6.	Guntur	615	2.51
7.	Nellore	609	2.49
8.	Chittoor	628	2.56
9.	Cuddapah	646	2.64
10.	Anantapur	715	2.92
11.	Kurnool	700	2.86
12.	Mahabub Nagar	689	2.81
13.	Hyderabad	653	2.67
14.	Medak	636	2.60
15.	Nizamabad	603	2.46
16.	Adilabad	681	2.78
17.	Karim Nagar	677	2.76
18.	Warangal	685	2.80
19.	Kammam	719	2.93
20.	Nalgonda	689	2.81

rate of Andhra Pradesh for the year 1961 was found to be 40.12 per thousand population. Among the 20 districts, the highest birth rate was found in Kam-mam district (44.94) and the lowest for Visakapatnam (33.67). For the six districts of Ananthapur, Kurnool, Mahabub Nagar, Warangal, Kam-mam and Nalgonda, the birth rate was above 43 per 1000 population, and for the six districts of Srikakulam, Visakapatnam, East Godavari, West Godavari, Nellore and Nizamabad, was below 39. The remaining 8 districts have shown birth rate between 39 and 43.

The child-woman ratio is the highest (719) for Kam-mam and the lowest (526) for the Visakapatnam. The corresponding ratio for the State is 633; 9 districts have lower and the remaining 11 have higher ratios.

The other index, G.R.R. is mainly based on child-woman ratios. The lowest G.R.R. (2.15) has been noticed in Visakapatnam district. Whereas the highest GRR (2.93) has been found in Kam-mam district. GRRs for the remaining districts lie in between 2.3 to 2.9.

While summarising the fertility differentials at district level, all the 20 districts of Andhra Pradesh can be grouped into three broad categories : (i) districts showing high fertility performance, with the CBR above 43 (Ananthapur, Kurnool, Mahabub Nagar, Warangal, Kam-mam and Nalgonda), (ii) districts showing medium performance with CBR between 40 and 43 (Cuddapah, Hyderabad, Medak, Adilabad and Karim Nagar), and (iii) districts with low performance with CBR below 40 (Srikakulam, Visakapatnam, East Godavari, West Godavari, Guntur, Nellore, Chittoor and Nizamabad).

Age at Marriage

"Age at marriage is one of the most significant variables accounting for observed variation in fertility levels. Considerable research into their effect on fertility has been conducted and is still in process. An increase in age at marriage was found to be one of the factors contributing to a lowering of the birth rate".¹

Agarwala² has calculated that the birth rate might be reduced as much as 30 percent by 1991-92 if all Indian women are married after the age of nineteen.

1. Determinants and consequences of population trends, U. N., pp. 79.

2. Agarwala S. N., "Effect of a rise . . ." (1967), p. 17.

Table 4 explains the association of GRR with mean age at marriage. The range of mean age at marriage lies in between 13.20 years for Nizamabad and

TABLE 4—G. R. R. AND ITS RELATIONSHIP WITH MEAN AGE AT MARRIAGE, LITERACY, AND PER CAPITA INCOME-1961

<i>S.No</i>	<i>Name of the Districts</i>	<i>G. R. Rl</i>	<i>Mean age at Marriage²</i>	<i>Percentage of Literacy rate³</i>	<i>Per Capita income* (in Rupees)</i>
1.	Srikakulam	2.39	15.50	15.71	231
2.	Visakapatnam	2.15	15.44	17.15	279
3.	East Godavari	2.38	15.65	26.00	276
4.	West Godavari	2.41	16.02	30.76	316
5.	Krishna	2.56	16.22	31.15	376
6.	Guntur	2.51	15.81	27.66	291
7.	Nellore	2.49	16.53	21.13	268
8.	Chittoor	2.56	16.33	20.94	251
9.	Cuddapah	2.64	16.41	21.75	250
10.	Ananthapur	2.92	16.56	20.61	291
11.	Kurnool	2.86	16.06	21.41	266
12.	Mahabub Nagar	2.81	14.30	15.46	192
13.	Hyderabad	2.67	16.32	35.05	402
14.	Medak	2.60	13.72	14.05	256
15.	Nizamabad	2.46	13.20	14.32	359
16.	Adilabad	2.78	13.66	11.72	342
17.	Karim Nagar	2.76	13.25	12.90	248
18.	Warangal	2.80	14.03	15.37	218
19.	Kammam	2.93	15.53	15.23	219
20.	Nalgonda	2.81	13.93	14.11	240
	Andhra Pradesh	2.58	15.11 ^s	21.19	280

SOURCE : 1. Computed through Rele's method.

2. R. P. Goyal and P. B. Desai : Inter district variation in mean age at marriage in India (1961) Appendix table I, pp. 7.

3. Computed from census of India 1961, A. P. part II-C pp. 49-54.

4. " " " " " 1961 Andhra Pradesh.

5. Computed through Hajnal formula.

16.56 years for Ananthapur district. The mean age at marriage was found below 14.31 years in all the districts of Telengana except Hyderabad and Kammmam. Similarly G.R.R. was found higher to the state average (2.58) for all the districts of Telengana except Nizamabad. It can be noticed that inverse relationship exists between the mean age at marriage (above the state average 15.11) and G.R.R. (below the state average 2.58) in the case of first 8 districts included (Table 4).

Literacy

According to 1961 census the literacy rate of Andhra Pradesh was 21.2%. The range for the districts lies between 11.7% for Adilabad and 35.05% for Hyderabad. The districts viz. East Godavari, West Godavari, Krishna, Guntur, Nellore and Chittoor have higher literacy (above 20.9%) and lower fertility (below the GRR 2.58), suggesting an inverse relationship. The districts of Srikakulam, Visakapatnam and Nizamabad have lower fertility and lower literacy, while Ananthapur, Kurnool, Cuddapah, Hyderabad have higher fertility and higher literacy. The remaining 7 districts show lower literacy and higher fertility. There is thus some evidence for inverse relationship between literacy and fertility at the district level for it is not quite common.

Income

Income is one of the important factors contributing for fertility differentials. In many studies it was found that there is an inverse relation between economic status and fertility. The range of per capita income for the districts of Andhra Pradesh was in between Rs. 192 and Rs. 402 for the year 1961 while for State average per capita income was Rs. 280. It has been noticed from the Table 4 that in the districts, Guntur, Krishna, West Godavari, Hyderabad, Adilabad and Nizamabad, the per capita income was higher (above Rs. 280) and the fertility performance was lower (below the GRR 2.58) except in case of Hyderabad and Adilabad. The districts like Warangal, Mahabub Nagar, Nalgonda, Karim Nagar and Kammmam have been found with lower per capita income and higher fertility performance (GRR 2.76 and above). In the case of the remaining districts the relationship was found erratic.

Multiple Regression Analysis

It is presumed that a linear relationship exists between GRR (F) and socio-economic factors affecting it, particularly, the mean age of marriage (x_j),

literacy rate (x_2) and per capita income (x_3). Multiple regression analysis explains the above mentioned association.

Let the Regression equation be

$$Y = b_1X_1 + b_2X_2 + b_3X_3 + b_0$$

$$\Sigma YX_1 = b_1\Sigma X_1^2 + b_2\Sigma X_1X_2 + b_3\Sigma X_1X_3 \quad \dots (1)$$

$$\Sigma YX_2 = b_1\Sigma X_1X_2 + b_2\Sigma X_2^2 + b_3\Sigma X_2X_3 \quad \dots (2)$$

$$\Sigma YX_3 = b_1\Sigma X_1X_3 + b_2\Sigma X_2X_3 + b_3\Sigma X_3^2 \quad \dots (3)$$

The results are as follows

$$\Sigma X_1^2 = 27.0429, \Sigma X_2^2 = 881.2076, \Sigma X_3^2 = 58695$$

$$\Sigma YX_1 = -8286, \Sigma YX_2 = 7.3750, \Sigma YX_3 = -54.02$$

$$\Sigma X_1X_2 = 114.3239, \Sigma X_1X_3 = 201.23, \Sigma X_2X_3 = 4085.54.$$

Equation is:

$$Y = -0.29656x_1 + 0.06352x_2 - 0.004673x_3$$

$$A = \bar{y} - b_1\bar{x}_1 - b_2\bar{x}_2 - b_3\bar{x}_3 = 2.62 + 0.29656 (15-22)$$

$$- 0.06852 (20.12) + 0.004673 (278) = 7.0541$$

The required regression equation given by the fitted model is

$$Y = 7.0541 - 0.29656x_1 + 0.06352x_2 - 0.004673x_3.$$

∴ the normal equations are:

From the equation it is evident that the variation in G.R.R. is greatly explained by the explanatory variable x_1 i.e. mean age at marriage. It shows that higher the mean age at marriage, the lower is the G.R.R. The regression coefficient for the other two variables viz., x_2 and x_3 seems to be insignificant. And their contribution in explaining the variability in G.R.R. seems to be feeble. This may be because of the multi colinearity.

Conclusion

The analysis in the preceding pages shows that there is appreciable difference in the level of fertility among the districts of Andhra Pradesh. By and large the Andhra districts represent relatively low fertility, Whereas those in Telengana maintain high fertility but for few exceptions.

It has been observed that for the districts where socio-economic conditions were favourable fertility performance was lower (below the G.R.R. 2.58) e.g. the districts Visakapatnam, East Godavari, West Godavari, Krishna, Guntur and Nellore. The fertility performance was found higher (above the GRR 2.58) among the districts Mahabub Nagar, Medak, Adilabad, Karim Nagar, Warangal, JCammam and Nalgonda where socio-economic factors were unfavourable. The districts Cuddapah, Kurnool, Ananthapur, and Hyderabad have shown higher fertility. One of the probable reasons for the same may be attributed to the higher proportion of Muslim population in the above mentioned districts. It is interesting to note that the districts like Srikakulam, Nizamabad and Chittoor have shown lower fertility. On the basis of the regression analysis it was found that there exists an inverse relationship between fertility and the mean age at marriage. A similar relationship was found between the literacy and fertility.

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