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Variations in the Age Structure of Indian Population During 1961-71

Introduction

THE population pyramid is a very useful tool for the study of the variations in the population composition. It is easy to observe the structure of a population at a given date and the accumulated effect of fertility, mortality and migration by just having a look at it.

For the sake of simplicity, the population can be divided into three main age groups; the dependent children (0-14 ages), the adults (15 to 59 ages) and the dependent aged (60+ ages). Change in the proportion of the youngest childrens' group is indicative of change in fertility level in the last decade and a half. The children (0-14) and the old persons (60+) are mostly dependent on the adult population (15-59) which is the main economically active section of the population. The high proportion of young adults (15-39) would result in high fertility in the long run if the fertility schedule and marriage pattern remains constant as this population is mainly responsible for reproduction. Generally, the proportion of adult population does not change much. The main variations take place in the children's and the old age groups depending on the nature of changes in fertility and mortality conditions.

Methodology and Discussion

In the present article, the variations in the age composition of the Indian population have been observed for the decade 1961-71. The 1961 data[1] on age distribution are smoothed for all India and the States. For 1971 the smoothed[2] data are available at all India level only. Accordingly, the smoothed data for both the years viz., 1961 and 1971 have been considered for comparing the age distribution at all India level, while at state level[3] the comparison has been made only of unsmoothed data.

A non-parametric test[4] has been used to test that both the age distributions (for 1961 and 1971) represent the same population. Calculations show *that using* both smoothed and unsmoothed data for both the years separately the results are statistically non-significant—giving values approximately equal to zero. So it can be concluded that the proportions in each age group for 1961 and 1971 are comparable. This has been further supported by observing mean ages for each year, which shows a difference of only 0.10 years in the decade.

Similar non-parametric tests have been used for the unsmoothed data of Indian states, which have also shown that between states the proportions in different age groups have not changed in the decade 1961-71. At the state level, five year age data are not available for 1971, therefore an attempt has been made to compare the two unsmoothed age distributions in three broad age groups, namely, the children (0-14 ages), the adults (15-59 ages) and the old persons (60+ ages).

The age distribution of the Indian population follows the trend of other

1. Census of India, 1961, *Age Tables,* Paper No. 2 of 1963, New Delhi, 1963, pp. 35-45.
2. U. P. Sinha, "Smoothed Age Distribution of 1971 Census Population of India based on Sample Data" *News Letter,* No. 47, January, 1974. International Institute for Population Studies, Bombay, 1974,pp. 2-4.
3. Census of India, 1971, *Pocket-Book of Population Statistics,* Census Centenary, 1972.
4. K. A. Brownlee , *Statistical Theory and Methodology In Science and Engineering,* John Wiley & Sons, Inc., New York, 1965, pp. 251-258.

developing countries. Table 1 shows the year-wise (1961 and 1971) age distributions for each sex and for the total population in five year age groups.

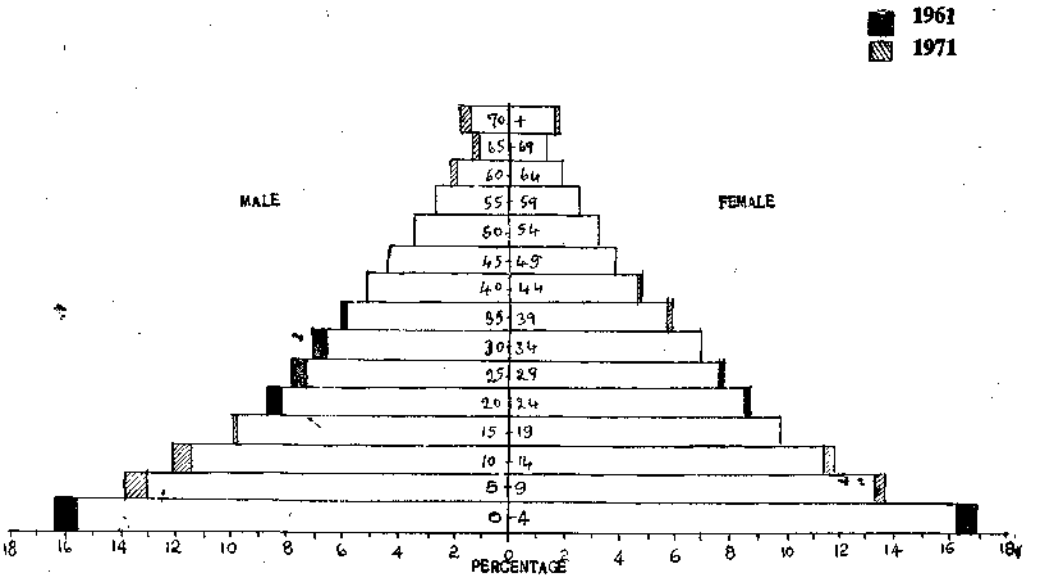
TABLE 1—PERCENTAGE AGE DISTRIBUTIONS FOR INDIAN POPULATION FOR 1961 AND 1971 (SMOOTHED DATA)

	Total		*Male*		*Female*	
Age Group	*1961*	*1971*	*1961*	*1971*	*1961*	*1971*
0-4	16.53	15.87	16.23	15.57	16.85	16.20
5-9	13.22	13.74	13.05	13.80	13.40	13.68
10-14	11.33	11.97	11.29	12.10	11.38	11.82
15-19	9.20	9.85	9.80	9.88	9.81	9.82
20-24	8.66	8.38	8.63	8.23	8.69	8.55
25-29	7.82	7.51	7.79	7.30	7.85	7.75
30-34	6.92	6.70	6.97	6.59	6.87	6.82
35-39	5.87	5.84	6.03	5.88	5.71	5.80
40-44	4.93	4.97	5.11	5.10	4.74	4.82
45-49	4.12	4.11	4.28	4.27	3.94	3.93
50-54	3.33	3.31	3.46	3.44	3.21	3.17
55-59	2.61	2.61	2.68	2.69	2.53	2.52
60-64	1.93	1.99	1.94	2.02	1.92	1.95
65-69	1.30	1.36	1.29	1.38	1.32	1.34
70+	1.62	1.79	1.47	1.75	1.78	1.83
Total	100.00	100.00	100.00	100.00	100.00	100.00
Mean Age	23.72	23.82	23.90	23.97	23.55	23.64

Comparing the smoothed age distributions for 1961 and 1971 censuses, it is observed that, the proportion of 0-4 age group has come down from 16.53 to 15.87 percent. This declining trend has been observed for both the sexes. A reverse trend has been observed for 5-14 age group, which showed an increase of 1.16 percent. An overall increase 0.50 per cent points in 0-14 age group during the decade 1961-71, could be due to (i) the nature of the data, *(ii)* the decline in mortality, and *(iii)* the increase in fertility. As the tests show that the data are comparable, this increase in percentage in the 0-14 age group could be assigned to the other two

factors. If one assumes that there has been substantial decline in infant mortality, it is difficult to assign this increase to an increase in fertility. The reduction in percentage of 0-4 age group by 0.66 per cent points is indicative of decline in fertility during the last five years of 1961-71 deca-

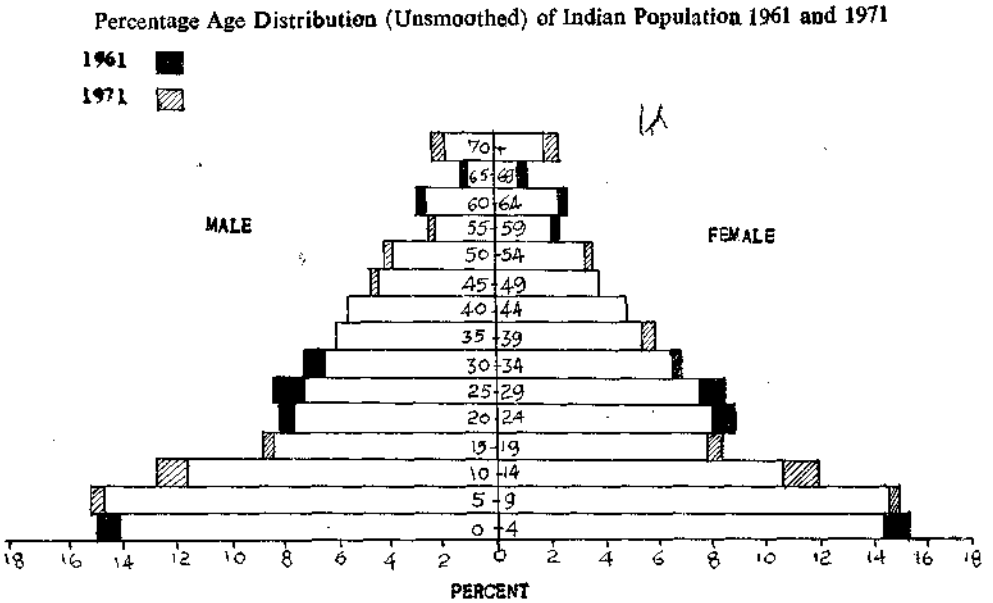
Percentage Age Distribution (Smoothed) of Indian Population for 1961 and 1971



de. This can be observed from the graphs also, which show a comparatively smaller base (0-4 age group) in 1971. This has been observed for both the sexes.

It has been further observed that for the adult age group (15-59 ages), the percentage has come down by 0.78 per cent points during the decade, the main decline has been observed in the young adult age group (15-39), which is mainly responsible for reproduction. During the decade the old age population has increased by 0.29 per cent points and so there has been an increase of 0.10 years in mean age. The decline in mortality may be assigned as the main cause of this increase. These trends have been observed for both the sexes. Almost similar observations have been made when unsmoothed data for 1961 and 1971 censuses were compared at all all India level.

Table 2 shows, the percentage age distribution in broad age groups for 1961 and 1971 (unsmoothed) for all the states of India. It has been obser-



ved that for the age group 0-14, almost all the states followed the all India trend, except Kerala and Punjab, for whom no significant changes could be observed. Some of the Union territories, viz; Delhi, Laccadive etc., Manipur and Nagaland have followed a reverse trend, showing a declining proportion for the 0-14 age group.

For the adult age greup (15-59 ages), all the states except Kerala and Punjab and Union territories except Delhi, Laccadive etc., Manipur and Nagaland, show a decrease during the decade. The percentage of 60+ population have gone up for all the states and all the Union territories except Andman and Nicobar, Laceadive etc., Himachal Pradesh and Nagaland. This shows an overall improvement in mortality conditions.

The index of ageing[5] for each year and for all the states of India has

5. Vasilios G. Valaoras, "Pattern of Ageing of Human Populations in Eastern states Health Conference" *The Social and Biological Challenge of an Ageing Population*, New York, Columbia University Press, pp. 67-85.

TABLE 2—PERCENTAGE DISTRIBUTION IN BROAD AGE GROUPS (UNSMOOTHED), STATES 1961 AND 1971

Percentage Age distribution in age group						
States	*1961*			*1971*		
	0-14	*15-59*	*60+*	*0-14*	*15-59*	*60+*
0. India	41.00	53.36	5.64	42.02	52.01	5.97
1. Andhra Pradesh	39.54	54.23	6.23	40.48	53.15	6.37
2. Assam	44.84	50.86	4.30	4S.86	48.42	4.72^
3. Bihar	42.31	52.05	5.62	42.58	51.52	5.90
4. Gujarat	42.88	52.17	4.95	43.05	51.69	5.26
5. Jammu & Kashmir	40.69	54.21	5.10	42.88	51.55	5.57
6. Kerala	42.64	51.52	5.84	40.26	53.52	6.22
7. Madhya Pradesh	40.81	54.00	5.17	43.70	50.51	5.79
8. Madras	37.60	56.80	5.60	37.77	56.49	5.74
9» Maharashtra	40.65	54.06	5,28	41.33	52,95	5,72
10. *Mysore*	42.15	52.11	5.74	42.44	51.46	6.10
11. Orissa	39.09	55.23	5.68	42.35	51.63	6.02
12. Punjab	43.57	49.86	4S7	43.30	49.97	6.73
13. Rajasthan	42.65	52.19	5.15	44.17	50.31	5.52
14. Uttar Pradesh	40.49	53.21	6.30	41.84	51.39	6.77
15. West Bengal	40.93	54.06	5.01	42.90	51.80	5.30
1. Andaman & Nicobar	36.27	60.89	2.84	38.26	59.13	2.61
2. Delhi	40.49	55.36	4.15	38.64	57.06	4.30
3. Himachal Pradesh	38.08	54.57	7.35	41.21	51.62	7.17
4. Laccadive, etc.	40.90	54.13	4.97	40.63	56.24	3.13
5. Manipur	43.20	51.18	5.62	42.50	51.44	6.06
6. Tripura	42.87	51.71	5.42	44.22	49.22	6.56
7. Dadra.etc,	43.70	52.27	4.03	45.95	50.00	4.05
8. Nagaland	38.75	54.43	6.82	37.79	55.43	6.78
9. Pondicherry	36.67	56.47	6.86	39.41	54.23	6.36
10. Siklcim	39.57	55.56	4.87	-	—	—
11. NEFA	-	-	-	38.25	57.05	4.70
12. Goa, etc.	-	-	-	38,11	55.25	6.64

been calculated in order to further support the proposition that the Indian population has been growing older during the decade

$$\text{Index of Ageing} = \frac{\text{percentage of population in 60+ age group}}{\text{Percentage of population in 0–14 age group}} \times 100$$

Table 3 shows an increase in the index from 1961 to 1971 for all-India, states except Andhra Pradesh and Orissa and Union territories except Andaman and Nicobar, Himachal Pradesh, Laccadive etc., Dadra etc. and Pondicherry. This shows faster increase in the old population than in the children (0-14) population during the decade. This trend suggests that the population of India is approaching the state of partial ageing, which is the trend of the developed countries.

The dependency ratio is another important indicator, reflecting the economic characteristics of the population. The population of children (0-14 ages) and the old (60+) population are mostly economically dependent upon the adult population of a country. To find the burden of the children and the old population on the adult population, young age, old age and total dependency ratios have been compiled[6] for all-India, its states and Union territories in Table 3.

The percentage of adult population has gone down during the decade and overall percentage of children and old population has correspondingly gone up. The increase in old dependency ratios indicates the improvement in mortality conditions, but the rise in the young dependency ratio shows that overall fertility has been high in the last decade.

Conclusions

We have examined the variations in the age structure of Indian population during the last decade. Due to the lack of smoothed data in 1971, it was not possible to observe percentage variations in the five year age groups at state level. An attempt has been made by taking into consideration smoothed data for both 1961 and 1971 in broad age groups at all-

6. Amos H. Hawley, "Population Composition", *The Study of Population, An Inventory and Appraisal,* edited by P. M. Hauser and O. D. Duncan, pp. 361-382, The University of Chicago Press, Chicago, 1959.

TABLE 3—INDEX OF AGEING AND DEPENDENCY RATIO FOR STATES, 1961 AND 1971 (UNSMOOTHED DATA)

	States	*Index of Ageing*		*Dependency Ratios*					
				Young		*Old*		*Total*	
		1961	*1971*	*1961*	*1971*	*1961*	*1971*	*1961*	*1971*
0.	India	13.74	14.21	76.84	80.79	10.55	11.47	83.97	92.26
1.	Andhra Pradesh	15.76	15.74	72.93	76.15	11.50	11.97	84.43	88.12
2.	Assam	9.57	10.07	88.19	96.80	8.44	9.75	96.63	106.55
3.	Bihar	13.26	13.86	81.27	82.62	10.79	11.45	92.06	94.07
4.	Gujarat	11.52	12.22	82.21	83.30	9.48	10.17	91.69	93.47
5.	Jammu & Kashmir	12.48	12.99	75.06	83.19	9.37	10.80	84.43	93.99
6.	Kerala	13.70	15.45	82.75	75.24	11.33	11.62	94.08	86.86
7.	Madhya Pradesh	12.65	13.25	75.57	86.51	9.55	10.46	85.12	96.97
8.	Madras	14.89	15.20	66.21	66.87	9.86	10.16	76.07	77.03
9.	Maharashtra	12.96	13.84	75.21	78.08	9.75	10.81	84.96	88.89
10.	Mysore	13.60	14.37	80.90	82.48	11.00	11.85	91.90	94.33
11.	Orissa	14.49	14.21	70.79	82.03	10.26	11.66	81.05	93.69
12.	Punjab	15.06	15.54	87.36	88.46	13.16	13.33	100.52	101.79
13.	Rajasthan	12.06	12.50	81.74	87.79	9.85	10.96	91.59	98.75
14.	Uttar Pradesh	15.54	16.18	76.10	81.42	11.82	13.53	87.92	94.95
15.	West Bengal	12.24	12.35	75.70	82.81	9.26	10.23	84.94	93.04
1.	Andaman & Nicobar	7.83	6.82	59.57	64.71	4.67	4.41	64.24	69.12
2.	Delhi	10.23	11.13	73.14	67.72	7.47	7.54	80.61	75.26
3.	Himachal Pradesh	19.31	17.40	69.79	79.84	13.47	13.73	83.26	93.57
4.	Laccadive, etc.	12.15	7.70	75.57	72.22	9.18	5.56	84.75	77.78
5.	Manipur	10.62	14.26	84.42	82.61	10.93	11.77	95.35	94.38
6.	Tripura	12.64	14.83	82.91	89.82	10.48	13.31	93.39	103.13
7.	Dadra, etc.	9.20	8.81	83.60	56.96	7.69	8.11	91.29	65.07
8.	Nagaland	17.58	17.94	71.17	68.18	12.50	12.24	83.67	80.42
9.	Pondicherry	18,71	16.14	64.92	72.66	12.15	11.72	77.07	84.38
10.	Sikkim	12.29	—	71.23	—	8.76	—	79.99	—
11.	NEFA	—	12.29	—	67.04	—	8.24	—	75.28
12.	Goa, etc.	—	17.42	—	68.99	—	12.02	—	81.01

India level and unsmoothed data at State level. Our examination suggests that there has been an overall increase in the percentage of children and old population during the decade, indicating steady fertility and declining mortality. The percentage in 0-4 age group has showed a declining trend. The dependency burden on adults has increased during the last decade, indicating improvement in mortality conditions in infancy as well as in old ages and a steady trend in the level of fertility.