UNIT 1 FROM PYRAMID TO PILLAR

Structure

1.0 OBJECTIVES

After going through this unit, you would be able to:

- describe the terminologies used in aging and the aged;

- appreciate why demographic transition is taking place in India; and

- identify the major reasons for this demographic transition and understand what impact it will have on the country.

1.1 INTRODUCTION

During your undergraduate years, you have learnt various clinical subjects as well as problems and diseases related to special groups like children (paediatrics), pregnant women (obstetrics). However very little emphasis was laid on the elderly (geriatrics). In this first unit you will realise that reading and learning about geriatrics has become more and more pertinent with a shift in the global population towards the older age group.

You will learn about the commonly used terminologies in this field. You will also understand how and why there is being a demographic transition.

1.2 FAMILIARISING TERMINOLOGIES

Aging as a population phenomenon is occurring throughout the world. You need to know why two scientific disciplines related to aging, are getting increased prominence throughout the world. These are gerontology and geriatrics.

- **Gerontology** is described as a scientific discipline which deals with the phenomenon of aging and all issues related to this process;

- **Geriatrics** or **Geriatric Medicine** which is a branch of medicine deals with diseases of the old age.

Every individual will age and no one knows precisely when the aging process really starts. Aging process is even now full of riddles for which we have no answers. What is known and without any question is that aging process is:

- Inevitable

- Irreversible

• Progressive once it starts

• Always associated with physiological and biological decline.

For the sake of global comparison between countries, a cut-off point has been established by the United Nations at 60 years. Any individual of this age and above is regarded as elderly individual, though in some agencies and according to some workers, this cut-off point should be 65 years.

Whether it is 60 years or 65 years, individuals over that age are not a homogeneous group. Since individuals age at different speed and different physiological system decline at different rate, the biological decline of an individual in comparison to his chronological age varies from one person to another. Thus a man of 65 years might be as active as a young adult whereas a 50 years old man might look and behave like an older person. The difference between biological and chronological aging varies from one individual to another.

It should also be remembered that elderly individuals are not a homogenous group because the physiological, biological and mental health decline varies quite significantly with age. Thus, for the sake of comparison, aged individuals are broadly divided into three categories:

• **Young old** up to the age of 75 years during which their biological function is almost comparable to an adult person;

• **Old old** individuals up to 85 years of age during which their biological functions have declined significantly and the person has many physiological and mental limitations; and

• **Very old** individuals over the age of 85 years where the biological limitations are quite significant and this group most often require the help of care-givers for their daily living.

1.3 CHANGING POPULATION STRUCTURE

Age and sex are the two important variables to describe the population of any country. Age-sex profile of population is the aggregated result of interaction among the demographic variables—fertility, mortality and migration.

As you have read from your undergraduate classes, age-sex pyramid (age-sex distribution) is an important tool to comprehend change in any population structure vis-à-vis demographic transition which is closely related to socio-economic and political situation in a country.

Let us look at Fig. 1.1(a-c).

The population structure of most developing countries is depicted as a pyramid [Fig. 1.1(a)], which implies that the country has a high birth rate and thus the infant population, the largest, forms the base of the pyramid. The size of the old aged population get sharply smaller and smaller, till it becomes a point as the top of the pyramid.

As the living conditions of the population become better with improved health care and economic status, the fertility rate and mortality rate gradually decline with gradual increase of life expectancy of the population. Population structure is then described as population barrel [Fig 1.1(b)]. In the developed world, where the fertility rate has come down drastically along with mortality rate with a vastly increased life expectancy, the population structure is then depicted as a pillar [Fig. 1.1(c)].

Thus, when a country is developing rapidly with increase in the living standard of the population, lowering of the percentage of poverty stricken population, better health care with the help of improved health technologies and miracle drugs, the transition of the population structure is commonly known as transition from pyramid to pillar. This transition is associated with rapidly increasing life expectancy and decline of fertility and
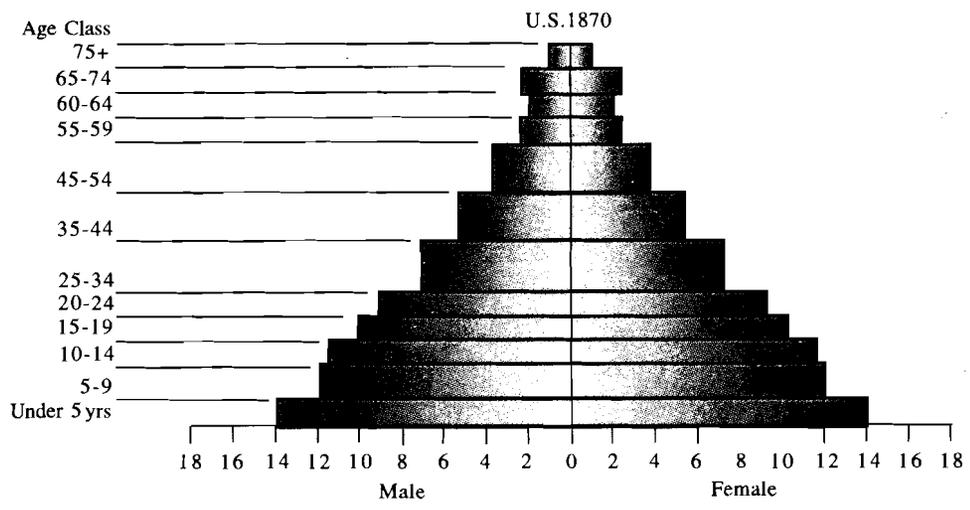
Per cent in each age class
a) Pyramid
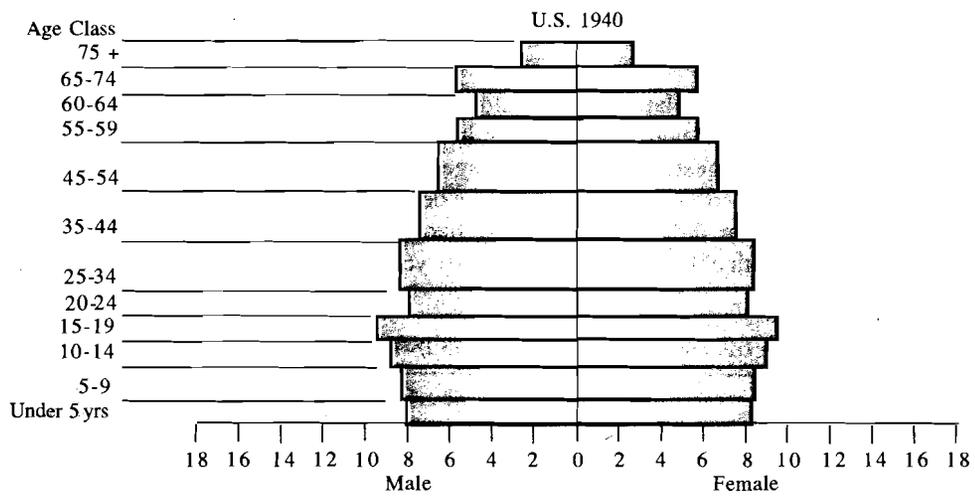
Per cent in each age class
b) Barrel
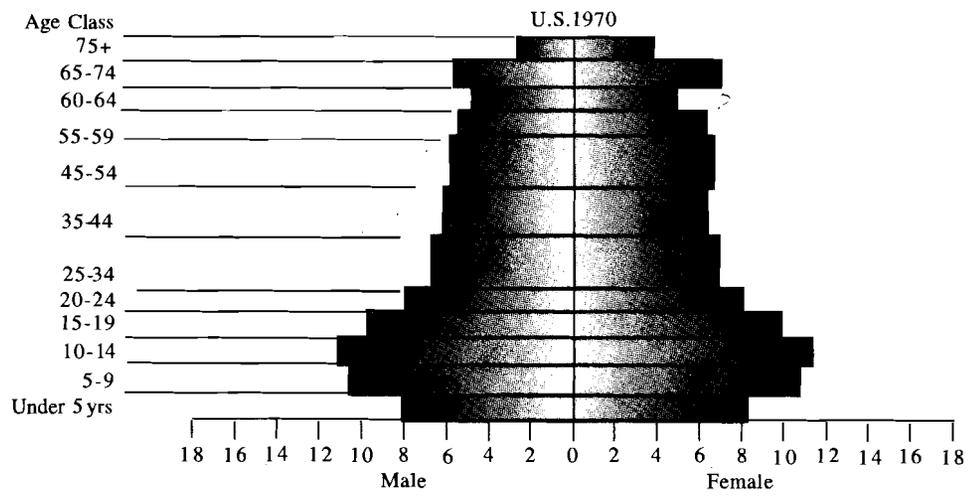
Per cent in each age class
c) Pillar

Fig. 1.1: Polulation pyramids for the United States: 1870, 1940, 1970

Source: U.S. Bureau of the Census. U.S. Census of the Population 1870, 1940 and 1970, Characteristics of the Population.
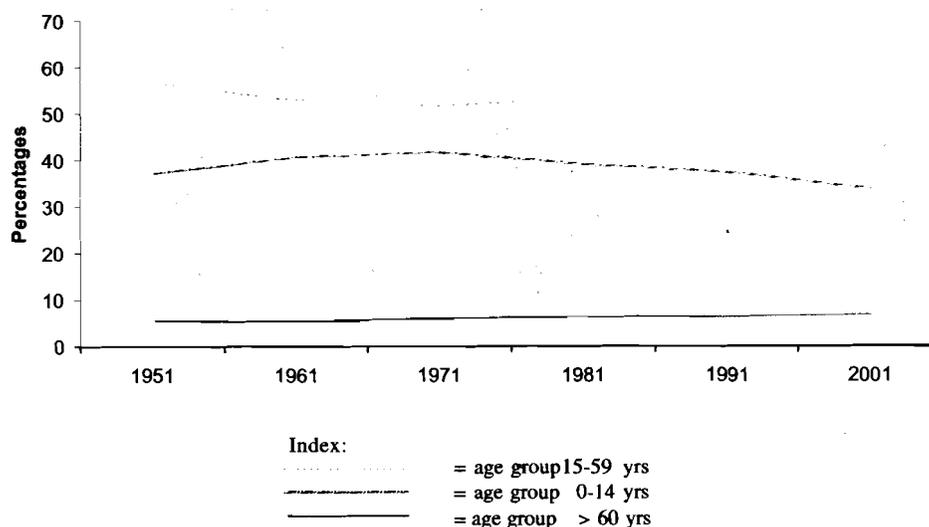
1.4   DEMOGRAPHIC TRANSITION IN INDIA

In the last 50 years, the population of India almost trebled and crossed a billion in number.
The age structures, with heavily weighted child and young population, during 1951 and
1961 decades were suggestive of the first stage of demographic transition during that
period. A longitudinal comparison over last five decades shows that there is a shift in the
population growth from child and young to higher age groups (15-59 years). However, a
slow and steady growth of greying population (60+ years) was visible during these decades
(Table 1.1, Fig. 1.2).

Table 1.1:Percentage Distribution of Population in Different Age Groups (1951-2001) India

Age group (years)	Percentage distribution of population					
	1951	1961	1971	1981	1991	2001*
0-4	13.4	15.1	14.2	12.6	13.0	10.7
5-9	12.8	14.7	15.0	14.1	13.3	11.5
10-14	11.3	11.2	12.5	12.9	11.5	12.1
10-14	37.5	41.1	42.0	39.6	37.8	34.3
15-59	57.1	53.3	52.0	54.0	55.5	58.7
60+	5.4	5.6	6.0	6.5	6.7	7.0

* Projected

Index:

_____ = age group 15-59 yrs

– – – – – – – – – = age group 0-14 yrs

_____ = age group > 60 yrs

Fig. 1.2: Trend of Population growth in different age groups in India

The declining trend of crude birth and death rates, representing the overall fertility performance and mortality behaviour have major influence in the age-sex structure vis-w.s.-vis the stage of demographic transition of the country. The fall in birth rate was significantly lower as compared to that of crude death rate over the period of five decades (Table 1.2, Fig. 1.3) resulting in the age distribution as shown above.

Table 1.2: Birth and Death Rates in India (1951-1999)

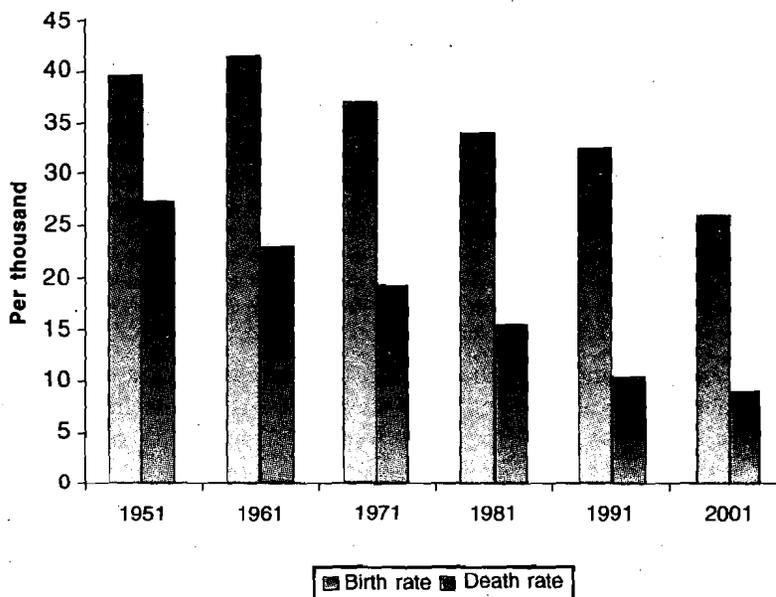| Year	Birth rate		Death rate	
	Per Thousand	% variation	Per thousand	% decrease
1951	39.9	—	27.4	—
1961	41.7	4.5	22.8	16.8
1971	36.9	11.5	19.0	34.5
1981	33.9	8.1	15.0	16.1
1991	32.5	13.0	10.2	18.4
1999	26.1	11.5	8.7	14.7

Fig. 1.3: Birth and Death Rates in India, 1951-2001

The infant mortality rate (IMR) and the expectation of life are the other two functions of mortality behaviour and they show a similar trend (Table 1.3, Fig. 1.4).

Table 1.3: Infant Mortality Rates and Expectation of Life—India (1951-99)

Year	IMR	Expectation of life at birth	
		Male	Female
1951	134	32.45	31.66
1961	146	41.85	40.55
1971	129	46.40	44.70
1981	110	54.20	54.70
1991	91	58.10	59.10
1999	70	62.36	63.39

Today, the absolute number of elderly individuals is about 70 millions and the demographers project that in 25 years of time, the figure would come to 150 million. In terms of percentage of old individuals of the total population, the present figure is about 6.8 per cent whereas in 25 years time, the figure would go up to more than 12 per cent. It is important to note that the percentage of elderly individuals is increasing at a much faster rate than the total population.
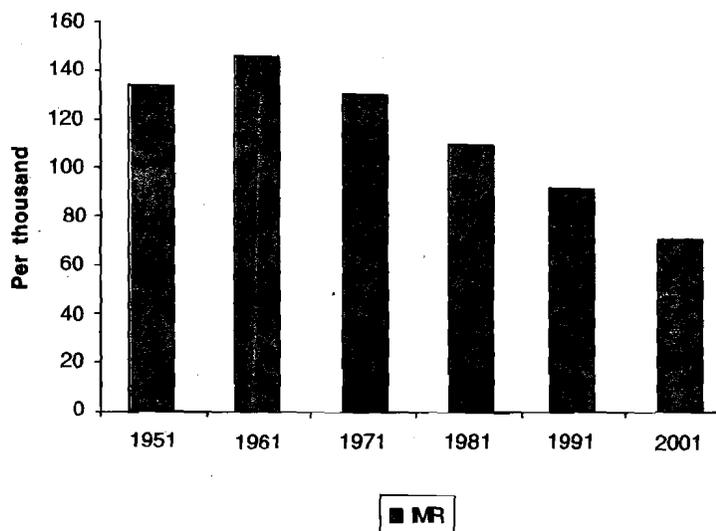
Fig. 1.4: Infant mortality rates in India (1951-2001)

Let us look at the similar demographic figures in the developed world. Today, in any West European country, almost 15 per cent of the population consist of elderly individuals and the demographers project that in 20 years time, these countries will have 25 per cent of the population consisting of older persons. In other words, every 4th individual in the congregation will be an old person. It is commonly remarked that in the parks of a city in any West European country, it is difficult to find babies on perambulator. Instead one can only see elderly individuals in wheel chairs being pushed by their care givers.

1.5 GROWTH OF POPULATION IN STATES

The growth rates of population as well as the age-sex structure varied widely from state to state. It may not be possible to identify the various factors influencing the differences in growth pattern in this unit. However, a close look at the population parameters of three typical states in the country viz. Kerala, a socially progressive state, Maharashtra, an industrially and economically developed state and Bihar, a socially and economically backward state, revealed that the decadal growth rates were higher in Maharashtra than those of Bihar—except in 2001. But in Kerala where the social parameters are better than all the states in the country, there were sharp decline in the decadal growth rates. Table 1.4 with Fig. 1.5 show the popoulation and growth of population in 1971, 1981, 1991 and 2001 decades.

Table 1.4: Population and Decadal Variation in Bihar, Maharashtra and Kerala (1971-2001)

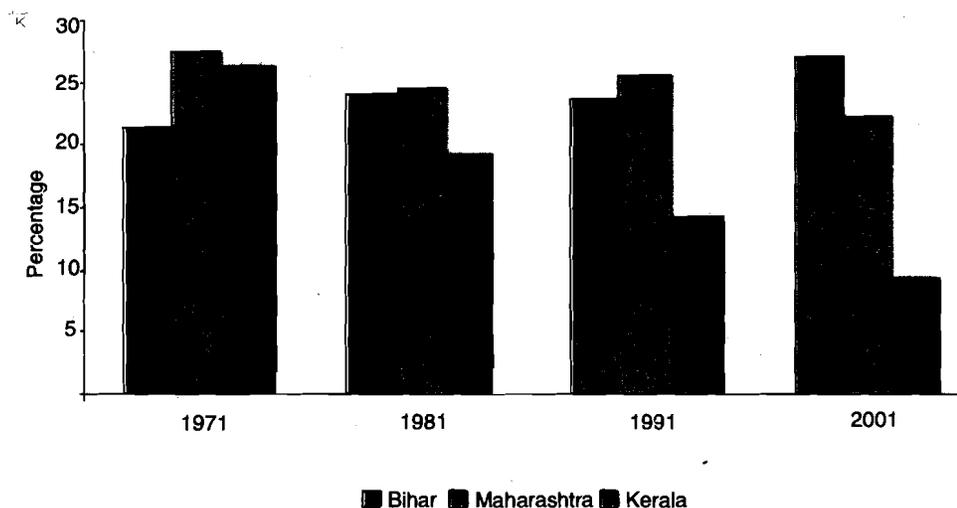| States	Year	Total population	Decadal variation	
			Absolute	Per cent increase
Bihar	1971	56.35	9.1	21.33
	1981	69.91	13.56	24.06
	1991	86.37	16.46	23.54
	2001*	109.78	23.45	27.16
Maharashtra	1971	50.41	10.86	27.45
	1981	62.78	12.37	24.54
	1991	78.94	16.15	25.73
	2001*	96.75	17.81	22.56
Kerala	1971	21.35	4.45	26.29
	1981	25.45	4.10	19.24
	1991	29.10	3.65	14.32
	2001*	31.84	2.74	9.42

* Provisional

Fig. 1.5: Decadal growth rate (%) in Bihar, Maharashtra and Kerala

Literacy is an important indicator of social development and is close corelate of demographic transition. Bihar had the lowest literacy rate in 1971; it was double in Maharashtra and treble in Kerala. In three decades, the rate increased by 183 per cent in Bihar achieving 47.53 per cent as compared to 197 per cent in Maharashtra (77.57%) and 150 per cent in Kerala (90.92%) (Table 1.5).

Table 1.5: Literacy Rates in Bihar, Maharashtra and Kerala (1971-2001).

States	Literacy rates			
	1971	1981	1991	2001*
Bihar	19.94	32.05	38.48	47.53
Maharashtra	39.18	55.83	64.87	77.27
Kerala	60.42	81.56	89.79	90.92

* Provisional

1.6 DEMOGRAPHIC TRANSITION IN STATES

In Bihar, the proportion of greying population to total population slided down over the last three decades after an initial increase in 1981. This was indicative of fluctuating fertility and mortality behaviour during the three decades. In Maharashtra, it was 5.7 per cent in 1971 which rose to 7.2 per cent in 2001 with gradual rise during the period. In Kerala, from 6.2 per cent in 1971, the percentage increased to 9.7 per cent in 2001 which was quite rapid growth as compared to Maharashtra. (Table 1.6, Fig. 1.6).

Table 1.6: Percentage of Greying Population in Bihar, Maharashtra and Kerala (1971- 2001)

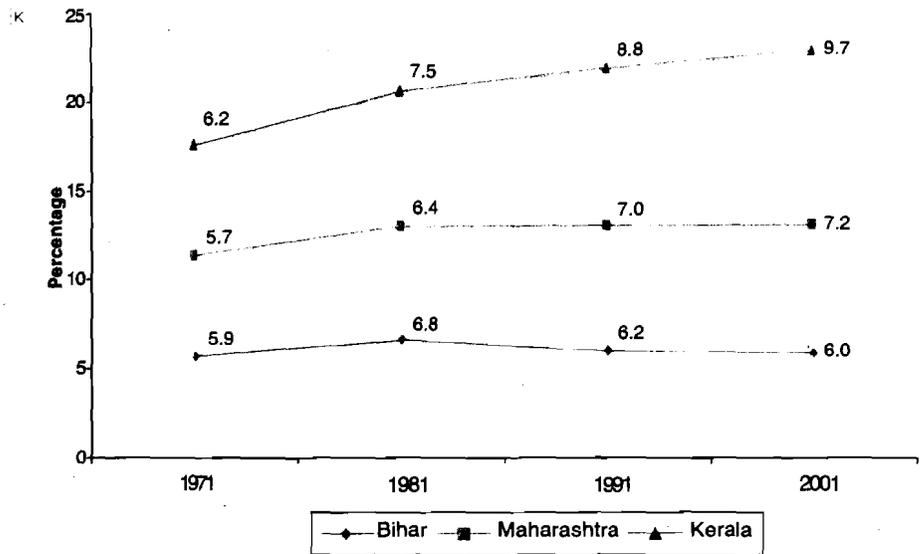| States	Percentage of 60 years population to total population			
	1971	1981	1991	2001*
Bihar	5.9	6.8	6.2	6.0
Maharashtra	5.7	6.4	7.0	7.2
Kerala	6.2	7.5	8.8	9.7

* Projected

Fig. 1.6: Percentage of 60+ years population to total population in Bihar, Maharashtra
and Kerala (1971-2001)

The birth and death rates, infant mortality rate (IMR) and expectation of life at birth
would further focus on the underlying reasons for the differences in the demographic
transitional pattern in these three states (Table 1.7, Fig. 1.7, 1.8, 1.9).

Table 1.7: Birth, Death and Infant Mortality Rates and Expectation of Life at Birth in
Bihar, Maharashtra and Kerala (1971-2001)

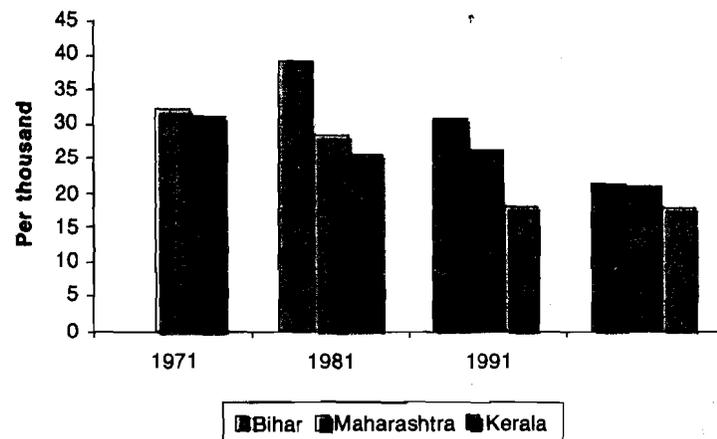| States	Year	Birth rate	Death rate	IMR	Expectation of life	
Bihar	1971*	—	—	—	—	—
	1981	39.1	13.9	118	54.2	515
	1991	30.7	9.8	69	60.1	58.0
	2001	21.5	8.9	63		
Maharashtra	1971	32.2	12.3	105	54.5	53.3
	1981	28.5	9.6	79	59.6	62.1
	1991	26.2	8.2	60	63.5	65.8
	2001	21.1	7.5	48		
Kerala	1971	31.1	9.1	58	60.8	63.0
	1981	25.6	6.6	37	65.4	71.5
	1991	18.3	6.0	16	69.9	73.3
	2001	18.0	6.4	14		

* Not compiled for 1971.

Fig. 1.7: Birth rates in Bihar, Maharashtra and Kerala (1971-2001)
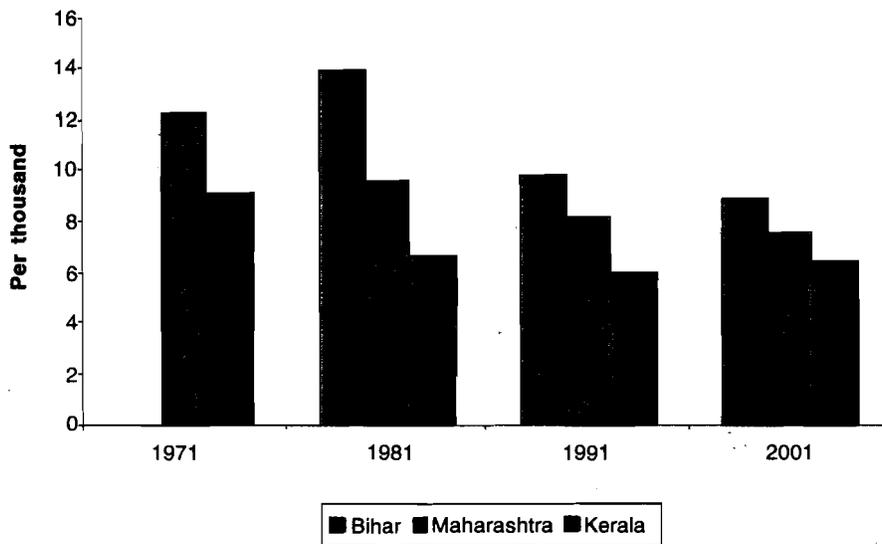
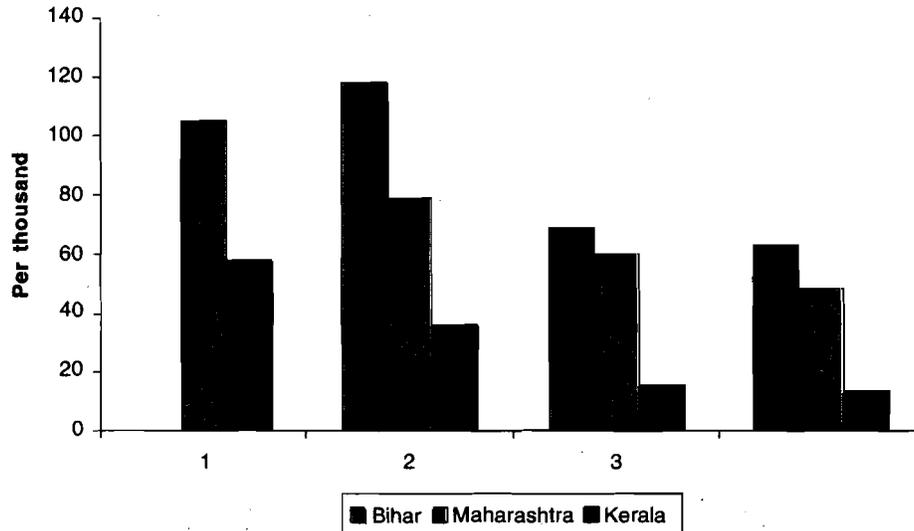Fig. 1.8: Death rates in Bihar, Maharashtra and Kerala (1971-2001)

Fig. 1.9: Infant mortality rates in Bihar, Maharashtra and Kerala (1971-2001)

Although a detailed analysis was not within the present purview, but a simple comparison of the three states data show that social development has a great role to play in enhancing the awareness level of population and bringing down the fertility and mortality level. Higher proportion of greying population is an evidence of greater health care, higher literacy and awareness. Economic development alone cannot bring such a change—it is people.

Check Your Progress 2

1) **Fill in the blanks:**

   a)   By 2025 AD the number of elderly individuals would come to.....................

   b)   In any West European country.....................percent of the population consists of elderly.

2) **State True (T) or False (F).**

   a)   Over a period of five decades (1951-1999) the fall in birth rate was significantly lower as compared to the crude death rate.   (T/F)

   b)   Literacy is an important indicator of social development and is closely associated with demographic transition.   (T/F)

1.7 LET US SUM UP

All individuals age, populations also age. Over the years, there has been a shift in the population structure with an increasing number of the elderly. This demographic transition is a consequence of low birth and low death rate coupled with improved health care and economic status. The phenomenon is more marked in the western world and is slowly being observed in the developing countries.

In India too the effect has begun to be felt. There is wide variation among the states depending upon the trend of mortality and fertility behaviours. Literacy is an important indicator of social development and is closely associated with demographic transition. It has been observed that a higher proportion of elderly in the population indicate better health care facilities, higher literacy and awareness.

1.8 KEY WORDS

Demography : Description of population of any country.

Gerontology : Science which deals with phenomenon of aging and the all issues related to the process.

Infant Mortality Rate : The ratio of infant deaths registered in a given year to the total number of live births registered in the same year.

1.9 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Scientific discipline deals with phenomenon of aging and all the issues related to it.

2) Branch of medicine which deals with diseases of the old age.

3) The three different types of population structions are pyramid, barrel and pillar.

Check Your Progress 2

1) a) 150 million.

b) 15 per cent

2) a) T

b) T