International Journal of Research in Social Sciences
Vol. 14 Issue 01, January 2024,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Demography of Ageing in North-West India: A Geographical Analysis

Dr. Reenu Devi* Dr. Pankaj Aashish** Dr. Arvind Paul***Assistant Professor, RKMV, Shimla (H.P)-INDIA
**Assistant Professor, St. Bede's, Shimla,(H.P)-INDIA.
*Assistant Professor, RKMV, Shimla,(H.P)-INDIA.

Population ageing refers to shifts in the age distribution of the population such that the relative share of persons at older ages increases and the share at younger ages decreases. Ageing is the increase in number and the proportion of elderly over the younger age group (0-14) in the total population over a long period of time In demographic terms, population is said to be ageing when the proportion of people in the older age range increases and the share of children and youth decreases, resulting in an ascending median age. The U.N. defines a country as 'ageing', where the proportion of people over 60 reaches 7 per cent. Population ageing is the most significant result of the process known as demographic transition. The different states in India are at different stages of the demographic transition, as a consequence experiencing the ageing transition also at different levels. The present paper has been made an attempt to study demography of ageing in north western states of India in a comparative perspective.

Keywords: *Population Ageing, Ageing Index, Old Age Dependency, Potential Support Ratio, Median Age, life Expectancy*

Introduction

The population structure of any region can be well-explained by the process of 'Demographic Transition'. The developed countries have been experiencing the process since long period while it is relatively new in the developing countries, due to slower transition. In India the growth of older population is faster than the total population. Population ageing is one of the structural changes in the population, a process that resulted due to demographic transition characterized with the decline of fertility and mortality (Zachariah, 2001; Rajan, Mishra and Sarma, 2000; Chaudhury, 2004; Alam and Mukherjee, 2005; Gulati and Rajan, 1990; Gulati, 1989. India's demographic transition started about 40 years ago and is likely to last for another 30 years (United Nations, 2007). Reduction in mortality means a longer life span for individuals. The process of population ageing emerged recently in the less developed countries which is an ongoing process throughout the world (Rajan, Mishra and Sarma, 1999; Alam and Mukherjee, 2005; Alam and Agarwal, 1999; Gulati and Rajan, 1990; Sengupta and Agree, 2003; Alam, 2004).

Population ageing involves a shift from high mortality/high fertility to low mortality/low fertility and consequently an increased proportion of older people in the total population. Hence, there arises a need to understand the socio-economic as well as demographic dynamics of the elderly population in general (Irudaya Rajan and Mishra, 2000). A recent emphasis on studies pertaining to the elderly in the developing world is

due to their increasing numbers and deteriorating conditions. While their increasing number is attributed to demographic transition, their deteriorating condition is considered as the end result of the fast eroding traditional family system in the wake of rapid modernization and urbanization. As neither of the circumstances is avoidable, the reason seems to be the lack of adequate preparedness (World Bank, 1994).The different states in India are at different stages of the demographic transition, as a consequence experiencing the ageing transition also at different levels. In this context, a number of studies have been undertaken to assess the different dimensions of the population ageing by geographers, economists and planners in different parts in the country and state but a quality study to examine the dynamics and spatial patterns of population ageing in North West India has not been conducted by geographers. So there is a need to conduct a geographical study to assess the spatial variations of population ageing in the study area. Thus the present study would also update the knowledge about the dimensions of population ageing and also helpful for policy makers.

Study area

The study area includes the entire State of Jammu and Kashmir (At the time of the Census, Jammu and Kashmir was a state but from 31 October 2019, it has been split into two Union Territories, namely Jammu and Kashmir and Ladakh), Himachal Pradesh, Uttarakhand, the Union Territory of Delhi, Chandigarh, Punjab, Haryana, and Rajasthan lying approximately between the 23° 33' 68" N to 37° 47' 54" N latitudes and 69° 30' 8" E to 81° 09' 41" E longitudes (Fig. 1.1).

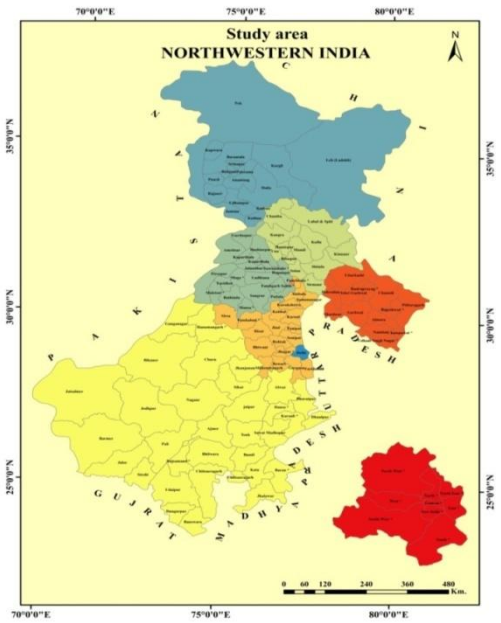


Fig No.1

Data and methodology

Data

The present study shall utilize secondary data of 2001 and 2011 census years and other information published by different departments and corporations. In the present chapter, we have analysed the different aspects of ageing in India using the Data of NSSO surveys for different years, Census of India, Sample registration system, UNFPA etc.

And following indicators have been selected to examine the population ageing and demographic transition:

INDICATORS

1) Proportion of younger and elderly population
2) Percentage of population by broad age group
3) Growth rate of elderly population
4) Sex ratio of elderly population
5) Age and sex composition
6) Median age
7) Ageing index
8) Potential support ratio
9) Old age dependency ratio
10) Total fertility rate
11) Total mortality rate
12) Total infant mortality rate
13) Life expectancy

Methods of study

Old age dependency has been studied at district level in north-west India and following methods have been used to calculate the old age dependency ratio:

$$ODR = \frac{P60+}{P15-59} * K$$

Where, ODR is old age dependency ratio, P60+ and P15-60 denote the population 60 and more than 60 and 15-59 respectively, K=100

In this paper **Ageing Index** has also been calculated by using the following formula:

$$Index\ of\ ageing = \frac{P60+}{P0-14} * 100$$

Where, P60+ denotes the population 60 and more than 60 and P0-14 respectively. **Ageing index** will be calculated by using method adopted by Singh (2003) and Shrestha and Shrestha (1996).

Median age is has been calculated with the following formula:

$$M = L + \frac{(N/2 - cf)}{f} * c$$

M= median
L= Lower boundary of median class
N= Total frequency
cf = cumulative frequency before median class
c= class interval
f= frequency of median class

Potential support ratio has been calculated by using the following formula:

$$\textbf{Potential support ratio} = \frac{\textbf{persons in the age group 15–64}}{\textbf{Number of persons in the group of 65 and above}}$$

Objectives of the Study

1. To analyse the trends and patterns of Ageing of population in North West India.
2. To examine the socio-economic status of aged population in the study area.
3. To describe the major causes of population ageing taking place in North West India.

Discussion and analysis:

Trends and patterns of population ageing in North West India

In India, as a result of the change in the age composition of the population over time, there has been a progressive increase in both the number and proportion of aged people. The Indian population has increased from 361 million in 1951 to 1.027 billion in 2001 and further to 1.21 billion in 2011. Simultaneously, the number of older people has increased from 19 million (i.e. 4 percent of total population) to 77 million and further to roughly 93 million (i.e. 7.5 percent of the total) during the same time span (Registrar General of India, SRS Statistical Report 2011).

Table no. 1 shows that percentage share of elderly population in total population by sex in India and North West India. According to Census of India, there has been a steady rise in the share of elderly population (aged 60 years or above) in the total population over the decades. The proportion of elderly people in the population of India rose from 5.6 percent in 1961 to 7.5 percent in 2001. According to SRS statistical report, in 2011 it rose further to 8.58 percent. Similarly the state of Punjab and Himachal Pradesh recorded higher proportion of elderly population in 2011 census i.e. 10.33 and 10.24 percent respectively in the study area. Likewise the union territory of Chandigarh and National Capital Territory recorded lowest proportion of elderly population in 2011 census in the study region with 6.36 and 6.83 percent respectively.

Table No: 1 Proportion of younger (<15 years) and elderly (60+ years) populations

Sr. No.	India and States	2001		2011	
		<15	60+	<15	60+
	India	**35.35**	**7.45**	**30.76**	**8.58**
1	Jammu & Kashmir	35.66	6.66	33.81	7.36
2	Himachal Pradesh	31.00	9.01	25.86	10.24
3	Punjab	31.27	9.00	25.54	10.33
4	Chandigarh	29.00	4.99	25.25	6.36
5	Uttrakhand	36.36	7.71	31.02	8.93
6	Haryana	35.85	7.49	29.70	8.65
7	Delhi	32.44	5.20	27.19	6.83
8	Rajasthan	39.89	6.74	34.61	7.46

Source: computed by the author

The changing proportions of the aged have been accompanied by steady decline in the proportions of children. Over the half century the proportion of children (0-14 years) dropped worldwide from 34.3 percent in 1950 to 30 percent in 2000. In India, the proportion of children (0-14) also dropped 35.35 percent in 2001 to 30.76 percent in 2011. Punjab and Himachal Pradesh recorded lowest proportion of younger population in 2011 census i.e. 25.54 and 25.86 percent respectively in the study area.

Distribution of Population by Broad Age Groups

Dividing the total population into three major age groups (i.e. age in years 0-14, 15-59 and 60 and above) it has been observed that the proportion of population in the younger age-groups (0-14 years) has dropped sharply and accordingly the proportion of population in the working-age-group (15-59 years) and the aged (60 years and above) has shown a tendency to increase. The proportion of population in the 0-14 age group which was 35.3 percent in 2001 dropped to 29.5 in 2011 (SRS Statistical Report, 2011).

Table No.2: Percentage distribution of population by broad age groups, North- West India, 2001-2011

States Name	2001			2011		
	0-14	15-59	60+	0-14	15-59	60+
Chandigarh	29.00	65.87	4.99	25.25	68.36	5.63
Delhi	32.44	62.21	5.20	27.19	65.87	6.83
Haryana	35.85	56.28	7.49	29.70	61.52	8.65
Himachal Pradesh	31.00	59.74	9.01	25.86	63.75	10.24
Jammu & Kashmir	35.66	57.23	6.66	33.81	58.71	7.36
Punjab	31.27	59.34	9.00	34.61	57.54	7.46
Rajasthan	39.89	52.85	6.74	25.54	63.98	10.33
Uttaranchal	36.36	55.72	7.71	31.02	59.88	8.93
India	**35.3**	**57.25**	**7.45**	**29.5**	**61.92**	**8.58**

Source: computed by author

While the proportion of elderly population (60 years and above) which was about 7.45 percent during 2001 rose to 8.85 percent in 2011. All the states of North West India follow the same pattern as India. In other words, the process of ageing of population has already begun in India (table no. 2).

Gender-wise and residence wise distribution of elderly population

The gender-wise and residence wise distribution of aged (60+) in total population for different states has also been shown in Table no.2. Two interesting observations have been observed, first regarding inter-state variation in size distribution of the elderly population, it has been observed that the share of aged population in most of the states exceed than all- India level (8.58 percent).

Table No. 3: Percentage share of elderly population (aged 60 years and above) in total population by sex in north western India, 2001-2011

States Name	2011					2001				
	Total	Male	Female	Rural	Urban	Total	Male	Female	Rural	Urban
Chandigarh	5.63	5.34	5.98	3.42	5.69	4.99	4.68	5.38	3.23	5.19
Delhi	6.83	6.42	7.32	6.48	6.84	5.2	4.82	5.66	4.53	5.24
Haryana	8.65	8.07	9.32	9.16	7.70	7.49	7	8.06	7.93	6.41
Himachal Pradesh	10.24	9.79	10.71	10.51	7.80	9.01	8.77	9.25	9.31	6.25
Jammu & Kashmir	7.36	7.27	7.46	7.16	7.88	6.66	6.82	6.47	6.76	6.36
Rajasthan	7.46	6.84	8.12	7.62	6.97	9	8.56	9.5	9.82	7.39
Punjab	10.33	9.86	10.85	11.29	8.73	6.74	6.22	7.31	6.99	5.95
Uttarakhand	8.93	8.60	9.27	9.61	7.37	7.71	7.55	7.87	8.29	6.03
India	**8.45**	**7.7**	**8.4**	**8.1**	**7.9**	**7.57**	**7.1**	**7.8**	**7.7**	**6.7**

Source: Computed by the author

This was particularly true for Punjab, Himachal Pradesh, Uttrakhand and Haryana. Among the states the proportion of elderly in total population was more than 8 percent. In Punjab the proportion of elderly in total population of the state was highest (10.33 percent) in year 2011. Secondly, regarding feminization of the elderly population it has been found that elderly female outnumbered elderly male in almost every state of the study area.

In the study area, as a result of the change in the age composition of the population over time, there has been a progressive increase, in the number and proportion of aged people. Table no. 3 shows distribution of elderly population to total population in the study area by age-groups during the study period 2001-2011.

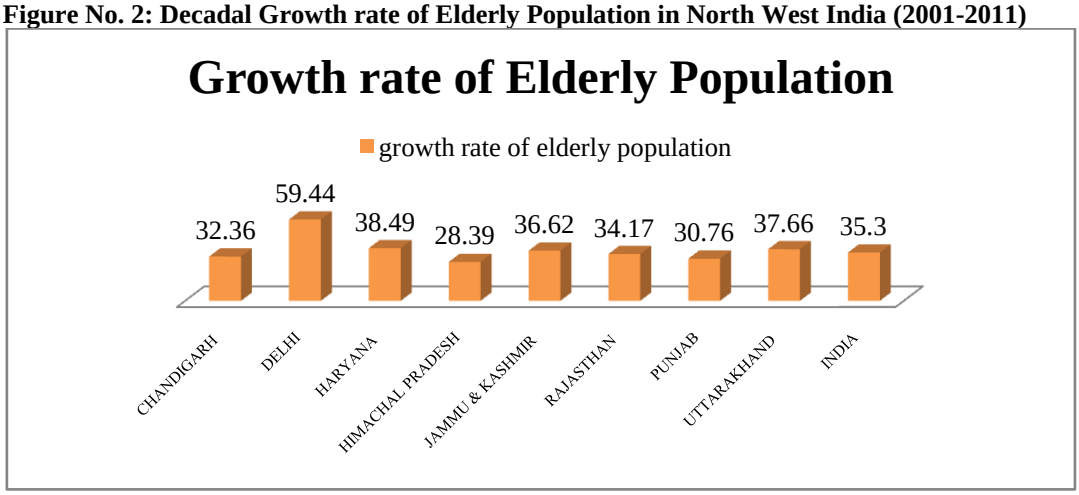
Growth rate of elderly population

The percentage of the elderly in India has been increasing at an increasing rate in recent years and the trend is likely to continue in the coming decades. The share of population over the age of 60 is projected to increase from 8 percent in 2015 to 19 percent in 2050. By the end of the century, the elderly will constitute nearly 34 percent of the total population in the country (India ageing report 2017). Though the growth rate of the elderly population dipped slightly in the 1960s and 1980s, it was always higher than the general population and the difference between the two has widened over the period.

In 2001-2011 the growth rate of general population declined to 17.64 percent as against 35.3 percent growth in elderly population. Figure no.2 shows that Punjab,

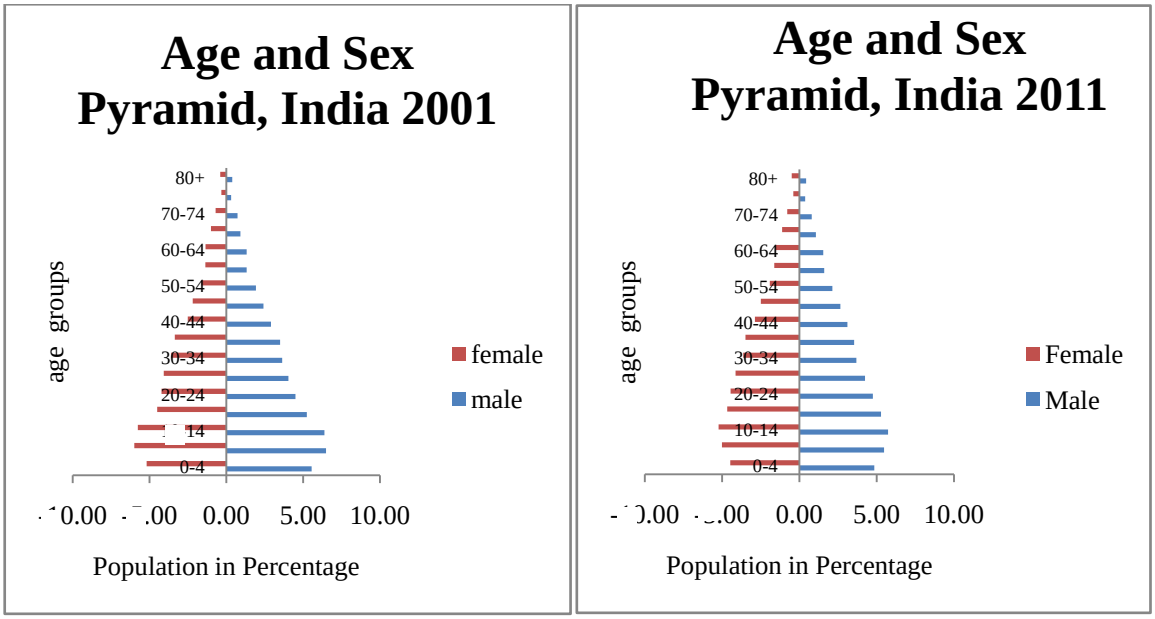
Himachal Pradesh, Rajasthan and Chandigarh have lower decadal growth rate than the nation in elderly population and Delhi, Haryana Jammu and Kashmir and Uttrakhand have higher growth rate than India.

Figure No. 2: Decadal Growth rate of Elderly Population in North West India (2001-2011)



Source: census of India, 1951-2011

Change in Age and Sex Composition



Source: census of India Fig No. 3

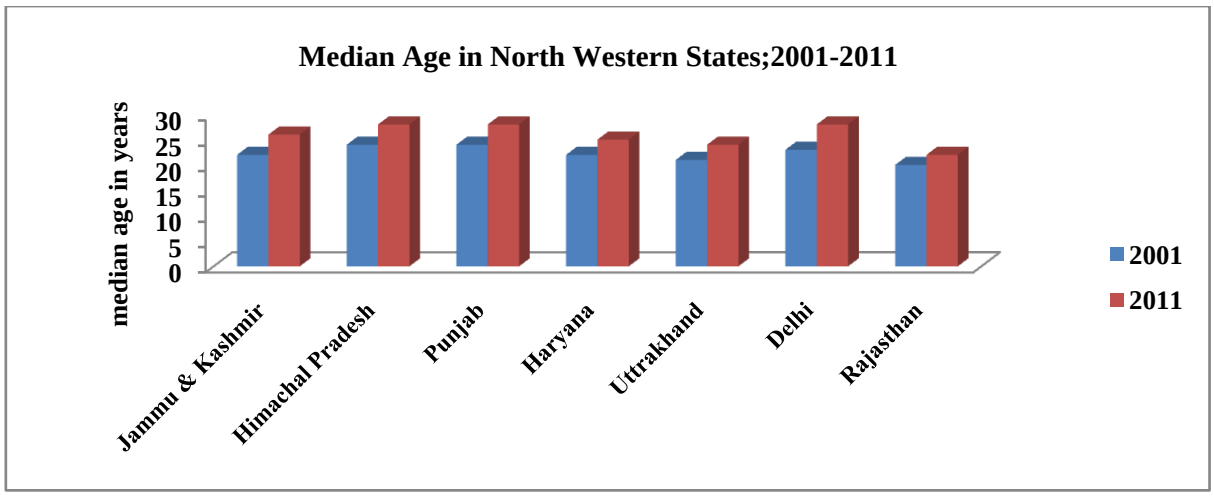
The substantial change in the population age-sex structure of India in the course of rapid demographic transition has been depicted in figure no.4. India's population pyramid evolves from a bottom heavy distribution of typical younger population during 2001 to a relatively mature population with a bulge in the higher age groups during 2011.

The share of young age population (<15 years) seems to decline from 35.35 percent in 2001 to 30.76 percent during 2011. At the same time, the share of elderly (60+ years) rises up to 8.58 percent in 2011 from the initial value of 7.45 percent during 2001.

Median age in north-west India

The median age of a population is that age that divides a population into two groups of the same size, such that half the total population is younger than this age, and the other half older. The evolving population dynamics in India arising out of the joint effect of declining fertility and increasing longevity and consequent shifting of the population age structure cannot be ignored. The trend in the median age (in years) of the population is presented in Fig no.5 for the period from 2001 to 2011. For the year 2000, the median age in the United States was 36 years, a typical age for most developed countries and twice the median age for Africa (United Nations 2^12). In 2001, the median age of India's population was 23 years, i.e., half of the Indian population was at below age 23 years.

Figure no. 4: Median Age in North-Western States; 2001-2011



Source: census of India

Figure no. 4 shows that among north-western states of India, Rajasthan was the state with youngest (20 years) population and Himachal Pradesh and Punjab were the states with oldest (24 years) population in 2001. In 2011 the median age increase in the study area and Rajasthan remained the state with youngest (22 years) population and Punjab, Himachal Pradesh and Delhi were the states with oldest (28 years) population. Over the next five decades, the median age of India's population is likely to increase by 16 years, to reach 39 years by 2051 (United Nations, 2007).

Ageing index of North -West India

The *ageing index* is defined as the number of persons aged 65 years or over per hundred persons under age 15. Index of Aging is an important indicator of age structure which measures the longevity defined as the percentage of aged population to child population. In the developed and developing countries, the ratio is more than 100 due to higher proportion of elderly people. As per norms, if the index is below 15 percent the

population is categorized as underdeveloped (Gavrilov and Heuveline, 2003). This is also referred to as elder-child ratio. The values of ageing indices are much lower in developing countries than in the developed world, but the proportional rise in the aging index in developing countries is expected to be greater than in developed countries (United Nations 2007). The index of ageing was 23.4 elderly persons for every 100 children but this number is projected to increase rapidly to 53 elderly persons for every 100 children by 2026, signifying an increasing pace of ageing in the coming decades (Subaiya and Bansod, 2011).

Table No. 4: Ageing Index in North-Western states; 2001-2011

India/States	2001	2011
India	**12.3**	**17.1**
Jammu & Kashmir	10.7	17.2
Himachal Pradesh	18.9	25.1
Punjab	19.3	24.7
Haryana	13.1	15.8
Uttrakhand	12.9	15.6
Delhi	9.8	17.6
Rajasthan	9.4	12.5
Chandigarh	17.2	22.3

Source: calculated by author

Table no.4 shows the ageing index of the study area. A wide variation is observed in ageing index in the study area. Himachal Pradesh (25.1) and Punjab (24.7) were the states where ageing index was very high in 2001 and 2011. Delhi and Chandigarh were joined with the group with the index value of 17.6 and 22.3 respectively. The ageing index was remained relatively low in the demographically lagging state of Rajasthan and Haryana.

Socio-economic status of elderly

Old age is the later part of life, which is characterized by deterioration in physical capacities. The deterioration brings changes in the person's active participation in different areas of life, role playing and role performance and from economic self sufficiency to dependence. As a person moves along the life cycle to the higher age group a general change occurs in his or her living environment. This is mainly because as the age goes up the ability of the individual to convert their endowments into output declines. The elderly person looses out their life time amenities as they passes through a lean period of their life (Bagchi, 2000). The socio-economic status of elderly in the northwest India has been discussed as below:

Trend in sex ratio of elderly population

The progressive increase in the proportion of females to males in the elderly population is also evident in the trend in the sex ratio of elderly population aged 60 years or over. Table no.5 depicts the Trend in Sex Ratio (females per 1000 males) for elderly according to Census of India. In India, the sex ratio among elderly people was as high as 972 in 2001 but subsequently dropped to about 968 in 2011and all the northwest Indian states follows the same trend as the nation. It has been found that there was relatively higher ratio of females to males in elderly population in 2001 and 2011 in the study area. Table no.4 shows that the union territory, Chandigarh ranked first in sex ratio of elderly population with 1092 in 2001 & 2011 and Rajasthan is lagging behind with 908.

Table no.5: Trend in Sex ratio (Number of Females per 1000 males) for elderly

States Name	Sex Ratio Of General Population		Sex Ration Of Elderly Population	
	2011	**2001**	**2011**	**2001**
Chandigarh	818	777	1092	1122
Delhi	868	821	1011	1038
Haryana	879	861	985	1009
Himachal Pradesh	972	968	941	979
Jammu & Kashmir	889	892	1097	1182
Punjab	895	876	1015	1029
Rajasthan	928	921	908	923
Uttarakhand	963	962	963	997
India	**940**	**933**	**968**	**972**

Source: Census of India for 2001-2011

Marital status

Marital status of the elderly assumes special significance in the context of care in old age as it is known that those who are married fair better in all economic and social aspects than those who are single. A major concern related to the increasing proportion of the elderly women, especially widows in the population. Two reasons are given for the marked gender disparities in widowhood in India (i) longer life span of women compared to that of men and (ii) the general tendency in India for women to marry men older than themselves (Gulati and Irudaya Rajan 1999).

Table no. 6: Marital status of elderly in North West India, 2001

States	Never Married		Married		Widowed		Divorced/Separated	
	Male	Female	Male	Female	Male	Female	Male	Female
Chandigarh	3.28	1.85	83.76	57.44	12.66	40.41	0.29	0.31
Delhi	2.29	1.51	81.62	51.64	15.95	46.64	0.14	0.21
Haryana	3.73	0.95	78.71	59.54	17.43	39.38	0.13	0.13
Himachal Pradesh	3.46	1.22	80.46	46.28	15.50	52.09	0.58	0.41
Jammu & Kashmir	3.65	2.49	80.89	57.39	15.08	39.69	0.38	0.43
Punjab	5.14	1.30	77.50	60.01	17.06	38.40	0.31	0.28
Rajasthan	2.63	0.79	81.43	49.61	15.77	49.47	0.16	0.13
Uttrakhand	2.89	1.27	79.90	45.77	17.01	52.64	0.21	0.32

Source: Census of India for 2001-2011

Table no 6 and 7 shows the marital status of the elderly in north western Indian states. Here we take a logistic position that those unmarried, separated and widowed are of same category with almost identical position in the society, as long as quality of life is concerned. The widowhood seems to be chronic problem among the elderly in India especially among elderly women. Almost in all states more than sixty percent of women were living without spouse despite significant spatial difference that exists in India while prevalence of widowhood among men was as low as twenty percent in most of Indian states. The state of Himachal Pradesh has highest percentage of widowed female in both the years. The trend of high incidence of loss of spouse was making life insecure for the elderly especially that of women in North West India in their life.

Table no. 7: Marital status of elderly in North West India, 2011

States	Never Married		Married		Widowed		Divorced/Separated	
	Male	Female	Male	Female	Male	Female	Male	Female
Chandigarh	2.68	1.76	83.69	57.75	13.19	40.09	0.43	0.40
Delhi	2.82	2.03	81.46	52.66	15.49	44.95	0.22	0.35
Haryana	3.36	1.36	80.61	58.92	15.85	39.51	0.18	0.22
Himachal Pradesh	3.01	1.38	81.36	46.52	15.09	51.59	0.58	0.55
Jammu & Kashmir	3.22	2.24	79.52	55.26	16.60	41.82	0.66	0.67
Punjab	4.32	1.46	77.46	58.91	17.70	39.21	0.52	0.42
Rajasthan	2.91	1.20	81.76	52.97	15.10	45.62	0.22	0.21
Uttarakhand	4.01	2.03	80.20	46.20	15.53	51.38	0.26	0.39

Source: Census of India for 2001-2011

Old age dependency ratio

The dependency ratio is the percentage of the combined population aged less than 15 years and aged 65 years and above, divided by the population aged 15–64 years (Barclay, 1958). However several authors as well as Census of India (2001, 2011) have considered above 60 years as elderly dependents and as such dependency ratios reported

by those studies may be slightly higher. The dependency ratio (derived from the age composition of a population) is based on the fact that every member of a society is a consumer and only some members are producers (Thompson, 1958).

Table No.8: old age dependency ratio in North West India (2001-2011)

States	2001			2011		
	Total	Male	Female	Total	Male	Female
Chandigarh	7.57	6.97	8.38	8.24	7.74	8.86
Delhi	8.35	7.59	9.32	10.38	9.71	11.15
Haryana	13.31	12.42	14.36	14.07	13.18	15.06
Himachal Pradesh	15.08	14.82	15.35	16.06	15.49	16.65
Jammu & Kashmir	11.63	11.78	11.46	12.53	12.40	12.68
Punjab	15.16	14.53	15.88	16.14	15.56	16.78
Rajasthan	12.76	11.74	13.86	12.96	11.90	14.10
Uttarakhand	13.83	13.72	13.95	14.91	14.56	15.27

Calculated by author

In the study area, table no. 8 shows that the state of Punjab (15.04%) and Himachal Pradesh (15.08) has higher old age dependency ratio in 2001 that increased to 16.14 and 16.06% in 2011 respectively. The union territory Chandigarh and NCT Delhi have lowest old age dependency ratio. The old age dependency ratio is persistently increasing in the population of Punjab and Himachal Pradesh. On the whole dependency ratio in aged population has been growing but slower rate. Such a trend, gives an indication of the increasing burden of the aged people in the study area. Since the old age dependency is on increase, suitable provisions may have to be made under social welfare programmes for the benefit of the elderly in the fields of health, nutrition, old age pension, leisure time activities and other amenities, changing life styles of the people and morbidity pattern among the elderly.

Potential Support Ratio

The potential support ratio is an alternative way of expressing the numerical relationship between those more likely to be economically productive and those more likely to be dependants. It is the inverse of the old-age dependency ratio. The potential support ratio is the number of persons aged 15 to 64 per person aged 65 or older. Table no.9 shows that in 2001, the potential support ratio was highest for Chandigrah (20.7) followed by Delhi (20.3) and was lowest for Punjab (10.3). In 2011 the study area experience reduction in the potential support ratio. In 2011 the potential support ratio was highest for Delhi (16.6) and lowest in Himachal Pradesh (10.7).

Table No. 9: Potential Support Ratio in North-Western states; 2001-2011

India/States	2001	2011
Jammu & Kashmir	15.7	14.4
Himachal Pradesh	10.6	10.7
Punjab	10.3	11.2
Haryana	12.5	14.1
Uttrakhand	12.5	12.3
Delhi	20.3	16.6
Rajasthan	14.9	14.3
India	13.8	12.8
Chandigarh	20.7	12.6

Source: calculated by author

Over time, the potential support ratio will reduce significantly for all the states. India will experience more than sixty percent reduction in potential support ratio by 2051 (13.8 in 2001 to 5.1 in 2051) (UNPF, 2017). The reduction will be highest for Delhi (81 percent) and other Indian states will experience more than seventy percent of reduction in potential support ratio by 2051.

Factors Responsible for Ageing of Population in North West India

The changes in the age structure which occurred in the developing countries, leading to the ageing of the population, are primarily because of the long term downward trend in the birth rates in these economically advanced countries. There is substantial improvement in life expectancy throughout the world. This is particularly due to a reduction in child mortality which reflects improvement in public health and medical advances in the prevention of many fatal infectious diseases in childhood. Since the mortality level of the developed countries was already low and the expectation of life at birth was very high, further improvement in mortality condition in these countries affected the older age groups and led to a further ageing of the population.

Reductions in Fertility

The sustained fertility decline that occurred during the twentieth century in the industrialized nations has caused the average TFR to fall from an already low level of 2.8 children per woman in 1950-1955 to an extremely low level of 1.6 children per woman in 2000-2005 (United Nations 2002). In the less developed regions, the major fertility declines occurred after 1970's. UN (2013) report states that even though total fertility in less developed regions is still well above that of the more developed regions, it is projected to fall to 2.3 children per woman in 2045-2050, narrowing the gap to 0.4 children per women in more developed regions.

Table no.10: Total Fertility rate of India and North-Western states of India (2003-2012)

Sr.No.	States	TFR									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
	INDIA	**3**	**2.9**	**2.9**	**2.8**	**2.7**	**2.6**	**2.6**	**2.5**	**2.4**	**2.4**
1	Haryana	3	3	2.8	2.7	2.6	2.5	2.5	2.3	2.3	2.3
2	Punjab	2.3	2.2	2.1	2.1	2	1.9	1.9	1.8	1.8	1.7
3	Rajasthan	3.8	3.7	3.7	3.5	3.4	3.3	3.3	3.1	3	2.9
4	Delhi		2.3	2.2	2.1	2	2	1.9	1.9	1.8	1.8
5	Himachal Pradesh		2.1	2.2	2	1.9	1.9	1.9	1.8	1.8	1.7
6	J & K		2.4	2.4	2.3	2.3	2.2	2.2	2	1.9	1.9
7	Uttarakhand	..	..	..	..	..	..	..	..	..	..
8	Chandigarh	1.7	1.7	1.8	1.8	1.8	..	..	..	..	..

Source: Abridged Life Table 2006-10 and 2010-14 Office of the Registrar General and the Census Commissioner of India, Ministry of Home Affairs,

The TFR in India was 5.2 children per woman by the year 1971. With the passage of three and a half decades, it reached to the level of 2.4 children per woman by 2012 (SRS 2011). The corresponding figures of north western states for the same period were declining. Table 4.7 depicts total fertility rate in India. Total Fertility Rate declined from 3 percent in 2003 to 2.4 percent in 2012. Himachal Pradesh and Punjab have been observed lowest fertility rates as compared to other north-western sates in 2012.

Reductions in crude death rate and infant mortality rate

Population ageing or ageing of population is the ultimate consequence of demographic transition where mortality first and then fertility falls from a very high level to extremely low levels. Such alterations in the mortality and fertility results in an increase in the number of the elderly fall in the number of children and young persons, and relative stability in the number in the central age group (Roland Pressat 1989). .Crude Death Rate (CDR) is another important measure as it, in combination with the crude birth rate determines population growth rate. It is the number of deaths in a year per 1000 population of the midyear population. It registered a decline from 8 deaths per 1000 population in 2003 to 7 deaths per 1000 population in 2013 (Table no.11). The maximum decline in CDR was observed in Rajasthan during the period 2003-2013. Chandigarh has the lowest crude death rate according the SRS bulletin 2013.

Table no. 11: Crude Death Rate of India and North-Western states of India (2003-2013)

Sr.No.	States	Crude Death Rate										
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	INDIA	**8**	**7.5**	**7.6**	**7.5**	**7.4**	**7.4**	**7.3**	**7.2**	**7.1**	**7**	**7**
1	Haryana	7.1	6.6	6.7	6.5	6.6	6.9	6.6	6.6	6.5	6.4	6.3
2	Punjab	7	6.4	6.7	6.8	7	7.2	7	7	6.8	6.8	6.7
3	Rajasthan	7.6	7	7	6.9	6.8	6.8	6.6	6.7	6.7	6.6	6.5
4	Delhi	5	4.7	4.6	4.7	4.8	4.8	4.4	4.2	4.3	4.2	4.1
5	Himachal Pradesh	7.1	6.8	6.9	6.8	7.1	7.4	7.2	6.9	6.7	6.7	6.7
6	J & K	5.7	5.6	5.5	5.9	5.8	5.8	5.7	5.7	5.5	5.4	5.3
7	Uttarakhand	6.5	7.2	7.4	6.7	6.8	6.4	6.5	6.3	6.2	6.1	6.1
8	Chandigarh	3.8	2.9	4.5	4.1	4	4.4	3.9	3.9	4.1	4	4

Source: Abridged Life Table 2006-10 and 2010-14 Office of the Registrar General and the Census Commissioner of India, Ministry of Home Affairs,

Life Expectancy

With the rapid advancement in medical science and technology it has now become easier to control various dreaded diseases which were the cause of high mortality earlier. This has resulted in a steady increase in the expected length of life or life expectancy at birth or life expectancy at age 0. Due to various biological factors, generally women live longer than men but still because of some social factors adverse to women, India is one of the few countries of the world where life expectancy at birth was slightly in favour of males till about 1980 (Gulati 1989).

Table no. 12: Life Expectancy at Birth, North Western Indian states

States	2006-10			2010-2014		
	Total	Male	Female	Total	Male	Female
Haryana	67	67	69.5	68.6	66.3	71.3
Himachal Pradesh	70	67.7	72.5	71.6	69.3	74.1
Jammu and Kashmir	70.1	69.2	71.2	72.6	70.9	74.9
Punjab	69.3	67.4	71.6	71.6	69.7	73.8
Rajasthan	66.5	64.7	68.3	67.7	65.5	70.2
Delhi	73.1	71.4	74.8	73.2	72	74.7
Chandigarh	DNA	DNA	DNA	DNA	DNA	DNA
Uttrakhand	DNA	DNA	DNA	71.7	69.1	74.5

Source: Abridged Life Table 2006-10 and 2010-14 Office of the Registrar General and the Census Commissioner of India, Ministry of Home Affairs.

Table no.12 and 13 shows the expectation of life at birth and at age 60 for north western states of India by sex for the period 2006-10 and 2010-2014. Among the north western states of India, while the expectation at birth was highest in Delhi (72 for males

and 74.7 for females) for the period 2010-14 followed by Jammu and Kashmir (70.9 for males and 74.9 for females), but if we look at life expectation at age 60 Jammu and Kashmir stood at top (19.8 for males and 23.1 for females). In terms of male expectation of life at age 60 for the period 2010-2014, Jammu and Kashmir was followed by Punjab (20.4) and Uttrakhand. An important feature of population ageing is therefore the greater longevity of women than men, a differential which has increased during the latter half of the twentieth century.

Table no. 13: Life expectancy at the age 60, north-western Indian states

States	2006-2010			2010-14		
	Total	Male	Female	Total	Male	Female
Rajasthan	18.8	17.2	20.4	18.6	16.9	20.6
Haryana	18.8	18.8	20.1	19	17.5	20.6
Himachal Pradesh	19.3	17.9	20.9	20.1	18.5	21.6
Uttrakhand	DNA	DNA	DNA	20.4	18.9	22.3
Punjab	19.6	18.7	20.5	20.4	19.3	21.3
Delhi	DNA	DNA	DNA	20.3	19.6	20.8
Jammu & Kashmir	12.4	18.1	19.9	21.6	19.8	23.1
Chandigarh	DNA	DNA	DNA	DNA	DNA	DNA

Source: Abridged Life Table 2006-10 and 2010-14 Office of the Registrar General and the Census Commissioner of India, Ministry of Home Affairs,

Increase in the life expectancy of older people reflected improvement in the quality of life in the later part of the twentieth century and to a limited extent some of the achievements of medical science, although we are not yet successful in combating some of the illnesses that are major causes of death among the elderly such as heart attacks, lung cancer, stroke and circulatory diseases.. Thus these factors differentially affect the sexes within the same age cohort and contribute to the increasing longevity of women to men.

Conclusions

- We can conclude that due to the ongoing demographic transition, India faces major age structure changes with an accelerating growth in the aged (60+) population. The cause of this change is decline in fertility reinforced by continued decline in mortality levels.
- In India, as a result of the change in the age composition of the population over time, there has been a progressive increase in both the number and proportion of aged people.

- The state of Himachal Pradesh (10.33 %) and Punjab (10.24) has the highest number and percentage of elderly population for last two decade among the northwestern states of India.
- These two states secured the top position in terms of median age, ageing index and life expectancy ratio in the study area.
- The proportion of elderly female to elderly males has been found higher than in the general population for all the years of study which indicates the Feminization of Ageing
- Ruralisation of the Elderly is observed in the study area as the proportion of elderly in rural area is higher than the urban area.
- The improvement in life expectancy and decline in crude death rate are particularly due to the improvements in public health and medical advances in the prevention of many fatal infectious diseases and both are the major cause for the increase in elderly population.

Recommendations and Suggestions

- Hastening growth in size and very poor socio-economic conditions of the aged need serious consideration by planners and policy makers because the priority for the welfare of aged has been low amongst the various welfare schemes because of some considerations like the belief that there is no real problem of the elderly in Indian society and the family should take care of the aged people.
- As the ruralisation of ageing is occurring in the study area as well as in India also, the rural aged needs much greater consideration not only because of their size, but also for their serious poverty issues with very high socio-economic disparities.
- Gender discrimination is evident from many of our empirical analysis. Women also face serious problem in their daily living. So special programmes need to be devised for the elderly women.
- Old age dependency ratio is speeding up so financing of old age income to be examined because Public pillared old age income security is essential.

References

Alam, Moneer and M.Mukherhee. 2005. Aging, activities of daily living disabilities and the need for public health initiatives: some evidence from a household survey in India. *Asia Pacific Population Journal*, 20(2) : 47-76.

Alam, Moneer and R.N. Agarwal. 1999. Ageing, Macro economic implications and health insurance requirements in India. *Indian Journal of Labour Economics*, 42(3) : 471-500.

Alam, Moneer. 2004. Aging, old age income security and reforms: an exploration of Indian situation. *Economic and Political Weekly*, 39(33) pp. 3731-40.

Bagchi, Kalyan., 2000. Healthy Ageing, *Health and Population: Perspective and Issues*. 23(1): 11-16.

Bali, Arun P. 2001.*Care of the Elderly in India: Changing Configuration*. Shimla: IIAS

Barclay, G.W. 1958. *Techniques of Population Analysis*, John Wiley & Sons, Newyork, pp 16-55.

Chakraborti, Dhar. R. 2004. *The Greying of India: Population Ageing in the context of Asia.*New Delhi: Sage Publication, pp – 33-53.

Chaudhury, Rafiqual Huda .2004. Aging in Nepal. *Asia Pacific Population Journal*, 19(1): 61-80

Gavrilov A. Leonid and Heuveline, Patrick. 2003. *Aging of Population*, Macmilan reference, the Gale group, Inc. - a division of Thomson learning, Inc., USA. In K. Bharthi. 2014. Dependency Ratio and Index of Ageing. *Asian Resonance* 3 (2): 151-156

Gulati, S.C. 1989. Demographic determinants of the aging process: A cross-country analysis. *Demography India* 18(1 & 2): 211-225

Gulati, S.C. and S. Irudaya Rajan. 1990. Social and economic implications of population aging in Kerala, India. *Demography India*, 19(2): 235-50

India Ageing Report (2017) *Caring for Our Elders: Early Responses* published by UNFPA

Issues, 14(2).

Kumar, Amit and Singh, M.B. 2009. Old age Population in Varanasi city: An Overview. *National Geographical Journal of India* 55(4):13-24

Office of the Registrar General and Census Commissioner of India Sample Registration System Bulletin (2013).

Office of the Registrar General and Census Commissioner of India. (2011). Report of Technical Group on Population Projection 2001- 2026.

Prakash, I.J. 1997. Women and Ageing.*Indian Journal of Medical Research* 29(1&2): 396-408.

Pressat, Roland., and Christopher Wilson. 1989. The Dictionary of demography. Blackwell Publications. UK.

Rajan, S Irudaya and U.S. Mishra. 2000. Ageing in India. *Indian Social Science Review*. 2(1) :1-48.

Rajan, S. Irudaya and U.S. Mishra., 2000. Ageing in India. *Indian Social Science Review* 2(1):1-48.

Sengupta, Manisha and Emily M. Agree. 2003. Gender, health, marriage and mobility difficulty among older adults in India. *Asia Pacific Population Journal*, 18(4) pp. 53-65.

Shrestha, G., & Shrestha, S. L. 1996. Population aging in Nepal and some of its Demographic Measures. Proceedings of the International Seminar on Ageing in SAARC Countries. Bangladesh: University of Rajshahi.

Singh, M. L. 2003. Ageing of population of Nepal. *Population Monograph of Nepal II*

Thompson, W.E., 1985. Pre-retirement anticipation and adjustment, *Journal of Social*

Thompson, W.S. and Lewis, D.T. 1965. Population Problems, 5th Ed., Mc-Graw Hill Book Company, New York.

United Nations, 2015. World Population Prospects, 2015 Revision, Department of Economic and Social Affairs, United Nations.

United Nations, 2015. World Population Prospects, 2015 Revision, Department of Economic and Social Affairs, United Nations.

United Nations, 2007, Department of Economic and Social Affairs, Population Division

United Nations. 2012, World Population Prospects: The 2012 Revision, Population Division, Department of Economic and Social Affairs, UN, New York

United Nations. 2013. World Population Ageing 2013. Population Division. New York. ST/ESA/SER.A/348.

World Bank. 1994. Averting the old Age Crisis: Policies to Protect the Old and Promote Growth. New York: Oxford University Press.In Bali, Arun P. 2001.*Care of the Elderly in India: Changing Configuration*. Shimla: IIAS

World Bank., 1994. Averting the old Age Crisis: Policies to Protect the Old and Promote Growth. New York: Oxford University Press. In Bali, Arun P. 2001.*Care of the Elderly in India: Changing Configuration*. Shimla: IIAS

Zachariah, K.C. 2001. Coping with Demographic Transition. *Economic and Political Weekly* 36(21):1938-40