

Understanding the Frontiers of Human Longevity in India: Imperative and Palliative Care

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Abstract

This article provides a theoretical and empirical insight on the study of population aging in India, with the special reference to the causes that have made it extremely significant. It evidently looks into the factors that are extensively associated with the process of population aging and have contributed to the Indian society. Demographically speaking, in the Indian context, the process of demographic transition has resulted from a falling birth rate, a slowing death rate, and spike in life expectancy. In the context of developing countries, the concept of population aging has been brought from developed countries. Initially, the outcomes of demographic transition had been experienced by developed regions followed by the rest of the world. Finally, it examines the consequences of complications that arise due to growth in life expectancy at birth, and further suggests the probable remedies to both strategy developers and policy-makers.

Keywords: Aging, demographic transition, life expectancy, longevity, remedies

BACKGROUND AND RATIONALE

The populations of most of the world's regions are growing older. One of the paramount achievements of the modern era has been the enormous reduction in human mortality.^[1-3] Significantly^[4] suggests that senescence occurs because the force of natural selection declines with age and longevity is only acquired at some metabolic cost. Historically, the mortality records elucidate that advances in the medical arena, eradication of poverty, control over endemic and pandemic diseases, improved sanitation and personal hygiene, control of wars and famines, and improvement in living standards helped to reduce the risk of mortality in all age cohorts. Significantly, these results have equally been worked in both developed and developing nations. The mortality decline was considerable among infants, children, and young and middle-aged adults, but modest or lacking at old ages.^[2] The aforementioned attributes have also contributed to the increase in the size of the old-age population, but in different ways. The decline in juvenile mortality in the early part of the 20th century had a greater effect on life expectancy at birth than the decline in old-age mortality is having today, for two reasons.^[3] It is worthwhile to note that the increase in human longevity is

a combination of many elements. Globally, these elements have worked in absolutely different manners. Historical evidence have already explained that developed countries are way ahead in adopting the concept of longevity compared to their developing counterparts. Consequently, wide ranges of disparities or compositions have been noticed in the pattern of life expectancy in the developed and developing regions. In the demographic literature, determinants of longevity^[5] conclude that “the rapidly growing populations of the elderly are putting unprecedented stresses on societies, because new systems of financial support, social support, and health care have to be developed and implemented.”

THEORETICAL BOUNDS TO HUMAN LONGEVITY

The historical trend in mortality in various age cohorts has had a serious impact on human longevity. Significantly,

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human cohorts may vary considerably in their morbidity, mortality, and longevity characteristics, yet they have shown a common increase in mean life expectancy in the past two centuries.^[6,4] In effect, the extension of lifecycle has been one of the significant elements of human survival. In this process, extensive discussions have already been documented by various scholars. In the modern era, the process of living long has raised heightened concern in both the developed and developing regions. Social gerontology is the science that is concerned with various aspects of aging. In this several functions, approaches and morphologies are involved to study aging. In a broad sense, these are generally defined as the psychological, biological, sociological, and demographical aspects to discuss different perceptions on the study of population aging.

PSYCHOLOGICAL PERSPECTIVE OF POPULATION AGING

Psychology is generally defined as a science of human deeds. The basic function of psychology is to examine human behavior and its functions. In this process, the human mind and its attributes are major contributors. In sum, the human mind is the chief component that controls entire body functions. In general settings, “the psychological approach concentrates upon examining personality, mental function, and notions of self and identity.”^[7] Thus, psychological functions determine the behavioral changes between individuals that occurred in two different time periods. In the last attempt, psychological perspective has been influencing the aging process in the multiple ways.

SOCIOLOGICAL PERSPECTIVES OF POPULATION AGING

From an evolutionary point of view, the important consequences of aging are a drop in survival probability and fecundity.^[8] Social gerontology is a branch of gerontology that defines the social attributes of growing old. In addition, the Indian society and their cultural values are quite different from western societies. Conventionally, in Indian society, elderly have commanded considerable respect and attention from their family members and its associates. However, over a period of time, these social values declined and have given way to trends that allow the younger generation to move out without supporting their older parents. There are several reasons why independent elderly are graying so quickly. Factors such as urbanization and substantial pattern of migration along with globalization have encouraged the elderly to resume their physical activeness and remain economically independent. Recent statistics indicate that ≥ 65 percent of Indian elderly are forced into gainful employment. It clearly indicates that the elderly are social, economically, filially, and physically weak when their youngsters leave them alone to survive without an insufficient or accurate support system.

DEMOGRAPHIC PERSPECTIVES OF POPULATION AGING

Demographically speaking, population aging, which entails an increasing share of older persons in the population, is a

major global demographic trend which will intensify during the 21st century. Aging results from demographic transition, a process whereby reductions in mortality are followed by reductions in fertility.^[9,10] In this context, population aging is a major demographic episode of the contemporary era. At the global level, this phenomenon has been affecting both developed and developing countries. While in the developing regions, the growth of the population aged 60 years or more is accelerating.^[11] It is evident that the number of older persons in the less developed regions grew from 376 million in 2000 to 602 million in 2015.^[11] In this scenario, the elderly are generally looking for both institutional and noninstitutional assistance for survival or to maintain their basic requirements. The concept of social security is widely settled in developed regions. In these regions, the government has a separate budget or provisions to support their older population. On the other end of the spectrum, in developing countries, the scenario is quite different, especially in a country like India where government initiatives have to be reinforced to protect and encourage the society toward healthy and successful aging. Another portent that threatens to affect the quality of life among the elderly is the growth rate of oldest-old (80+), which is increasing steadily.

MATERIALS AND METHODS

The data used in this research work came from multiple sources. In context, prominent sources include the Census of India (1961–2011), Sample Registration System reports (1974–2014), and World Population Aging (2015). To understand the gravity of population aging, both univariate and bivariate were used as main methods of analyses. Originally, this study entails the history of human longevity and factors that are associated with efficacious aging in India. The study also suggests that population aging is a growing concern in developing countries like India where public health infrastructure and institutional and noninstitutional security measures are still under consideration.

EMPIRICAL FINDINGS

Population aging is one the most powerful consequences of demographic transition. The process of population aging had been initially experienced in European, Scandinavian, and American countries followed by developing countries. Furthermore, recent evidence on aging depict that this phenomenon has widely shifted toward developing countries. In light of this, the demographical projections confirm that the growth rate of population aging will be faster in developing countries than in developed countries. In addition, data in Table 1 describe the distribution of aged 60 years or above in various regions in the world.

Furthermore, old age is considered as the last phase of life cycle. While longevity is increasing, vulnerabilities against the elderly are also on the rise. Worldwide, the majority of older adults are surviving with multiple disorders. Globally, the number of people aged 60 years or more is growing faster in all regions. Between

2000 and 2015, Asian countries have grayed more compared to European and other regions, and this incline is likely to continue during the next few decades. Similar trends have been experienced in African countries. Significantly, Asia is the most populous continent, and it contains a huge amount of absolute elderly population. It is noteworthy that initially European countries experienced the consequences of human longevity. Subsequently, countries in America and Oceania encountered similar propensity. Table 2 shows the distribution of the gray population in India with respect to sex and place of residence.

It has clearly emerged from the various census reports that the reason behind the successful aging in India comprises three components, namely, declining trends in birth rate and death rates accompanied by a sharp rise in life expectancy at birth. These factors have working been at work constantly and the continuing trend will further intensify this pressure. According to recent statistics related to the elderly population in India, in the year 2011, around 8.58 percent of the population was aged 60 years or more. Interestingly, a higher proportion of elderly people were reported living in rural areas compared to urban areas. Among the older adults (60 years or more), the death rate among males is significantly higher than in females. In India, the elderly population will be a great area of concern among strategy developers and policy-makers. The current demographic trends show that declining socioculture norms, the mobility of productive age group and shift of predominantly joint family system into nuclear family structures have caused great grief among the elderly population. Table 3 presents the distribution of elderly population by their 5-year age groups for 2001 and 2011.

Data in Table 3 portrays that India has a rapidly growing elderly population, especially women who are experiencing a lower death rate than their male counterparts in the older cohorts. Most notable are in the oldest-old (80+) category, in which the proportion of female elderly have been higher. This is possible due to the large increase in expectancy of life among females as against males. It is absolutely clear from the above results that the share of the elderly population has consistently increased in the first two decades of the 21st Century both in rural and urban areas. Similar trends are noticed in the gender arena. During the last two census decades, the larger proportion of the elderly population has been observed in rural areas. However, in rural areas, these people are seen to be suffering

from multiple disorders. For instance, widespread poverty, lesser employment opportunities, and provision of health-care services are comparatively worse in rural areas compared to urban areas. For all these reasons, the condition of the elderly population in rural areas is highly distressing and concrete remedial actions need to be taken to alleviate their sufferings. Both institutional and noninstitutional support systems need to be put in place and they should be functional and highly sensitive. In short, the important consequences of growing aging cohorts are the minimal availability of support systems. In general, in old age, support systems work as ventilator that could deliver the essential elements for human survival. For the purpose of present discussion, since independence, the population growth rate has accelerated steadily, and it will continue to do so over the next three decades. It is interesting to note that, unprecedented efforts were undertaken to obtain declining trends in both birth and death rates.^[2,12] Furthermore, the performance of fertility and mortality rates reflects the socioeconomic status of a society. For instance, the majority of Western societies have had experienced similar trends in the past.^[13,14] Consequently, both crude death and birth rates are found lower in the developed world compared to the developing nations. In the wake of “demographic transition theory, in the past two centuries, fertility and mortality decline in Europe and later elsewhere was largely the result of economic and social development.”^[15] Data in Table 4 depict the trends of birth and death rates along with the natural growth rate during the 16 years between 1997 and 2013. Indeed, during this period, the decline in birth and death rates has been constantly steady along with natural growth.

Disparities in the socioeconomic status of an individual have largely been associated with improving health and quality of lifestyle. During several decades of the last century, improved health-care infrastructure and services have contributed greatly to higher life expectancy. Significantly, in the global market, population aging is considered a striking feature of the last century.

CHANGING PATTERN IN LIFE EXPECTANCY AT BIRTH IN INDIA

As mentioned above, an extension of human life expectancy is described as a great success story of modern medical

Table 1: Population aged 60 years or above for the world regions: 2000, 2015, 2030 and 2050

Region	Person aged 60 years or above (Million)				Percentage change		Distribution of older persons (Percentage)			
	2000	2015	2030	2050	2000-2015	2015-2030	2000	2015	2030	2050
Africa	42.4	64.4	105.4	220.3	51.9	63.5	7.0	7.2	7.5	10.5
Asia	319.5	508.0	844.5	1293.7	59.0	66.3	52.6	56.4	60.2	61.8
Europe	147.3	176.5	217.2	242.0	19.8	23.1	24.3	19.6	15.5	11.6
Latin America and Caribbean	42.7	70.9	121.0	200.0	66.1	70.6	7.0	7.9	8.6	9.6
Oceania	4.1	6.5	9.6	13.2	56.2	47.4	0.7	0.7	0.7	0.6
North America	51.0	74.6	104.8	122.7	46.4	40.5	8.4	8.3	7.5	5.9

Source: World Population Ageing 2015 (ST/ESA/SER.A/390)

explorations. In this context, over the past decades, life expectancy in developed countries has risen to historically dented levels.^[16] Life expectancy can be used as an indicator of well-being if its level is determined primarily by the quality of general living conditions and by the degree of social equality.^[17] Table 5 portrays results on the expectancy of life at birth by sex and residence in India (1990–1994 to 2014).

It's resultant from early stages of the demographic transition, decline in the infant and youth mortality were the prime forces that account for raise in the life expectancy.^[18] Before independence, India experienced wars, famines, droughts, and epidemics, especially influenza. During that era, the population growth rate was quite slow and its associates (higher birth and higher death rates) were entirely different from the

postindependent era. Postindependence, India became a socialist state. Therefore, it adhered to several cultural, religious, socioeconomic, and political convergences at large scale. With respect to whole circumstances, after India's population began to nurture itself and continued to grow over the next four decades up till the 1990s. Another literature-based agreement suggests that India was the first country in the world that initiated the concept of family planning to limit family size and to control population explosion that assists to laying the foundation of sustainable development. It has been argued that, at present, population aging is a highly focused phenomenon in less developed countries accompanied with multiple vulnerabilities. Consequently, lower trends in fertility, mortality, and widespread tendencies of migration across international borders have influence spatial distribution of the elderly population in the world.

This article proposes two procedures for examining the factors which have led to longer human longevity and contributed to reducing the chances of mortality. Currently, India is the second most populous country in the world. With this perspective, growing trends in life expectancy at birth have been a vital episode of modern demographic notions.^[19] Due to recent downfalls in both fertility and mortality rates, India has annually added more elderly population to its general population. Interestingly, in India, a large variation has been observed in the age-specific life expectancy at birth. It is evident from Table 6 that expectancy of life at birth is growing faster in urban areas than in rural areas. The major cause behind this observation is that the condition of health-care facilities and standard of living is much ahead in urban areas. More specifically since independence, huge variations have been experienced in the growth of the elderly population. It is quite evident from Table 5 that during the last couple of decades, the life expectancy at birth was favored among females compared to males. A result of this is that in old-age women usually face discriminatory rejoinders from society, family members, as well as people in general. More often than not, their situation becomes worse after the death of a spouse. Consequently, millions of silver-haired women have been

Table 2: Distribution of elderly population in total population in India by sex and place of residence: 1961-2011

Census year	Place of residence	Sex		
		Person	Male	Female
1961	Total	5.63	5.46	5.81
	Rural	5.82	5.71	5.95
	Urban	4.62	4.42	5.11
1971	Total	5.97	5.94	5.99
	Rural	6.54	6.26	6.17
	Urban	4.89	4.73	5.26
1981	Total	6.42	6.23	6.41
	Rural	7.03	7.55	6.85
	Urban	5.02	5.08	5.69
1991	Total	6.55	6.69	6.71
	Rural	7.51	7.21	7.03
	Urban	5.34	5.59	6.01
2001	Total	7.45	7.61	7.83
	Rural	7.74	7.43	8.06
	Urban	6.7	6.25	7.21
2011	Total	8.58	8.20	8.98
	Rural	8.79	8.42	9.19
	Urban	8.10	7.17	8.52

Source: Census of India, 1961-2011

Table 3: Distribution of elderly population by five-year age group in India: 2001-2011

Census year	Age-group	Total			Rural			Urban		
		Person	Male	Female	Person	Male	Female	Person	Male	Female
India (2001)	60-64	35.9	36.0	35.9	36.0	35.8	36.1	35.8	36.6	35.1
	65-69	25.9	25.1	26.6	25.8	24.9	26.6	26.0	25.5	26.5
	70-74	19.2	19.9	18.5	19.4	20.3	18.5	18.7	18.9	18.4
	75-79	8.6	8.6	8.5	8.4	8.5	8.3	9.0	9.0	8.9
	80+	10.5	10.4	10.6	10.5	10.5	10.4	10.5	9.9	11.1
India (2011)	60-64	36.3	36.6	35.9	35.9	35.9	35.8	37.2	38.3	36.2
	65-69	25.5	25.3	25.6	25.8	25.6	26.0	24.7	24.8	24.6
	70-74	18.5	18.9	18.1	18.8	19.4	18.3	17.7	17.7	17.6
	75-79	8.9	8.8	9.0	8.7	8.6	8.8	9.3	9.1	9.5
	80+	10.9	10.3	11.4	10.8	10.5	11.1	11.1	10.1	12.1

Source: Census of India, 2001-2011

Table 4: Declining trends in birth and death rates in India 1997-2013

Year	Birth rate			Death rate			Natural growth rate		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1997	27.2	28.9	21.5	8.9	9.6	6.5	18.3	19.2	15.0
1999	26.1	27.6	20.8	8.7	9.4	6.3	17.4	18.2	14.5
2000	25.8	27.5	20.7	8.5	9.3	6.3	17.3	18.3	14.4
2001	25.4	27.1	20.2	8.4	9.0	6.3	17.0	18.0	13.9
2002	25.4	27.1	20.2	8.4	9.0	6.3	17.0	18.0	13.9
2003	24.8	26.4	19.8	8.0	8.7	6.0	16.8	17.8	13.8
2004	24.1	25.9	19.0	7.5	8.2	5.8	16.6	17.8	13.3
2005	23.8	25.6	19.1	7.6	8.1	6.0	16.3	17.5	13.1
2006	23.5	25.2	18.8	7.5	8.1	6.0	16.0	17.2	12.8
2007	23.1	24.7	18.6	7.4	8.0	6.0	15.7	16.8	12.7
2008	22.8	24.4	18.5	7.4	8.0	5.9	15.4	16.5	12.6
2009	22.5	24.1	18.3	7.3	7.8	5.8	15.2	16.3	12.5
2010	22.1	23.7	18.0	7.2	7.7	5.8	14.9	15.9	12.2
2011	21.8	23.3	17.6	7.1	7.6	5.7	14.7	15.7	11.9
2012	21.6	23.1	17.4	7.0	7.6	5.6	14.5	15.5	11.8
2013	21.4	22.9	17.3	7.0	7.5	5.6	14.4	15.4	11.7

Source: Various Reports Published by Sample Registration System, 1997-2013

Table 5: Expectancy of life at birth by sex and residence in India: 1990-94 to 2010-14

Year	Total			Rural			Urban		
	Person	Male	Female	Person	Male	Female	Person	Male	Female
1990-94	60.0	59.4	60.4	58.6	58.2	58.7	65.4	64.1	66.7
1991-95	60.3	59.7	60.9	58.9	58.5	59.3	65.9	64.5	67.3
1992-96	60.7	60.1	61.4	59.4	58.9	59.8	66.3	64.9	67.7
1993-97	61.1	60.4	61.8	59.9	59.3	60.2	66.6	65.1	68.0
1994-98	61.4	60.6	62.2	60.1	59.5	60.5	66.8	65.3	68.2
1995-99	61.5	60.8	62.3	60.3	59.7	60.9	66.4	65.1	67.9
1996-2000	61.9	61.2	62.7	60.7	60.1	61.3	66.7	65.4	68.3
1997-01	62.3	61.4	63.3	61.1	60.3	61.9	67.1	65.7	68.7
1998-02	62.9	61.9	64.0	61.6	60.7	62.5	67.6	66.1	69.2
1999-03	63.4	62.3	64.6	62.2	61.1	63.2	68.0	66.5	69.7
2000-04	63.9	62.8	65.2	62.7	61.6	63.8	68.4	66.9	70.0
2001-05	64.3	63.1	65.6	63.0	61.9	64.2	68.6	67.2	70.3
2002-06	64.7	63.5	66.1	63.5	62.3	64.7	68.9	67.4	70.6
2003-07	65.0	63.7	66.5	63.8	62.6	65.2	69.0	67.5	70.7
2004-08	65.4	64.0	66.9	64.2	62.9	65.7	69.0	67.5	70.8
2005-09	65.7	64.3	67.2	64.5	63.2	66.0	69.2	67.6	71.0
2006-10	66.1	64.6	67.7	64.9	63.5	66.5	69.6	68.0	71.4
2007-11	66.5	64.9	68.2	65.3	63.8	67.0	70.1	68.4	71.9
2008-12	67.0	65.4	68.8	65.8	64.2	67.6	70.6	69.0	72.4
2009-13	67.5	65.8	69.3	66.3	64.6	68.1	71.2	69.6	73.0
2010-14	67.9	66.4	69.6	66.7	65.1	68.4	71.5	70.0	73.5

Source: Various Reports Published by Sample Registration System: 1990-94 to 2010-14

surviving without inadequate institutional and noninstitutional support systems.

TRAJECTORY OF PALLIATIVE CARE IN OLD AGE

Normally, life is associated with multiple concerns, surprises, and worries in old age; these dynamics might be more aggravated. Globally, the majority of studies have been claimed

that elderly are forcefully received institutional care and country like where noninstitutional support system is strongly linked with the notion of sociocultural practice. Historically, caregiving or residential support for elder members is the essential and crucial attribute of Indian society. Sadly, due to the changing pattern of modern lifestyle, incidences of unemployment, heavy outmigration, and family conflicts are the major elements that forced older people to survive without

Table 6: Expectancy of life in selected age groups, India: 2014

Age-group	Total			Rural			Urban		
	Person	Male	Female	Person	Male	Female	Person	Male	Female
0-1	67.9	66.4	69.6	66.7	65.1	68.4	71.5	70.0	73.2
1-5	70.0	68.3	71.9	69.0	67.3	70.9	72.6	71.0	74.4
5-10	66.7	64.9	68.8	65.9	63.9	68.0	68.9	67.3	70.8
10-15	62.0	60.1	64.1	61.2	59.2	63.4	64.1	62.4	65.9
15-20	57.2	55.3	59.3	56.4	54.5	58.6	59.2	57.6	61.1
20-25	52.5	50.6	54.6	51.8	49.8	53.9	54.5	52.9	56.4
25-30	47.9	46.1	50.0	47.2	45.2	49.4	49.8	48.2	51.7
30-35	43.4	41.5	45.4	42.7	40.7	44.8	45.2	43.6	46.9
35-40	38.8	37.0	40.7	38.1	36.3	40.2	40.5	39.0	42.2
40-45	34.3	32.7	36.1	33.7	31.9	35.6	35.9	34.6	37.4
45-50	29.9	28.4	31.6	29.4	27.7	31.1	31.5	30.3	32.8
50-55	25.7	24.4	27.2	25.2	23.7	26.8	27.1	26.1	28.3
55-60	21.7	20.5	23.0	21.2	19.9	22.6	23.0	22.1	23.9
60-65	17.9	17.0	19.0	17.5	16.5	18.6	19.1	18.4	19.9
65-70	14.5	13.7	15.4	14.2	13.2	15.1	15.5	14.9	16.1
70-75	11.5	10.9	12.2	11.3	10.5	12.0	12.3	11.8	12.7
75-80	9.0	8.5	9.5	8.8	8.2	9.4	9.5	9.2	9.8

Source: Sample Registration System: 2014

the appropriate residential support system. It is evident that caregiving is a family affair.^[20] More specifically, a family is the primary source and inspiration of caregiving in old age. Within family^[21] discussed that spouses are the most common caregivers, followed by adult children and then other relatives.

DISCUSSION

In this section, the degree and intensity of human longevity in several important ways would be discussed. After independence, seven census installments have already been successfully conducted. In the past 70 years, the entire Indian demographic culture has changed considerably. In the context of demographic content, in India, the concept of successful and healthy aging has been set as another giant target for both demographers and policy-makers.

One of the major achievements of humankind in the modern era is the extension of the length of human life.^[2,22] It is interesting to note that, population aging is seen as a major episode of demographic transition that is largely influenced by crude birth rate, crude death rate, and the phenomenal increase in the life expectancy at birth and new discoveries in the fight to control diseases.^[16,23,24] In India, there are large variations in the concentration of aging population across states and their districts. As already mentioned above, there are various causes of death in old age. Particularly, in this cohort people are afflicted with multiple health disorders. Moreover, body functions start shrinking and the capability of adaptability of the elderly also gradually declines. It is noteworthy that mortality at older ages has fallen dramatically since 1950 in developed countries and most developing countries as well.^[5] Significantly, there has been a prominent concern among experts that human aging

will be a great attribute to determine various features. Thus, it is obligatory to reinforce the current demographic trends, which will further contribute toward estimating future population trends. The result of the empirical analysis suggests that, in preeconomic reform period, there was higher life expectancy at birth in urban areas as compared to rural areas. Similar trends were observed in the analysis carried out in the posteconomic reforms period. In addition, the economic impact of an aging population is also an area of concern in many developing countries like India where almost 80 percent of the labor force is engaged in informal sectors for their survival. Most recent statistics from various sources indicate that nearly 60 percent of India's elderly are still engaged in productive activities to maintain and fulfill their basic requirements. Thus, the majority of Indian elderly reside in rural areas, where agricultural and allied activities are predominant. Likewise, in these sectors, there is no specific age of retirement at which people are withdrawn from work and enjoy the rest of their life. Consequently, due to economic insecurity, costly health-care maintenance and other concerns people may continue to work till their physical capacity tolerates. Prior to this study, the majority of studies have already been conducted to convey the various concerns that particularly affect the quality of life of the elderly population. Against this backdrop, this study has discussed the mixed approach to evaluate the causes and consequences of human longevity and further provides efficient remedial aspects for successful and healthy aging in India.

CONCLUSION AND POLICY PERSPECTIVES

To sum-up, the past several decades have witnessed an astonishing growth of the general population, and the scenario

has been more serious with respect to older adults. Worldwide, the major causes of population aging are declining fertility and mortality with higher life expectancy at birth. It has been interesting to note that excellent developments in medical sciences have enabled provision of healthier surviving opportunities throughout the entire spectrum of age cohorts. In India, the growth of the elderly population has been much faster than the growth of the general population. The main objective of this study was to explore how population aging is positioned and its superfluous pressure on health-care management and its associates along with inadequate institutional and noninstitutional support systems. The central theme of this study was to investigate the probable attributes that are the major contributors to healthy and successful aging. Thus, evidence presented in this study suggest that population aging will be the central area of consideration among demographers, medical consultants, and government counselors. In a parallel manner, the study stresses upon an urgent need to establish concrete institutional support systems for the older population and encourage the society to protect and strengthen their grave concerns.

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Conflicts of interest

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REFERENCES

- Burger O, Baudisch A, Vaupel JW. Human mortality improvement in evolutionary context. *Proc Natl Acad Sci U S A* 2012;109:18210-14.
- Horiuchi S, Robine JM. Increasing longevity: Causes, trends, and prospects. *Genus* 2005;61:11-7.
- Wilmoth JR. The future of human longevity: A demographer's perspective. *Sci* 1998;280:395-97.
- Kirkwood TB. The origins of human ageing. *Philosophical Transactions: Bio Sci* 1997;352:1765-72.
- Vaupel JW. Demographic analysis of aging and longevity. *Am Econ Rev* 1998;88:242-47.
- Slagboom PE, Beekman M, Passtoors WM, Deelen J, Vaarhorst AA, Boer JM, *et al.* Genomics of human longevity. *Philos Trans R Soc Lond B Biol Sci* 2011;366:35-42.
- Victor C. *The Social Context of Ageing: A Textbook of Gerontology*. 2Park Square, Milton Park, Abingdon, Oxon OX14 4RN, UK Routledge; 2005.
- Partridge L, Barton NH. On measuring the rate of ageing. *Proc Biol Sci* 1966;263:1365-71.
- United Nations, Department of Economic and Social Affairs, Population Division. *World Population Ageing ST/ESA/SER.A*; 2013. p. 348. Available from: <https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2013.pdf>. [Last retrieved 2019 Jan 20].
- Vaupel J. Demographic insights into longevity. *Popul Engl Sel* 2001;13:245-59.
- United Nations, Department of Economic and Social Affairs, Population Division. *World Population Ageing 2015 (ST/ESA/SER.A/390)*. Available from: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf. [Last retrieved 2019 Jan 18].
- Guillot M. The momentum of mortality change. *Popul Stu* 2005;59:283-94.
- Canudas-Romo V. Three measures of longevity: Time trends and record values. *Demography* 2010;47:299-312.
- Catalano R. Economic antecedents of mortality among the very old. *Epidemiology* 2002;13:133-37.
- Amonker RG, Brinker G. Reducing fertility in India. *Int J Sociol Fam* 2007;33:327-48.
- Coelho E, Nunes LC. Forecasting mortality in the event of a structural change. *J R Stat Soc* 2011;174:713-36.
- Valkonen T. Trends and inequalities in mortality. *Int J Sociol* 1993;23:91-105.
- Caselli G, Vallin J. Mortality and population ageing. *Eur J Popul* 1990;6:1-25.
- Dublin LI, Lotka AJ. Trends in longevity. *Ann Am Acad Polit Soc Sci* 1995;237:123-33.
- Pilisuk M, Parks SH. Caregiving: Where families need help. *Soc Work* 1988;33:436-40.
- Abel E. Family care for the elderly in the United States. *Rev Jpn Cult Soc* 1989;3:31-36.
- Bongaarts J. How long will we live. *Popul Dev Rev* 2006;32:605-28.
- Moriyama IM. Recent mortality trends in areas of low mortality. *Public Health Rep* 1954;69:963-69.
- Smith TE. The control of mortality. *Ann Am Acad Polit Soc Sci* 1967;369:16-25.