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**Abstract**

*Changing age structure is one of structural change that witnessed in the last century. Population ageing is one of its consequences, which emerges as a global phenomenon in the present day. It is generally expressed as older individuals forming large share of the total population. This process is considered to be an end product of demographic transition or demographic achievements with a decline in both birth and mortality rates and consequent increase in the life expectancy at birth and older ages. The Indian aged population is currently the second largest in the world to that of china with 100 million of the aged. The absolute number of the over 60 population in India will increase from 77 million in 2001 to 137 million by 2021*

*"Population Ageing is profound, having major consequences and implications for all facets of human life. In the economic area, population ageing will have an impact on economic growth, savings, investment and consumption, labor markets, pensions, taxation and inter generational transfers. In the social sphere, population ageing affects health and healthcare, family composition and living arrangements, housing and migration.*

*In this paper we try to document different aspects of human deprivation in the old age other than the measurement of income poverty. We mainly take up on aspects of economic, health and social aspects of deprivation and how it vary across space(sector and state) and gender and try to map how much it vary in relative terms. It further looks up on correlates and determines of old age deprivation in India.*

**Keywords:**

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**Deprivation and vulnerability among elderly in India**

## Introduction

Ageing can generally be described as the process of growing old and is an intricate part of the life cycle. Basically it is a multi-dimensional process and affects almost every aspect of human life. Introduction to the study of human ageing have typically emphasized changes in demography focusing on the 'ageing of population'- a trend, which has characterized industrial societies throughout the twentieth century but in recent decades, has become a worldwide phenomenon. Ageing is basically the result of a two dimensional demographic transformation which is explained by overall declines in mortality and fertility.
This is a dynamic process was first observed in post-industrial European societies in the nineteenth century. The United Nations Conference of Ageing Populations in the context of the family held in Japan in1994 observed that all developed countries at least one demographic issue in common: population aging which was the inevitable consequence of fertility decline. But although fertility decline is usually the driving force behind changing population age structures, changes in mortality assume greater importance as countries reach lower levels of fertility. Ageing of the population is a major phenomenon in the present day world as a result of the changing demographic transition. Though the phenomenon has a universal character, it occurs in various countries at different point of time. The ageing is a phenomenon already occurred in the developed countries in the latter half of the twentieth century. The similar situation is emerging in the developing countries in the recent periods. Although the proportion of elderly in the years 60 and above is considered to be relatively low in the case of the developing countries such as India and China, they have a larger population base. Developed countries have aged with high social and economic development, the socio and economic condition of the elderly in the developing world is a cause for concern as most of them end up in living below poverty line in old age due to inefficient social security (Rajan 2004). The poverty and deprivation are very common among the aged in the country as it does not have proper safety nets either state sponsored or socially build.

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## Ageing in India

Population ageing is the most significant consequence of the process known as demographic transition. Reduction in fertility leads to a decline in the proportion of young in the population. Coupled with fertility decline, reduction in mortality enhances the life span of

individuals leading to higher life expectancy at older ages. In other words, population ageing involves a shift from high mortality/high fertility to low mortality/low fertility.

The population of the world stood at around 6.1 billion in the early 21st century and projected to increase to 9.4 billion in 2050 and 10.4 billion in 2100. If we compare the global population, it is doubled between 1950 and 2000 and likely to add another 4.4 billion in the next 100 years. However, the growth of the elderly population is much higher than that of general population (please put a reference) The proportion of elderly aged 60 and above is expected to grow from 9.9 percent in 2000 to 14.6 percent in 2025 and 21.1 percent in 2050 respectively. Among the elderly, the oldest old (80+) is likely to increase its proportion from just 1.1 percent in 2000 to 3.4 percent in 2050 and 7.1 in 2100

In the beginning of 20th century, the life expectancy for India was just 23 years for both sexes (Davis, 1951). In 1947, when India became independent from the British rule, life expectancy was around 32 years – added 9 years during the first half of the twentieth century. Improvements in public health and medical services have led to substantial control of specific infectious diseases and eradicated few more diseases, which translated into significant decreases in mortality rates among all ages. Government sponsored sanitation and maternal and child immunization programs have improved maternal health and reduced infant mortality. The infant mortality in 2002 for India is 63 – 62 for males and 65 for females (Registrar General, 2003). This has enhanced the life expectancy at birth to 61 years for males and 63 years for females – 30 years increase during the second half of the twentieth century (Registrar General, 2003).

The Indian aged population is currently the second largest in the world after China (100 million). The absolute number of 60 and over in India will likely to increase from 77 million in 2001 to 137 million by 2021 (United Nations, 2003). The decadal growth rate among elderly population during 1991-2001 is about 40 percent – double than the general population growth of 21 percent. The percentage of elderly in India has increased from 5.4 percent in 1951 to 6.4 percent in 1981 and further to 7.4 in 2001. If the percentage of elderly population is above seven percent in any country, as per the UN criterion that country is ageing. In other words, India has emerged as “aging India” in the beginning of the 21st century. Thus twenty first century is the century of old (Leibig and Rajan, 2003)

The lives of many older people are more frequently negatively affected by the social and economic insecurity that accompany demographic and development process (World Bank 1994). The growth of individualism and desire of the independence and autonomy of the young generation (serow 2001) affect the status of the elderly. The studies show that socio

economic condition of older women is more vulnerable in the context of the demographic and socio cultural change (Tout 1993). The situation of the elderly poverty has been a consistent phenomenon in the third world as the older population is deprived of the basic needs (Keyfitz and Flieger 1990). Chambers (1995) described the eight diminution of deprivation among the elderly as poverty, social inferiority, social isolation, physical weakness, vulnerability, seasonality, powerlessness and humiliation of the aged. The poverty is sought to be a major risk of ageing in developing countries (Sen K1994) and study by world bank reveals that in the most of developing countries the older people and dependent are poor and vulnerable (world Bank 1994). The linkage between ageing and poverty and deprivation can have three channels of relations. They interlinked through the links on production relations, health implication and social institutions that affects different stages of life cycle.

**Old age deprivation**

The lives of many older people are more frequently negatively affected by the social and economic insecurity that accompany the demographic and developmental process (World Bank, 1994). The growth of individualism and desire for the independence and autonomy of the young generation (Serow, 2001) affect the status of the elderly. The studies show that the socioeconomic condition of older women is more vulnerable in the context of the demographic and sociocultural change (Tout, 1993). The condition of elderly poverty has been a consistent phenomenon in the Third World as the older population is deprived of the basic needs (Keyfitz and Flieger, 1990). Chambers (1995) described the eight diminutions of deprivation among the elderly as poverty, social inferiority, social isolation, physical weakness, vulnerability, seasonality, powerlessness and humiliation of the aged. Poverty is sought to be a major risk of ageing in developing countries (Sen,1994) and study by the World Bank reveals that in the most of the developing countries, older people are vulnerable(WorldBank,1994)

Ageing diminishes the capacity to work and earn. "A reduced capacity for income generation and a growing risk of serious illness are likely to increase the vulnerability of elders to fall into poverty, regardless of their original economic status…" (Lloyd-Sherlock.2000) The presence of elderly make its implication on the production function within the household and thus on overall work effort that reflects in income and production (Schwarz, 2003). In other words, in most of the cases, the presence of the elderly creates distortions in the production function as they are physically unfit to work. This can have direct effect on the wellbeing of the households that reflects in the poverty among aged. The inability in the initial endowment

of an individual that deteriorates as they go up in the life cycle make them more vulnerable and puts them a position in which they fail in risk management and maintenance of a cope-up strategy in maintaining the level of living conditions (Zwi, 1993). This makes the elderly more dependent on others for their needs resulting in higher levels of economic insecurity and deprivation. Studies across the globe have revealed a sudden dip in the life of the elderly after the retirement (World Bank, 1994,Steyn 2000, Bradshaw, 2006). While in the West most of the elderly are under the social safety net, the incidence and magnitude of the economic insecurity are high in the case of developing countries (Helpage International, 2003; World Bank, 2001)

Physical and health risks are very high among the aged. The precise implications of population aging for future levels of health and health care utilisation depend on whether the increases in life expectancy experienced in general are accompanied by an increase or decrease in health problems in later life (Gruenberg, 1977; Kramer, 1980; Manton, 1982). Studies in the West show that fast decline in the mortality in the old population is creating a nightmare with high incidence of morbidity (Hainess, 1995). The changing pattern of morbidity puts thr elderly in a situation of risk in old age where they are in a condition of lacking capacity to cope with the risk. The changing patterns of morbidity in late life have created challenges and burdens for the existing health care system with higher incidence of social costs for extended access to health care to avoid the risk of morbidity (Kane, 1990).

The process of ageing has resulted in the emergence of a new epidemiological scenario in the developing countries with high prevalence of degenerative diseases that act as a major cause of death and disability and lack of mobility (Smith and Bares, 1991, Zwi, 1999). There are evidences of unhealthy ageing from almost all the developing countries of Asia, Africa, and Latin America. Pelaez and and Palloni (1998) have concluded that there is a long-run health degeneration in the ageing societies of the Caribbean and Latin America with changing disease pattern. Studies from Africa also look into epidemiological shift among the aged population (Helpage International, 1998; Wilson and Adamchak, 1999). Various studies shows that the health risk of the elderly is mainly confined to access to health care that result in unhealthy ageing (Robeldo, 1985; Sokolovsky, 1991). The health risk of an aged person in a household can result in a catastrophic shock in the family that can make households more exposed to poverty. The increased cost of the medical bill in a household in the old age make large chunks of the elderly in the developing world deprived of access to health and also not in a position to better health treatment (Helpage International, 2005). The studies highlight high rates of deprivation of good health and lack of care in the developing and transitional

economies (Balkov, 2005; Ferrer, 2002; WHO, 2004). The work of Moner Alam shows the incidence of chronic illness in India without proper access to health care (Alam, 2007).

The belief that children will take care of the parents in the old age is eroding in India where the family size has been cut down as a result of the demographic process (Dandelkar, 1996). The situation in the urban areas shows a rejection of older people by the next generation and this is spreading to rural areas (Desai, 1985). In the nuclear family regime, the position of the aged becomes more vulnerable and is treated as a burden to the family (Nayar, 1992). The social negligence of the aged occurs due to cultural, social and economic relations within the society and its coexistence with demographic development (Achenbaum, 1978). This changing dynamic that starts within the family and society can make the elderly insecure (Alter G Et all 1996) through intergenerational imbalance (Hareven and Adams, 1996). These changing dynamics can affect the living arrangements and social protection system and make the elderly more insecure. In most of the countries in the West the shift in the living arrangements to a state of living alone has made the elderly more insecure (EEC, 2003; World Bank, 2000). The scenario is almost emerging to high levels of insecurity in the Asian countries with shift in the living pattern and increase in the social exclusion (Zeng, 2005; Yoko, 2000; Moregami, 2003)

Deprivation and exclusion are one of the common phenomena in almost all-ageing societies. The elderly in the developing countries also suffer from chronic deprivation and poverty as socio-economic relations change. Studies on the livelihood pattern of the aged in Africa show that poverty among the elderly is one of the challenges in the new millennium (Williams, 2003). In Africa, poverty among the elderly is more acute in the areas where the younger population is affected by the spreading of AIDS that create the intergenerational balances within the population and thus results in chronic poverty among the elderly and highlights the issue of the missing generation. Empirical studies in South Africa and Nigeria highlight a large incidence of such families with a missing or skipped generation that breaks intergenerational balances (Schwarz, 2003)

In a country like India where the majority of the population is suffering from chronic poverty, it is found interesting to study chronic poverty and vulnerability in the aged. Here, poverty is looking into issues of hunger and vulnerability is a larger issue of the socio-economic insecurity among the elderly that act as a determinant of the poverty among the aged. Poverty is addressed in terms of denial of livelihood to the aged where they are denied of adequate flow of food, cash and assets to attain minimum basic needs (OASIS, 1999). In a country like India that lacks a proper social security system and the majority of the population are in the

hands of the chronic poverty, the condition of the elderly is in a mystery. The aged does not have adequate income to meet basic needs (UNDP, 2000). The socio-economic condition of the elderly in India is in bad shape. The majority of the elderly are deprived of the basic necessities and are thus in chronic poverty (Rajan, 2004). The majority of the elderly is dependent and even compelled to work when too old to earn a living.

Here we look into the levels and magnitude of economic, health and social aspects of deprivation among the elderly in India

**Old age deprivation in India**

The elderly in India often end up in a state of deprivation and negligence as there is no proper social security system as in the West (OASIS, 1999). The majority of the elderly work in the informal sector with low levels of wages and deficient working conditions and this has also put the aged in a state of deprivation, vulnerability and distress in old age in terms of both health and economic security (Helpage International, 2002). Empirical studies by different researchers have shown a gradual decline in the standard of life of the aged with high rates of dependency and lack of basic needs (Rajan Mishra and Sarma, 1999; Rajan, 2004; Alam, 2007). The occurrence of economic, health and social insecurities are becoming common (Dey, 2000; World Bank, 2001; Priya, 2003; Alam, 2007). So here we try to capture the economic, health and social insecurity, which together culminate in vulnerability among the aged. Here, we look up on the different aspects of vulnerability in terms of economic, health and social insecurity across four broad categories – Rural male, Rural Female, Urban male and urban female.

**Economic aspects of deprivation**

The economic insecurity and deprivation is looking up on the fact that whether elderly are in a position to maintain a minimum living slandered in terms of access to economic resources which is measured in terms poverty either as income poverty, subsistence poverty in terms of basic need, capability poverty in terms of dependency. The income poverty is measured in terms of ability of the aged to maintain minimum income level on which physical efficiency is maintained and is considered a parameter of deprivation among the aged. (Rowntree. 1941). Economic Insecurity among aged are also characterized by elements of denial of the basic needs to maintain a minimum level of living. This is captured in terms of access to medicine, food and clothing. Among aged the denial of the basic needs increases the dependency of them to lead a minimum level of life. In capability poverty an individual's inability to lead a

normal life without impoverishment is captured (Williams, 2003). Various studies across the globe show that economic deprivation of the aged is one of the common phenomena in almost all developing countries, which have achieved their targets in demographic transition. (Shaw and Lee, 2004). The evidences of more vulnerability to aged in the added years of life are visible from existing literature from both developed and developing world. The researches have shown has shown that the oldest old have the highest chance of poverty in almost all nations (Smeeding, and Williamson, 2001). There is high economic dependency of the elderly is one of the sign of deprivation among the aged (Kinsella and Velkolf, 2001) and will be high among the elderly in a poor country since aged are out of formal social protection (Clark, York and Anker 1997). Here we look up on the economic aspects of deprivation among the aged in India that are beyond the purview of poverty analysis. Here we look up on dependency status, no of dependent on the aged, source of financial support and indebtness of the elderly.

First we look up on the economic dependency as a component of economic deprivation. The dependency status of a person identified as an indicator of freedom and autonomy of an individual that reflects on the ability to transform his capability to the wellbeing (Sen 1992). The studies of the wellbeing of the elderly gives that there is high degree of dependency in the old age for both economic and Physical (Omran 1982, World Bank 1994). In the developed world, it is protected by the intuitional and social care that one way curtails the incidence of the dependency (Heslop, A. and Gorman, M. 2002, Hestop 1999). The studies in the developing countries like India shows high incidence of dependency where the system of social protection is premature (Perera 2004, Rajan, 2004, Alam, 2007)

Here we tried to map the dependency among aged in India. This is done across four sub groups, Rural Male, Rural female, urban male and urban female. In India in both categories of full and partial dependency, more than 80 percent of the women fall. In the national level more than 70 percent of the elderly are fully dependent in both female categories in both rural and urban areas (72.07 and 72.12) while it is just over 30 in the case of men (32.7 and 30.11). Kerala is the toper in the Rural male section with more than 43% are fully dependent while more than 81% of women are fully dependent in Rural Assam. Bihar records highest rates of fully dependent in the urban males and J&K in the case of urban females. States like Haryana and Kerala records higher rates in the section of partial dependence.

Table 1 Percentage Distribution of status of economic dependence among elderly according to sex and residence across Indian States, 2004

| | RURAL MALE | | RURAL FEMALE | | URBAN MALE | | URBAN FEMALE | |
|---|---|---|---|---|---|---|---|---|
| | Partial dependent | Fully dependent | Partial dependent | Fully dependent | Partial dependent | Fully dependent | Partial dependent | Fully dependent |
| Andhra Pradesh | 11.14 | 39.62 | 11.24 | 72.93 | 10.35 | 32.65 | 9.25 | 64.59 |
| Assam | 24.18 | 27.87 | 5.25 | 81.17 | 15.07 | 28.65 | 2.88 | 67.32 |
| Bihar | 15.56 | 24.8 | 11.74 | 69.6 | 12.33 | 37.88 | 7 | 73.14 |
| Chhattisgarh | 10.09 | 32.89 | 10.67 | 60.78 | 16.93 | 24.32 | 10.36 | 66.32 |
| Gujarat | 14.66 | 35.41 | 9.79 | 77.23 | 11.36 | 36.18 | 9.1 | 78.36 |
| Haryana | 37.96 | 24.34 | 42.96 | 44.37 | 20.2 | 30.47 | 29.23 | 50.19 |
| Himachal Pradesh | 18.06 | 22.18 | 15.05 | 63.46 | 7.65 | 20 | 14.38 | 54.5 |
| Jammu &Kashmir | 11.86 | 20.5 | 12.63 | 75.99 | 8.39 | 28.49 | 5.07 | 83.19 |
| Jharkhand | 16.65 | 27.1 | 10.75 | 70.59 | 21.81 | 27.9 | 6.47 | 78.33 |
| Karnataka | 13.68 | 32.12 | 11.16 | 73.09 | 9.7 | 34.89 | 7.14 | 78.58 |
| Kerala | 20.43 | 43.17 | 18.32 | 69.96 | 18.28 | 34.47 | 15.51 | 63.97 |
| Madhya Pradesh | 10.46 | 29.72 | 12.27 | 70.14 | 7 | 27.56 | 11.73 | 66.94 |
| Maharashtra | 16.61 | 34.1 | 12.88 | 68.15 | 20.19 | 29.32 | 6.63 | 74.16 |
| Orrissa | 20.62 | 32.42 | 12.38 | 77.41 | 15.32 | 33.28 | 9.8 | 79.98 |
| Punjab | 16.82 | 36.34 | 18.89 | 70.86 | 14.25 | 33.67 | 6.32 | 80.5 |
| Rajasthan | 14.67 | 37.71 | 12.68 | 77.85 | 13.63 | 30.99 | 8.23 | 78.9 |
| Tamil Nadu | 15.88 | 35.46 | 16.5 | 64.2 | 13.88 | 31.83 | 11.91 | 68.79 |
| Uttar Pradesh | 10.1 | 28.08 | 7.88 | 77.08 | 9.58 | 29.01 | 8.21 | 76.53 |
| Utharanchal | 4.92 | 27.66 | 4.69 | 59.28 | 5.9 | 11.41 | 7 | 71.13 |
| West Bengal | 18.15 | 33.14 | 8.18 | 82.01 | 10.07 | 22.72 | 8.44 | 72.26 |
| India | 15.26 | 32.07 | 12.44 | 72.07 | 13.37 | 30.11 | 9.54 | 72.12 |

Source: estimated from NSS 60th Round Unit level data.

The existence of multiple generations within the households makes the household relations and interdependence more complex (Kinsella and Velkoff, 2001) Cross-national experience shows that there high rates of economic participation among the elderly in the poor countries. (Clark, York and Anker, 1997). This in turn develops a situation of the younger generation depending up on the old (Williams, 2003). Based on these circumstantial evidences, the concept of reverse dependency was introduced which examines the extent of dependency on the aged by others (EFC 2003; Helpage International, 2006) Here we try to trace the incidence of reverse dependency on the aged, i.e., the aged providing support to the younger ones in the households. Table 2 gives the average number of those dependent on the elderly. It is clear that on average there is more reverse dependency on the men rather than on women. At the national level, the levels of RD (reverse dependency) are 3.11 for rural male and 2.15 for the urban male while it is only 1.60 and 1.39 for the female counterparts. Among the states, UP, Bihar, Orissa, Assam, Rajasthan, Utharanchal and West Bengal show relatively high levels of reverse dependency, while the southern states like Kerala and TN shows less incidence of reverse dependency. This is calculated based on the question regarding number of dependent on the elderly in the block 5 of the NSS schedule on health and morbidity round for 60$^{th}$ Round.

Table 2 Average number of dependent per elderly by sex and residence across Indian States, 2004

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| Andra Pradesh | 2.06 | 1.20 | 1.90 | 1.37 |
| Assam | 3.54 | 1.41 | 2.54 | 2.36 |
| Bihar | 3.40 | 2.19 | 4.22 | 2.39 |
| Chhattisgarh | 3.05 | 2.36 | 2.23 | 1.66 |
| Gujarat | 1.94 | 0.60 | 1.96 | 1.16 |
| Haryana | 3.38 | 1.42 | 1.95 | 1.32 |
| Himachal Pradesh | 2.46 | 1.33 | 1.50 | 0.69 |
| Jammu &Kashmir | 2.24 | 0.95 | 2.19 | 1.16 |
| Jharkhand | 3.38 | 4.36 | 3.26 | 1.81 |
| Karnataka | 2.56 | 0.98 | 2.27 | 1.45 |
| Kerala | 1.99 | 1.34 | 1.75 | 1.32 |
| Madhya Pradesh | 2.86 | 1.06 | 2.37 | 1.10 |
| Maharashtra | 2.06 | 1.43 | 1.58 | 1.05 |
| Orrissa | 2.50 | 1.70 | 2.62 | 1.55 |
| Punjab | 2.54 | 1.51 | 1.59 | 1.65 |
| Rajasthan | 3.11 | 1.37 | 2.14 | 1.45 |
| Tamil Nadu | 1.99 | 0.89 | 1.81 | 0.88 |
| Uttar Pradesh | 3.48 | 2.46 | 2.79 | 2.20 |
| Uttaranchal | 3.17 | 1.46 | 2.62 | 2.60 |
| West Bengal | 3.10 | 1.34 | 2.25 | 1.61 |
| India | 2.80 | 1.60 | 2.15 | 1.39 |

Source: estimated from NSS 60th Round Unit level data.

The financial support system for the elderly is a crucial factor in determining wellbeing. Indian society considers next to kin as the most reliable source of financial support. Studies have shown that the majority of the elderly depend on their son or daughter as the reliable source of support in old age (Rajan, 2004; Yadav, 2006; Alam, 2007) Here we look up on the source of financial support to the elderly. This is a very important factor in economic wellbeing, as the country does not have a well-established social security system (OASIS, 1999; Rajan and Prasad, 2008; World Bank, 2008). Table 3 gives the percentage of the elderly in India that do not have any kind of financial support by the next to kin. More than 52per cent of rural males and 56per cent of urban males manage their own financial needs (without any support) while the corresponding proportions are 15 and 18 per cent in the case of females. This lack of proper financial support varies differently across different states depending on state-specific factors. This lack of proper support puts most of the elderly in a condition of stress of work in their old age (NLI, 2006; Rajan, 2004) that results in the higher Work Participation in the old age.

Table 3: Percentage Distribution of Elderly without financial support according to Sex and Residence across Indian States

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| Andra Pradesh | 49.24 | 15.82 | 57 | 26.16 |
| Assam | 47.95 | 13.58 | 56.28 | 29.81 |
| Bihar | 59.64 | 18.66 | 49.79 | 19.86 |
| Chhattisgarh | 57.02 | 28.55 | 58.74 | 23.32 |
| Gujarat | 49.93 | 12.98 | 52.47 | 12.54 |
| Haryana | 37.7 | 12.67 | 49.34 | 20.58 |
| Himachal Pradesh | 59.76 | 21.49 | 72.35 | 31.13 |
| Jammu &Kashmir | 67.64 | 11.38 | 63.12 | 11.74 |
| Jharkhand | 56.26 | 18.66 | 50.29 | 15.2 |
| Karnataka | 54.19 | 15.74 | 55.41 | 14.28 |
| Kerala | 36.39 | 11.72 | 47.26 | 20.52 |
| Madhya Pradesh | 59.83 | 17.58 | 65.44 | 21.33 |
| Maharashtra | 49.29 | 18.97 | 50.49 | 19.21 |
| Orrissa | 46.96 | 10.21 | 51.4 | 10.22 |
| Punjab | 46.85 | 10.26 | 52.08 | 13.17 |
| Rajasthan | 47.63 | 9.47 | 55.38 | 12.87 |
| Tamil Nadu | 48.66 | 19.3 | 54.3 | 19.3 |
| Uttar Pradesh | 61.82 | 15.03 | 61.41 | 15.26 |
| Uttaranchal | 67.42 | 36.03 | 82.69 | 21.87 |
| West Bengal | 48.71 | 9.81 | 67.21 | 19.3 |
| India | 52.66 | 15.49 | 56.51 | 18.34 |

Source: estimated from NSS 60th Round Unit level data.

NSSO 60th round on health and morbidity gives the amount of the financial debt or the loan outstanding on the name of the elderly. The studies from the west gives the evidence that bearing of the financial debt in the old age affect the loss of welfare in the old age as the capacity to repay will be low in the two ends of life cycle (Gaymu, 2003; Knodel and Auh, 2002 World Bank 1994). Table 4 gives the percentage of elderly with the financial indebtness

Table 4: Percentage Distribution of Elderly with financial Debt according to Sex and Residence by Indian States, 2004

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| AndHra Pradesh | 24.15 | 4.38 | 17.94 | 3.91 |
| Assam | 16.16 | 2.98 | 9.39 | 2.07 |
| Bihar | 15.78 | 1.99 | 4.55 | 2.64 |
| Chhattisgarh | 9.90 | 2.07 | 3.92 | 3.41 |
| Gujarat | 12.60 | 0.52 | 3.82 | 1.39 |
| Haryana | 9.90 | 0.41 | 5.46 | 2.38 |
| Himachal Pradesh | 10.17 | 0.11 | 4.43 | 0.00 |
| Jammu &Kashmir | 15.64 | 0.54 | 2.56 | 0.24 |
| Jharkand | 9.96 | 0.00 | 4.76 | 0.37 |
| Karnataka | 23.23 | 1.33 | 12.40 | 1.25 |
| Kerala | 11.00 | 1.71 | 11.53 | 1.81 |
| Madhya Pradesh | 15.75 | 2.17 | 9.19 | 0.86 |
| Maharashtra | 18.36 | 1.86 | 5.85 | 0.63 |
| Orrissa | 12.21 | 0.53 | 3.83 | 0.90 |
| Punjab | 12.20 | 1.23 | 6.96 | 0.99 |
| Rajasthan | 13.94 | 0.82 | 5.82 | 1.04 |
| Tamil Nadu | 25.02 | 5.31 | 15.40 | 3.05 |
| Uttar Pradesh | 12.83 | 1.19 | 6.82 | 1.03 |
| Uttaranchal | 9.04 | 0.93 | 1.16 | 0.00 |
| West Bengal | 17.82 | 1.97 | 10.39 | 0.92 |
| India | 15.88 | 1.91 | 8.69 | 1.50 |

Source: estimated from NSS 60th Round Unit level data.

It is found that more than 16per cent of rural elderly and 9 per cent of urban elderly males are indebted, while this proportion is less than 2 per cent in the case of females. Among the states Tamil Nadu, Andhra Pradesh and Karnataka show more than 20 per cent of the rural male indebted, while Andhra Pradesh tops in the case of urban males followed by other South Indian states. The pattern is the same in the case of females with low levels of financial debt.

**Health Insecurity**

Physical and health risk is very high among the aged. Morbidity risk and lack of access to health care are among the factors causing physical and health insecurity among the elderly. The precise implications of population aging for future levels of health and health care utilisation depend on whether the increases in life expectancy experienced in general are accompanied by an increase or decrease in health problems in later life (Gruenberg, 1977; Kramer, 1980; Manton, 1982). The elderly are likely to have more health concerns than the rest of the population. The process of ageing is likely to be accompanied by changes in the pattern of diseases in the epidemiological tradition (Omran, 1971). In the past, nations that underwent the same demographic experience have witnessed a change in the pattern of morbidity to chronic and degenerative diseases of the kind of heart attack and strokes with high incidence of mortality in the old age (Fries, 1980.).

Decline in health, though, is just one of the possible risks associated with old age apart from a prospective fall in income, dependency and loneliness, and it remains one of the dominant concerns among the aged (Prakash, 1999). This is not surprising, as studies have shown that health is one of the crucial factors that determine the quality of life among the elderly (Wiggins et al., 2004). Moreover, poor health would be a cause of worry among the elderly since illness episodes in general have the potential to cause economic shock (Crystal et al., 2000), leading to financial dependency (Pal, 2004), loss of autonomy, reduced social contact and loneliness. Literature on health clearly shows that a positive relation exists between age and morbidity among the adults, i.e., at old age there is higher prevalence of morbidity implying that the risk of illness and morbidity is higher among the aged (Duraisamy, 2001**)**. Studies on linkage of widowhood and health status show greater association among gender, widowhood and health being (Hu and Goldman, 1990; Umberson et al., 1992; Verbrugge, 1979; Wyke and Ford, 1992; Sreerupa, 2006). The studies have shown a grim picture as most of the elderly in the world are deprived of health care and protection (WHO, 2007) and these deprivations get aggregated in the developing countries (Helpage International, 2005). Studies across the globe attributed that aspects of health insecurity are conditioned by economic and social conditions (Gove, 1973; Zick and Smith, 1991 Sengupta and Agree 2003; WHO, 2003). In India, issues of health insecurity and deprivation are a chronic problem among the aged (Alam 2007; Rajan Mishra and Sarma, 1999; OASIS, 1999) In this section, we look at health vulnerability by looking at the perceptive health status, physical mobility and access to health care of being sick.

Table: 5. Percentage Distribution of Elderly with self perception of bad health status according to sex and residence across Indian States, 2004

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| Andhra Pradesh | 23.83 | 29.17 | 19.14 | 21.15 |
| Assam | 22.74 | 29.72 | 20.80 | 21.78 |
| Bihar | 22.36 | 30.75 | 23.84 | 26.78 |
| Chhattisgarh | 17.03 | 19.25 | 30.17 | 25.64 |
| Gujarat | 13.11 | 13.27 | 12.65 | 13.19 |
| Haryana | 17.50 | 19.39 | 17.09 | 18.17 |
| Himachal Pradesh | 18.26 | 18.35 | 11.40 | 5.28 |
| Jammu &Kashmir | 21.85 | 38.33 | 25.26 | 21.54 |
| Jharkand | 25.78 | 35.37 | 17.69 | 33.08 |
| Karnataka | 19.21 | 19.58 | 14.73 | 22.59 |
| Kerala | 39.29 | 40.63 | 24.81 | 31.92 |
| Madhya Pradesh | 24.48 | 24.17 | 24.31 | 27.65 |
| Maharashtra | 18.56 | 17.91 | 19.58 | 19.01 |
| Orrissa | 24.12 | 37.50 | 19.36 | 22.92 |
| Punjab | 12.39 | 26.03 | 15.01 | 22.29 |
| Rajasthan | 19.82 | 23.88 | 28.97 | 28.58 |
| Tamil Nadu | 14.45 | 12.40 | 8.07 | 12.06 |
| Uttar Pradesh | 23.09 | 30.02 | 22.80 | 31.37 |
| West Bengal | 35.39 | 41.56 | 23.16 | 34.02 |
| India | 22.31 | 26.62 | 19.01 | 23.22 |

Source: estimated from NSS 60th Round Unit level data.

Table 5 gives the percentage of the sixty plus population which reports its perceptive health status as not good. In India, 22.31 per cent of rural male and 26.62 per cent of the females in the rural sector perceive bad health status. In the urban areas, it is 19.01 and 23.22 per cent. The rates vary considerably across the Indian states. Kerala and West Bengal report a high rate among the rural males while it is lowest in the case of Gujarat. West Bengal, Kerala, J&K and Jharkand report high rates among the rural women while it is lowest in Gujarat. In the case of urban men, states like Chhattisgarh Rajasthan and Jammu & Kashmir top the list. Himachal and Gujarat fall in the lower end. The States of West Bengal, UP and Jharkand report more than 30 per cent of the elderly with low health status, while it is only 5 per cent in the case of Himachal Pradesh.

Table 6 gives data on the physical mobility of the aged. This is considered to be a good indicator of health status. Many studies have shown a decline in physical mobility as age goes up (Hu and Goldman 1990; Umberson et al., 1992; Verbrugge, 1979). Studies in India have also highlighted incidence of increasing immobility as the age climbs (Alam 2007; Duraisamy, 2001). So here we

look up on the incidence of physical immobility in the form of "confined to bed" and "confined to home."

Table 6: Percentage distribution of Elderly in terms of their Physical Mobility according to sex and residence by Indian States, 2004.

| | RURAL MALE | | RURAL FEMALE | | URBAN MALE | | URBAN FEMALE | |
|---|---|---|---|---|---|---|---|---|
| | Confined to bed | Confined to home | Confined to bed | Confined to home | Confined to bed | Confined to home | Confined to bed | Confined to home |
| Andhra Pradesh | 1.11 | 7.62 | 1.00 | 8.91 | 1.30 | 4.33 | 1.96 | 7.86 |
| Assam | 0.78 | 5.94 | 1.91 | 7.44 | 0.37 | 8.72 | 6.19 | 3.98 |
| Bihar | 0.67 | 5.22 | 0.51 | 5.39 | 3.55 | 8.15 | 0.35 | 4.05 |
| Chhattisgarh | 2.09 | 5.96 | 0.79 | 3.66 | 0.47 | 7.15 | 3.65 | 7.17 |
| Gujarat | 1.90 | 2.04 | 0.57 | 6.94 | 1.53 | 3.07 | 1.09 | 6.20 |
| Haryana | 1.89 | 1.45 | 1.11 | 5.90 | 4.30 | 1.44 | 0.09 | 12.28 |
| Himachal Pradesh | 1.35 | 7.45 | 2.31 | 6.43 | 3.59 | 3.02 | 2.21 | 2.21 |
| Jammu &Kashmir | 0.76 | 8.29 | 2.94 | 14.15 | 1.28 | 3.40 | 0.79 | 4.34 |
| Jharkhand | 1.95 | 8.12 | 4.17 | 7.35 | 3.90 | 6.90 | 2.45 | 8.64 |
| Karnataka | 0.82 | 4.99 | 0.98 | 9.66 | 0.82 | 7.09 | 0.77 | 9.01 |
| Kerala | 1.58 | 10.52 | 1.60 | 11.81 | 3.74 | 9.61 | 1.35 | 10.47 |
| Madhya Pradesh | 1.14 | 8.15 | 1.47 | 7.31 | 2.55 | 3.52 | 2.10 | 8.62 |
| Maharashtra | 2.31 | 4.22 | 1.26 | 6.56 | 2.64 | 3.86 | 0.86 | 7.70 |
| Orrissa | 0.24 | 5.01 | 1.89 | 7.32 | 0.67 | 2.58 | 1.34 | 5.28 |
| Punjab | 0.60 | 3.49 | 2.83 | 9.85 | 0.44 | 5.51 | 2.19 | 4.36 |
| Rajasthan | 1.30 | 5.85 | 1.93 | 7.69 | 0.09 | 8.23 | 2.63 | 7.85 |
| Tamil Nadu | 0.88 | 3.59 | 0.94 | 3.64 | 0.84 | 3.15 | 1.61 | 5.40 |
| Uttar Pradesh | 1.06 | 4.20 | 1.85 | 6.78 | 1.03 | 4.51 | 2.02 | 10.67 |
| West Bengal | 2.26 | 8.60 | 1.95 | 11.33 | 1.35 | 7.02 | 2.01 | 11.85 |
| India | 1.27 | 5.60 | 1.47 | 7.56 | 1.74 | 5.20 | 1.72 | 8.41 |

Source: estimated from NSS 60th Round Unit level data.

It is found that in India more than 7.5 percent of the males are either confined to bed or in home, while it moves to over 9 per cent in the rural women and 10 per cent in the case of urban women. The rates showing those confined to home is much more than that of those confined to bed. States like Kerala and West Bengal show high levels of physical immobility across the groups.

The health insecurity of a society or group is often measured in terms of access to health care (WHO, 1998; Nadal, Khatri and Kadian, 1987). Studies on the elderly report that the ability to access health care is often cut down by socio-economic realities. It is modulated by gender, age and socio-economic conditions (Darshan, Sharma and Singh, 1987; Hu and Goldman 1990; Zick

and Smith 1991; Helpage 2006; Alam 2007). So in India, it is very important to look up on the deprivation of healthcare when we look up on health insecurity. Here we look up on the deprivation of hospital care of being sick during the last one year. We use this information from the NSSO 60th round to look up on the access of health care.

Table 7: Percentage Distribution of Elderly Deprived of hospital care during sickness according to sex and residence by Indian States, 2004

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| Andhra Pradesh | 14.09 | 4.52 | 15.25 | 11.68 |
| Assam | 2.53 | 2.86 | 21.84 | 5.80 |
| Bihar | 7.86 | 6.70 | 5.48 | 1.92 |
| Chhattisgarh | 8.30 | 2.51 | 10.34 | 5.04 |
| Gujarat | 15.30 | 11.07 | 18.31 | 17.30 |
| Haryana | 25.00 | 6.63 | 22.51 | 11.60 |
| Himachal Pradesh | 10.76 | 12.44 | 29.18 | 28.01 |
| Jammu &Kashmir | 6.40 | 5.69 | 5.33 | 14.85 |
| Jharkhand | 5.08 | 5.34 | 4.84 | 5.52 |
| Karnataka | 13.96 | 10.46 | 19.34 | 12.38 |
| Kerala | 25.62 | 27.87 | 30.87 | 18.45 |
| Madhya Pradesh | 10.13 | 4.94 | 13.44 | 12.13 |
| Maharashtra | 13.07 | 8.95 | 13.04 | 14.91 |
| Orrissa | 10.21 | 7.01 | 17.59 | 7.29 |
| Punjab | 10.62 | 10.59 | 18.44 | 12.49 |
| Rajasthan | 10.66 | 10.35 | 18.73 | 13.93 |
| Tamil Nadu | 25.10 | 10.94 | 21.84 | 13.06 |
| Uttar Pradesh | 5.13 | 4.30 | 10.92 | 14.85 |
| West Bengal | 8.77 | 4.07 | 13.78 | 9.00 |
| India | 10.62 | 10.59 | 18.44 | 12.49 |

Source: estimated from NSS 60th Round Unit level data.

From the table, it is clear that about 11 per cent of the elderly in the rural areas were deprived of the hospital care when sick while the proportions were 18.44 per cent and 12.49 per cent in the case of urban males and females respectively. The position of Kerala is much above the national average followed by the states like Tamil Nadu and Haryana. The major cause of this interstate disparity could be the difference in the perception of those identified as being sick.

**Social Insecurity**

Social isolation and loneliness are often considered to be problems of growing older. As people age, many outlive relatives and friends, and social interaction may become limited as people stay closer to home because of mobility difficulties and increased chronic illness. Older individuals may be more or less dissatisfied with the narrowing of their social network; and for those who

are dissatisfied, the result is feeling lonely. Researchers and practitioners tend to agree that social isolation and social loneliness among older people are often related to living alone and being in poor health (Ryff, 1995). Social isolation is an objective measure of social interaction, while social loneliness is considered to be the subjective expression of dissatisfaction with a low number of social contacts. Social isolation is sometimes referred to as aloneness or solitude. Those who are often alone, however, are not necessarily lonely, as solitude can be a personal choice. Social loneliness is defined as negative feelings about being alone (Keith, 1994). Studies from West show that the aged are more socially isolated after retirement and their detachment from the work (Maddox, 1999; Knodel, Chayovan and Siriboon, 1992). There is empirical evidence that more than sixty percentage of the aged in the OECD countries are in social isolation though they are economically well off (Helpage International, 1995). The changing social relations in various countries and breakdown of their cultural and traditional systems are resulting in a more individualistic society leading to social isolation of the elderly (Kinsella and Velkolf, 2001). In India, the traditional family set up had been providing social security for the elderly. Studies have shown there is an emergence of social isolation among the aged (Goswami, 2000; Rajan, 2004). This social isolation affects the living pattern of the aged (NSSO, 2004). The problem will be aggravated in the future as the system undergoes rapid modernisation and transformation. Here we look at the social insecurity by looking at living arrangements and family support of the aged.

The term 'living arrangement' is used to refer to one's household structure (Palloni, 2001). Irudaya Rajan, Mishra and Sarma (1995) explain living arrangements in terms of the type of family in which the elderly live, the headship they enjoy, the place they stay in and the people they stay with, the kind of relationship they maintain with their kith and kin, and on the whole, the extent to which they adjust to the changing environment. The living arrangement is an important component when dealing with welfare of any specific group. The elderly, being less independent, need the care and support of others in several dimensions on the social, familial and individual fronts (Rajan, 2004). Here Table 8 gives the percentage of the elderly who are living without next relatives in the house, which is the worst possible thing in the Indian context.

Table 8: Percentage distribution of Elderly Living without next relatives within the house (living arrangement) according to sex and residence across Indian States, 2004

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| Andra Pradesh | 4.46 | 9.21 | 5.39 | 5.63 |
| Assam | 1.60 | 4.66 | 2.56 | 1.55 |
| Bihar | 3.79 | 4.03 | 3.53 | 1.84 |
| Chhattisgarh | 14.68 | 15.25 | 2.00 | 6.04 |
| Gujarat | 3.55 | 3.71 | 1.83 | 3.72 |
| Haryana | 6.61 | 5.68 | 1.78 | 5.40 |
| HimachalPradesh | 9.13 | 4.11 | 5.70 | 1.97 |
| Jammu &Kashmir | 9.62 | 1.05 | 7.14 | 2.29 |
| Jharkhand | 3.31 | 1.87 | 0.45 | 4.67 |
| Karnataka | 6.09 | 7.99 | 6.02 | 6.64 |
| Kerala | 5.64 | 5.47 | 11.57 | 11.67 |
| Madhya Pradesh | 6.16 | 7.56 | 8.30 | 6.52 |
| Maharashtra | 3.73 | 9.66 | 3.85 | 7.44 |
| orrissa | 5.89 | 5.51 | 7.95 | 5.33 |
| punjab | 3.07 | 0.22 | 3.80 | 2.41 |
| Rajasthan | 8.16 | 3.13 | 2.44 | 5.27 |
| Tamil Nadu | 2.21 | 7.25 | 6.76 | 7.90 |
| Uttar Pradesh | 11.57 | 6.63 | 8.17 | 7.53 |
| West Bengal | 4.02 | 5.33 | 9.25 | 9.65 |
| india | 6.16 | 7.56 | 8.30 | 6.52 |

Source: estimated from NSS 60th Round Unit level data.

In India, 6.16 per cent of rural males and 7.56 per cent of rural females are either living alone or living with distant relatives in the house. It is 8.30 and 6.52 per cent in the case of urban counterparts. The proportion is high in the case of Chhattisgarh and UP in the case of rural males, while it is high in the case of Chhattisgarh and Andhra Pradesh in the case of rural females. In the urban areas, Kerala records more than 11 per cent of the elderly living without next relatives within the house and this could be due to the high incidence of migration. Increasing incidence of migration, internal and international, lead to the elderly population being left alone in the homes as the younger members move outside for work.

In India, people generally respect the aged and take care of them in a respectful manner. Conventionally, the family system has a main responsibility of the taking care of the elderly. In most cases, the elderly live with their son or daughter (Nayar 1999; Deshai, 1982; OASIS, 1999; Helpage International, 2005)). Recent years have witnessed a redefining in the relations as the social and economic transformation has resulted in the disintegration of the joint family system

and the rapid decrease in the family size has put the elderly in the isolated units . A study by Dak and Sharma (1987) highlights a decline in the role of the aged in the family, as they get isolated in urban India. There is whole lot of literature in India on the increase in the intergenerational conflict in life of aged that led to a decline in family support. (Joseph, 1987; Gangarde, 1989; Goswami, 2003). High incidence of migration and urbanization has put the elderly in stress (Rajan, 2004; Alam, 2007). Here we look into the conditions of the elderly without proper familial support (living without son or daughter in the house). This is a sign of lack of social and emotional security among the aged. Table 9 gives the distribution of the elderly living without son or daughter under same roof. It is found that among rural males at the national level, 21.32 per cent of the elderly are living without son or daughter in the house, while the percentage is 24.03 in the case of the urban females. The proportion is 16.63 per cent and 18.75 per cent in the case of urban males and urban females respectively. The pattern reveals that the problem is relatively greater in the South Indian states of Kerala, Karnataka and TN and in Gujarat as they have high incidence of migration.

Table .9: Percentage Distribution of Elderly without familial support (living without son or daughter in same roof) according to sex and residence across Indian States, 2004.

| | RURAL MALE | RURAL FEMALE | URBAN MALE | URBAN FEMALE |
|---|---|---|---|---|
| AndHra Pradesh | 26.87 | 29.43 | 20.96 | 22.95 |
| Assam | 25.85 | 19.95 | 20.16 | 15.56 |
| Bihar | 23.72 | 21.95 | 18.50 | 17.12 |
| Chhattisgarh | 27.61 | 26.69 | 21.54 | 20.82 |
| Gujarat | 29.06 | 29.59 | 22.66 | 23.07 |
| Haryana | 26.76 | 25.83 | 20.88 | 20.15 |
| HimachalPradesh | 26.45 | 26.73 | 20.63 | 20.85 |
| Jammu &Kashmir | 28.73 | 25.70 | 25.53 | 20.05 |
| Jharkhand | 28.67 | 31.41 | 22.36 | 24.50 |
| Karnataka | 30.21 | 28.38 | 23.57 | 22.14 |
| Kerala | 31.77 | 32.86 | 24.78 | 25.63 |
| Madhya Pradesh | 28.02 | 26.29 | 21.85 | 20.51 |
| Maharashtra | 24.30 | 27.49 | 18.95 | 21.44 |
| Orrissa | 26.33 | 24.86 | 20.54 | 19.39 |
| Punjab | 22.63 | 24.27 | 17.64 | 18.93 |
| Rajasthan | 27.20 | 28.95 | 21.21 | 22.58 |
| Tamil Nadu | 30.08 | 32.76 | 23.46 | 25.55 |
| Uttar Pradesh | 27.73 | 26.81 | 21.63 | 20.91 |
| West Bengal | 21.32 | 24.03 | 16.63 | 18.75 |

Source: estimated from NSS 60th Round Unit level data.

**Measuring Deprivation: using a composite index**

Considerable progress has been made in developed countries to date in applying the concepts described above to measure spatial deprivation. This reflects a profound change in approach away from income-only measures, which are criticised as being too simplistic, and is evidence that the idea of multi-dimensional deprivation is now becoming a mainstream one in government policy. There are numerous examples of deprivation indices that are used in the United Kingdom. Carr-Hill et al. (2004) provide a comprehensive comparison of them in their seminal work in measuring health inequality. Indices like the Townsend Index, Jarman Index, ScotDep, Carstairs and the much more recent Index of Multiple Deprivation (ODPM 2004) have mostly benefited from the ideas of relative deprivation as described by Townsend. Although Townsend's ideas have been developed at the level of the individual, studies have shown that area-level deprivation measured using composite indices reveal a link between geography and welfare distribution. For example, the spatial distribution of health-related behaviour or outcomes (Mohan et al. 2005; Lorant et al., 2001) have been shown to correlate strongly with area-level deprivation.

Composite area-level deprivation indices like composite 2004 Index of Multiple Deprivation (IMD) have been used for the allocation of government resources in the UK.

In the developing world as well, poverty maps have become important tools in the design and communication of poverty reduction programs. These typically measure the proportion of the population earning below a breadline income at the small area-level. However, while these maps comprehensively show the distribution of income poverty in developing countries, they do not map the multi-dimensional deprivation present, which in many cases may be more important for addressing the fundamental issues of wellbeing in the country (Henninger and Snel, 2002). Composite deprivation indices of a kind are available for developing countries, like the United Nations (UN) Human Development Index (HDI) or the "unsatisfied basic needs index". Here we try to develop a composite measure of deprivation of multiple deprivations.

Carr-Hill and Chalmers-Dixon's work on measuring inequalities in health provision (Carr-Hill et al 2004) provides an excellent foundation from which to begin this small discussion about deprivation indices. Carr-Hill et al explain that in the UK and other developed countries the improvement in the availability, accuracy and relevance of regularly updated administrative data has allowed deprivation indices to be more seriously considered for resource allocation purposes as implementers. Deprivation indices attempt to look at poverty in a more holistic manner than is generally the case with "poverty" indices that typically look at just income deprivation and does not consider other material and social forms of deprivation. However this inclusion of a range of domains for measuring deprivation is also cited as a source of weakness of this approach because opponents claim that it is difficult to avoid subjectivity in the choice of indicators and especially in the weighting of indicators. In a bid to preserve objectivity sophisticated techniques like PCA to locate the variables to create the composite index**.**

***Three main methods can be used to construct indices of deprivation.***

First, a simple average of values for the variables of interest may be used. However, within this approach those variables with higher values will implicitly be given greater weight than variables with lower values. Second, an unweighted index can be created through the addition of standard scores assigned to individual variables (Klasen, 1996). However the failure to weight variables assumes, often incorrectly, that individuals displaying any one characteristic reflected in the index are just as likely to experience deprivation as individuals or households displaying any other characteristic (Gordon, 1995;

Folwell, 1995). To address this problem, there is growing consensus that an index created from several variables must be additive. In other words, the index must allow that any person showing two or more of the characteristics among the index's variables is more likely to experience deprivation than a person demonstrating fewer characteristics (Gordon, 1995).Third, the currently preferred approach to construct indices also requires the use of weighting to make explicit the relative importance of the different variables driving deprivation. A key difficulty of weighting is choosing the basis on which to determine the variable weights. The index is also likely to be context specific and to require recalculation for use in differing time periods or for differing purposes, as the contribution of each variable to deprivation may change over time and may differ depending on whose views are considering in determining weights (Folwell, 1995).

One of the more recent and popular methods through which to construct an index with which to investigate area deprivation is factor analysis, which determines from the data themselves the weights to be used in creating an index. The technique was initially developed by psychologists to investigate relationships between personality characteristics and psychological test scores (Kline, 1994), although it has subsequently been used in other ways. Alderman and Morris (1967), who used factor analysis in the investigation of contributors to economic development, provided a good summary of its usefulness: "The primary purpose of factor analysis is to reduce the original number of explanatory variables to a smaller number of independent factors in terms of which the whole set of variables can be understood. Factor analysis thus provides us with a simpler, more compact explanation of the regularities apparent in the empirical results." In practice, therefore, factor analysis combines individual variables that are highly correlated with each other into subsets, each subset being relatively independent of (uncorrelated with) the others. These subsets are termed factors and are determined through an iterative process that ensures that the percentage of the variance in the correlation between variables for which each successive factor accounts is maximized. The factors are interpreted by assuming that each reflects a separate influence over the relationship between variables (in other words, that each reflects the underlying process that has created the correlations observed between variables: Tabachnick and Fidell, 20066).

There are various methods of factor analysis, including principal component analysis (PCA). PCA was chosen for use in this study for two key reasons. Firstly, it maximises the variance in the correlation matrix explained by any number of factors (called components in PCA) Through the process of PCA, the components are automatically uncorrelated (orthogonal) ensuring that they can be placed into a linear regression model for other analyses without problems of multicollinearity. Here we use the various components of economic, health and social insecurity among the aged.

**Composite index of old age deprivation in India**

After applying PCA, we identified 7 variables for the creation of composite index (see appendix 1), dependency status of the aged (not dependent as minimum), having financial debt (no as 1), being dependent on the elderly (no as 1). From health insecurity, we take physical mobility, having disease (no as 1). From social insecurity, we take the living arrangements and the source of familial support. In all the cases, we take the variables recoded as 1 for the best and it gets worse as the degree worsens. We created a Composite index with the above given 7 components. By taking the coefficient of variance as the weight, higher the score of the index, higher is the multiple deprivations. Then we normalized it to get its score between zero and one and divided it into 3 equal parts with different levels of deprivation (Bad, Relatively Bad and Worse). We then obtained the condition of elderly in terms of non-income aspects of deprivation.

Table 10: Percentage distribution of elderly according to generalized deprivation index score by sex and residence across Indian States, 2004.

| | RURAL MALE | | | RURAL FEMALE | | | URBAN MALE | | | URBAN FEMALE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | good | bad | Worse | good | bad | Worse | good | bad | Worse | good | bad | Worse |
| Andhra Pradesh | 50.5 | 42.5 | 7.0 | 17.7 | 70.4 | 11.9 | 56.3 | 39.7 | 3.9 | 27.1 | 65.3 | 7.6 |
| Assam | 59.9 | 38.2 | 2.0 | 23.2 | 70.4 | 6.4 | 58.8 | 41.0 | 0.3 | 36.4 | 62.1 | 1.5 |
| Bihar | 62.5 | 32.5 | 4.9 | 32.8 | 60.5 | 6.7 | 49.2 | 42.5 | 8.3 | 30.7 | 66.4 | 2.9 |
| Chhattisgarh | 55.7 | 39.8 | 4.6 | 34.6 | 59.1 | 6.3 | 68.6 | 31.4 | 0.0 | 28.6 | 67.6 | 3.8 |
| Gujarat40. | 52.9 | 41.8 | 5.4 | 21.4 | 68.3 | 10.3 | 53.1 | 42.6 | 4.3 | 22.3 | 70.3 | 7.4 |
| Haryana | 42.7 | 45.7 | 11.6 | 25.3 | 70.6 | 4.1 | 51.8 | 42.8 | 5.5 | 28.6 | 63.2 | 8.2 |
| HimachalPradesh | 54.0 | 36.8 | 9.2 | 27.0 | 58.7 | 14.3 | 68.8 | 27.9 | 3.3 | 32.2 | 61.2 | 6.6 |
| Jammu &Kashmir | 61.6 | 29.3 | 9.0 | 19.9 | 64.1 | 16.1 | 58.6 | 37.2 | 4.2 | 18.0 | 73.6 | 8.4 |
| Jharkhand | 56.6 | 35.7 | 7.7 | 24.6 | 68.4 | 7.0 | 60.8 | 36.0 | 3.3 | 28.8 | 53.5 | 17.7 |
| Karnataka | 58.9 | 36.1 | 5.0 | 23.0 | 67.2 | 9.8 | 57.0 | 40.5 | 2.5 | 24.9 | 61.6 | 13.5 |
| Kerala | 35.1 | 52.4 | 12.5 | 13.3 | 73.0 | 13.7 | 50.8 | 39.0 | 10.2 | 20.7 | 63.1 | 16.2 |
| Madhya Pradesh | 58.6 | 35.5 | 5.9 | 27.4 | 64.0 | 8.7 | 63.0 | 30.5 | 6.5 | 31.9 | 55.1 | 13.0 |
| Maharashtra | 50.0 | 44.8 | 5.2 | 29.1 | 61.8 | 9.1 | 50.6 | 41.7 | 7.7 | 23.5 | 64.4 | 12.1 |
| Orissa | 52.9 | 40.9 | 6.2 | 19.0 | 74.3 | 6.7 | 55.0 | 41.9 | 3.1 | 25.6 | 66.5 | 7.9 |
| Punjab | 48.7 | 45.9 | 5.5 | 22.0 | 72.4 | 5.7 | 53.4 | 43.4 | 3.2 | 24.6 | 69.4 | 6.0 |
| Rajasthan | 48.8 | 41.8 | 9.4 | 18.6 | 71.3 | 10.1 | 53.5 | 38.9 | 7.6 | 21.2 | 63.5 | 15.3 |
| Tamil Nadu | 51.4 | 42.9 | 5.7 | 27.9 | 63.6 | 8.5 | 57.1 | 37.3 | 5.6 | 23.9 | 67.9 | 8.2 |
| Uttar Pradesh | 63.0 | 28.3 | 8.7 | 27.3 | 64.4 | 8.3 | 58.6 | 34.7 | 6.7 | 29.1 | 62.4 | 8.6 |
| West Bengal | 54.0 | 40.9 | 5.1 | 18.7 | 73.0 | 8.3 | 59.0 | 34.9 | 6.1 | 24.8 | 60.2 | 15.0 |
| India | 54.8 | 38.5 | 6.8 | 24.3 | 66.8 | 9.0 | 56.1 | 38.0 | 5.9 | 25.6 | 63.7 | 10.8 |

Source: estimated from NSS 60th Round Unit level data.

Table 10 shows the male elderly are better positioned in both urban and rural areas than the females. At the all India level, there are more than 55 per cent with relatively low levels of deprivation among men while it is 25 per cent in both divisions of women. When we look across different categories, we can see a concentration in the first category in almost all the states among the males except in the case of Kerala. In

the case of women there is high concentration in the second group with the values ranges in between 0.34 to 0.66. Kerala reports more elderly in the worst category of deprivation and vulnerability in all the sections.

**RDI based on deprivation index**

To understand the relative disadvantages of the elderly in the different states, we employ the tool of relative deprivation index, which shows whether the aged of different groups are relatively disadvantaged or not in comparison to certain reference groups. Here we adopt the methodology used by Jayaraj and Subramanian (2002). The simple logic of RDI is that we consider a group as disadvantaged when the rate of the deprivation of that group is higher than the share of that group in the total deprivation. Here, when the value of the index is positive, the group is disadvantaged compared to other groups, while the degree of index takes its severity when the value is higher. (See Appendix 2). Here we take rate of elderly who has the score of DI above the state average as being deprived. The rate of deprivation is fixed on the basis of that. We then found the RDI across sector and sex. Here we calculated the relative disadvantages of being female or male, and also compared urban elderly to rural elderly.

**F**rom the table it is clear that in most of the Indian states the women are relatively disadvantaged compared to men in terms of deprivation in old age. Thus in the case of urban to rural, all states except Assam, Bihar, Chhattisgarh, Haryana, UP, Utharanchal and Orissa shows high disadvantage for men in old age. Kerala is the most disadvantaged state with 0.66 of RDI, followed by HP and Punjab. In the case of relative disparity in the urban to rural areas, Kerala records the highest value of 0.64 followed by Rajasthan and Bengal. In almost all the states, elderly deprivation exists except in the case Assam, Bihar, Chhattisgarh, Haryana, HP, Uttaranchal.

Table 11: RDI based on deprivation index for Indian states across Sex and Sector

| States | Female | Urban |
|---|---|---|
| Andhra Pradesh | 0.41 | 0.13 |
| Assam | -0.2 | -0.74 |
| Bihar | -0.32 | -0.55 |
| Chhattisgarh | -0.38 | -0.44 |
| Gujarat | 0.2 | -0.07 |
| Haryana | -0.45 | -0.1 |
| Himachal Pradesh | 0.51 | -0.28 |
| Jammu &Kashmir | 0.38 | 0.08 |
| Jharkhand | -0.16 | 0.23 |
| Karnataka | 0.13 | 0.36 |
| Kerala | 0.66 | 0.64 |
| Madhya Pradesh | 0.04 | 0.22 |
| Maharashtra | 0.02 | 0.27 |
| Orrissa | -0.11 | -0.08 |
| Punjab | 0.26 | 0.21 |
| Rajasthan | 0.23 | 0.56 |
| Tamil Nadu | 0.07 | 0.03 |
| Uttar Pradesh | -0.08 | 0.09 |
| Uttaranchal | -0.13 | -0.44 |
| West Bengal | 0.05 | 0.47 |

**Correlates of deprivations**

In old age, vulnerabilities exist in the form of economic, health and social insecurities. (Hu and Goldman, 1990; Umberson et al, 1992; Verbrugge, 1979; Wyke and Ford, 1992, World Bank, 1994). Studies in general find a high degree of association between these insecurities (Hu and Goldman, 1990; Umberson et al, 1992; Smeeding, Timothy and Williamson, 2001, Kinsella and Velkolf, 2001). In India, the levels of association are high, and many studies show that health shocks can make the elderly economically fragile (Alam, 2007; Prasad, 2007; WHO, 2007). Social isolation often accompanies health shocks (Alam, 2007; Gupta, I. and Sankar, D; Dey, 2000).

In this section, we look up on the correlates of the different aspects each other. Here we try to link economic, health and social insecurity of the elderly by looking at the inter-relativity of the economic, health and social insecurity components of General deprivation. We use the Correlation matrix of the Economic Deprivation Index (EDI), Health Deprivation Index (HDI) and Social Deprivation Index (SDI) components of deprivation by creating different index scores obtained by aggregating the economic, health and social insecurity indicators (variables) obtained from the PCA technique.

From the correlation matrix it is clear that there is a high relativity between economic and health component of deprivation and economic and social aspects of deprivation (0.86 and 0.89 for all India). While the relationship between the health and social deprivation is relatively low (0.59), there is a disparity in the correlates across Indian states. The relationship is much stronger in the states of Haryana, Kerala and TN. North Indian states show relatively low levels of the coefficients. Assam shows the lowest levels of relativity.

Table 12: Correlation matrix of EDI, HDI and SDI

| | EDI and HDI | EDI and SDI | HDI and SDI |
|---|---|---|---|
| Andhra Pradesh | 0.8598 | 0.8985 | 0.5365 |
| Assam | 0.5421 | 0.5664 | 0.3382 |
| Bihar | 0.8599 | 0.8986 | 0.5366 |
| Chhattisgarh | 0.8578 | 0.8964 | 0.5353 |
| Gujarat | 0.8610 | 0.8998 | 0.5373 |
| Haryana | 0.9400 | 0.9823 | 0.5866 |
| Himachal Pradesh | 0.8587 | 0.8973 | 0.5358 |
| Jammu &Kashmir | 0.8571 | 0.8957 | 0.5349 |
| Jharkhand | 0.8582 | 0.8968 | 0.5355 |
| Karnataka | 0.8610 | 0.8998 | 0.5373 |
| Kerala | 0.9200 | 0.9614 | 0.5741 |
| Madhya Pradesh | 0.8614 | 0.9002 | 0.5375 |
| Maharashtra | 0.8605 | 0.8992 | 0.5369 |
| orrissa | 0.8602 | 0.8989 | 0.5368 |
| punjab | 0.8587 | 0.8974 | 0.5359 |
| Rajasthan | 0.8612 | 0.9 | 0.5374 |
| Tamil Nadu | 0.9200 | 0.9614 | 0.5741 |
| Uttar Pradesh | 0.8593 | 0.8979 | 0.5362 |
| West Bengal | 0.8615 | 0.9002 | 0.5376 |
| India | 0.8602 | 0.8989 | 0.5969 |

Source: estimated from NSS 60th Round Unit level data.

**Regression results of GDI and determinants**

In Asian conditions, with the modernisation of the society, there is a complete paradigm shift in old age care. There is a widespread expectation that the elderly will be taken care of by their children and that at least one child will co-reside with them (Cowgill, 1972; Knodel, Havanon and Pramualratana, 1984; Pramualratana, 1990; Tuchrello, 1989). However, with a change in perceptions, old age care was separated from familial relationship. The traditional Indian system had a legacy of treating elderly as head

of the family, and they were taken care of by the family itself in the later years (Prakash, 2001). A multiplicity of factors contributes to the changing status of elderly and thus the vulnerability among them. Here we try to locate the factors affecting the wellbeing of the aged subjectively perceived. Here we try to link how the factors can affect the subjective being of the elderly, which is identified as an indicator of living condition of the aged as perceived by them. We construct a regression model by taking scores of deprivation index as the Dependent variable and sector, sex, religion, Marital Status, and family size as Independent variables.

Table 13: Regression results of determinants of deprivation.

| N | 34806 | | |
|---|---|---|---|
| R sq | 0.7819 | | |
| | Coefficient | Std error | P>t |
| cons | 0.842976 | .0336956 | 0.000 |
| age | 0.026422 | .0003593 | 0.000 |
| urban | 0.04112 | .0051594 | 0.000 |
| female | 0.217323 | .0053424 | 0.000. |
| Not married | 0.480129 | .0216968 | 0.000 |
| hsize | -0.003682 | .0007332 | 0.000 |
| Muslim | 0.039163 | .0080613 | 0.000 |
| Christian | -0.12792 | .0120306 | 0.000 |
| SC | 0.006741 | .0109167 | 0.000. |
| OBC | 0.078991 | .0098648 | 0.000 |
| General | 0.048808 | .009919 | 0.000 |

From the regression results gives R square of 0.78 that gives relatively high levels of goodness of fit. It is clear that as age goes up the extent of vulnerability among the aged goes up as there is a positive coefficient in the case of age GDI relation (0.026422). If the elderly is from an urban area, they have high chance of a greater GDI score with positive coefficient (0.04112). Women have a relatively high chance of being deprived than men. Th aged in the category of 'not married' or 'widowhood' are more prone to deprivation. As the size of the household increases, GDI score is likely to go down among the aged, with a negative relation persisting (-0.003682). SC, OBC and general categories are likely to have high scores of GDI in comparison to the ST sections. The coefficient is highest for the OBC section of the population. Muslims are more deprived and Christians less compared to the Hindu population in India.

**Conclusion**

we looked at the non-income aspects of poverty among the elderly in India in terms of deprivation. Deprivation is a much broader term than poverty that includes all kinds of denial or being excluded from a minimum standard of living. It is a position in which the people are denied of the basic needs, i.e., both economic and social necessities that enhance the capability and thus the wellbeing of individuals.

The process of ageing is always accompanied by a decline in the wellbeing of the human beings that results in the rising economic, health and social insecurity among the aged. The aged generally suffer from economic dependency, physical immobility and insecurity in the form of access to health care and also from social isolation. In the West, most of these insecurities are looked after by the state in the form of social and institutional arrangements. In India, where the incidence of the public provision of the old age care is less, the family system played a key role in the protection of the old. Here we looked at the deprivation of the aged in the context of changing intergenarional balance with a rapid growth of the aged.

The elderly in India are generally suffering from economic, health and social insecurity. Majority of the elderly are reported to be in a bad condition in terms of deprivation measured as Generalized deprivation. There exists disparity across states, sex and sector in the case of different aspects of deprivation. The study also looked at the relative disparity of the incidence of deprivation across sex and sector by taking the percentage of elderly below the state average of the deprived. It is clear that in most of the Indian states the women are disadvantaged compared to men in terms of deprivation in old age. The relative disadvantage is high in the case of urban areas in comparison to the rural areas in most of the cases. There is high relativity between economic and health components of deprivation and economic and social aspects of deprivation. It is clear that the levels of deprivations of the elderly are mostly conditioned by the social and demographic characteristics of the elderly and the household.

## APPENDIX 1

**Principal component analysis (PCA)** involves a mathematical procedure that transforms a number of possibly correlated variables into a smaller number of uncorrelated variables called principal components. The first principal component accounts for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible.

Karl Pearson invented PCA in 1901. Now it is mostly used as a tool in exploratory data analysis and for making predictive models. PCA involves the calculation of the eigenvalue decomposition of a data covariance matrix or singular value decomposition of a data matrix, usually after mean centering the data for each attribute. The results of PCA are usually discussed in terms of component scores and loadings (Shaw, 2003).

PCA is the simplest of the true eigenvector-based multivariate analyses. Often, its operation can be thought of as revealing the internal structure of the data in a way which best explains the variance in the data. If a multivariate dataset is visualised as a set of coordinates in a high-dimensional data space (1 axis per variable), PCA supplies the user with a lower-dimensional picture, a "shadow" of this object when viewed from its (in some sense) most informative viewpoint.

Here we use PCA to create GDI that captures both economic, health and social aspects of deprivation. Since our objective was to create a composite index that contains all these aspects of deprivation, we did PCA for all these aspects separately.

We obtained the Dependency status of the aged, having financial debt, having dependence on the elderly as principal components; from the health insecurity, we take physical mobility, having disease. From the social insecurity, we take the living arrangements and the source of familial support. Here we retain only components with eigenvalues of one or more.

**Economic aspects**

Variables Taken for PCA:

Dependency status of the aged, having financial debt, having dependent on the elderly, type of the household, employment status,

**Health aspects**

Variables Taken for PCA:

physical mobility, having disease. Access to health care being sick, lack of access to medical insurance. Lack of reimbursement of the medical bill.

**Social and familial aspects**

Variables Taken for PCA: living arrangements, source of familial support, whether child/ grandchild/sibling staying nearby, person helping in the old age.

Eigenvalues of the selected variables

| | Egenvalues | Variance |
|---|---|---|
| Economic aspectS | | |
| Dependency status of the aged, | 3.12 | 42.05 |
| Having financial debt, | 2.10 | 31.25 |
| Having dependent on the elderly | 1.58 | 24.56 |
| Health aspects | | |
| Physical mobility, | 3.42 | 42.23 |
| Having disease. | 2.32 | 33.62 |
| Social and familial aspects | | |
| Living arrangements | 2.89 | 39.32 |
| Source of familial support. | 1.92 | 32.53 |

## APPENDIX 2

**Relative Disadvantage Index based on GDI**

First of all one has to create 'n' number of mutually exclusively group based on particular social or economic characteristics (for example

Sector and sex). The formula is :

(Ci – Si) Ci(max) = Si /AD if Si < AD

RDI = i = 1…n Ci(max) = 1 if Si > AD

((Cimax) –Si) AD = Σ Si * DCi

DCi – 'i' th group specific incidence.

**CI** – share of 'i'th group in total deprived elderly; **Si -** share of 'i'th

group in child population

**Cimax-** Maximum contribution that 'i'th group can make; **AD** – all groups

average incidence.

Here we create a relative deprivation index based on GDI constructed and consider elderly who has the score of DI above the state average as being deprived and create RDI. We look up on relative disadvantages across sex and sector. We assess RDI in Indian states in terms of females in comparison to males and urban elderly in terms of Rural Elderly.

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