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**Does Living Longer Mean
Living Healthier?
Exploring Disability-free
Life Expectancy in India**

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DOES LIVING LONGER MEAN LIVING HEALTHIER? EXPLORING DISABILITY-FREE LIFE EXPECTANCY IN INDIA

M Benson Thomas, K S James and S Sulaja*

Abstract

During the last century, India has experienced a drastic reduction in mortality and a vast improvement in life expectancy. However, a question is raised regarding quality of life. Have the extra years gained with respect to life expectancy really improved the quality of life in India? Such a question becomes pertinent particularly when one considers the changes in morbidity in the country. No study, to date, has combined mortality and morbidity changes into a single index by to represent the health status in India. This paper is an exploration of quality of life, based on Disability-Free Life Expectancy (DFLE) rates in India. It follows the methodology developed by Sullivan (1971), using three levels of disability rates – perceived morbidity, restricted activity and confined to bed. Mortality data given by SRS and morbidity data given by NSSO are used for the analysis. The study finds higher rates of decline in DFLE in developed states with high life expectancy indicating a considerable decline in the quality of life with improvement in life expectancy. Such reduction is much higher in the older ages. On the other side, females and urbanites experienced considerable decline in the quality of life compared to males and rural people respectively. This indicates that even though females and urban people have more expected years of life, they spend more years in morbidity. An assessment based on the effect of diseases shows that chronic/degenerative diseases cause major losses in DFLE. The study concludes that a mere increase in longevity does not mean a better life, especially in the older ages. It is time for India to have effective interventions to improve the quality of life along with life expectancy.

Over the last Century, India has witnessed a drastic improvement in the overall life expectancy (LE). This attainment in LE is often attributed to a decline in the death rates of infants, children and young mothers (Bhat 1987). In fact, several studies in the recent years also point out that declining death rates among adults and elders in India have contributed significantly towards improved LE (Saikia, 2011; Thomas and Thomas, 2011). However, a question could be raised in this context regarding the quality of life. Has increased life expectancy really improved the quality of life in India? In this regard, it is important to note that very few studies deal with the health status of people in India from a combined perspective of mortality and morbidity changes. The lack of such indices, taking into account both mortality and morbidity, limits the usefulness and applicability of the State policies with respect to provision of social security and healthcare in the country.

There is also a serious debate whether or not an increase in LE can be taken as an indicator of healthy life. According to a group of scholars, mortality decline and resultant increase in LE evolves from the postponement of the onset of morbidity and hence, morbidity tends to be compressed with decline in mortality (Fries 198, 1989 and 2000; Fries and Capro, 1981). Others argue that a fall in mortality may not be accompanied by a decline in morbidity; rather the population with poor health increases – a

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scenario where morbidity is widespread in nature with declining mortality (Gruenberg, 1977; Kramer, 1980; Schneider and Brody, 1983). Some also argue in favour of the latter scenario but with a decreasing prevalence of severe health-related disorders (Verbrugge 1991 and, 1994). Notably, not many studies deal with the changes in morbidity in the context of aging population and the changing nature of causes of death in India.

While exploring the health status of the people in India, a recent study mentions the expansion of morbidity in the country (Arokyasamy, Yadav 2013). However, this study limits itself to 'self-reported ailments' (generally given by the heads of households or/and adult members on behalf of individuals in the house) collected by the NSSO in its last three rounds of health surveys. However, the veracity of self-reported ailments possibly suffers from a certain degree of bias in that it is largely influenced by socio-economic conditions and educational attainment of the individuals reporting such ailments. On the other side, while taking the national averages of the self-reported ailments, their study ignores the prevailing disparities in morbidity among the States. Such major inadequacies necessitate a further exploration of the changing health status based on reliable indicators as proxy for self-reported ailments, given a decline in mortality across the states in India.

In this context, an exploration into such lacunae could throw light on priorities in respect of individual and social health provision by identifying healthcare needs of each State. Besides, such an understanding could also help plan a holistic healthcare system to address the needs of the aging population, an issue that is gaining a considerable recognition in the country. Considering these research gaps, this study examines changes in the health status, using Disability Free Life Expectancy (DFLE), a combined index of mortality and morbidity. We specifically attempt to explore (i) the pattern of DFLE in India and the states, (ii) the relationship between LE and DFLE among the major states in India and (iii) the contributions of major groups of ailments to the loss of DFLE

Data Sets, Sources and Methodology

A combined index of mortality and morbidity is required to explore whether additional years of life are spent in good health or LE is increasing faster than the decline in disability rates. In this respect, this study uses DFLE, a measure developed by Sullivan (1971) that has widely been used as a combined index for studying mortality and morbidity. This method for DFLE is simple and easy to understand. An abridged Life Table and the age-wise prevalence of ailments are the only data required for its estimation. As a First Step to DFLE estimation, the person years lived at various age intervals are divided into years spent without ailments and with ailments. The years with ailments are a product of the prevalence of ailments and the years lived under various age groups. In this way, a new series of nL_x values were generated which were then used to construct new life tables showing the number of years that people can expect to live with disability. To obtain the number of years spent without ailments (DFLE), from the total life expectancy, the person years spent with ailments were subtracted.

The analytical part of this paper is divided into two major sections: The first section of the report consists of three levels of DFLE estimation by differently categorising the severity of ailments. Among them, the first sub-part relies on the proportion of people reporting morbidity as self-perception for DFLE estimation. The second and the third sub-parts of DFLE estimation use the proportion of

people reporting activity restriction and confinement to bed respectively as proxies for disability. In the second section, this paper examines the contribution of major groups of diseases to the loss of healthy life years, using a decomposition analysis. All these estimations were carried out for age at birth, young adult age (at exact age 15 years) and older age (at exact age 60 years) by considering differences in susceptibility to ailments for those age groups. Further, the ratios of the LE and DFLE were calculated and presented as percentages to indicate life spent at different age stages without ailments. All the estimation and analysis of DFLEs are carried out sex-wise and region-wise (rural, urban) for India and its major states except for DFLE coming under 'confined to bed'.

The study used Age Specific Death Rates (ASDR) given by Sample Registration System (SRS as the mortality data for the construction of abridged Life Tables). The average of ASDR from the years 2002 to 2006 was used as the ASDR of 2004 to avoid inconsistencies. To get the morbidity/ailment related data, the study relied on a survey conducted by the NSSO in 2004 on Mortality, Health Care and Conditions of the Aged in its 60th round. Three levels of ailments were sourced from the survey – (i) Proportion of people reporting ailment, (ii) Proportion of people reporting 'activity restriction' and (iii) Proportion of people reporting 'confined to bed' during the last 15 days prior to the survey. It is important to note here that through this survey, we collected data regarding the morbidity status based on self-rated health of the respondents. Therefore, it is not a socio-medico study.

Rate of Morbidity and Disability in India – An Overview

The prevalence of varied ailments is one of the prominent health indicators of any country. A major source of this information in India is the NSSO (Periodical survey reports) which gives the morbidity rate as a proportion of reported ailments for 15 days prior to the survey. A major lacuna of the morbidity rates given by NSSO is that it is not directly sourced from any formal medical records but based on the reported ailments during the survey. This section analyses the morbidity rates in India and its major states for 2004. Moreover, it considers the rate of 'restricted activity' and the rate of 'confined to bed' as proxies for ailments that are apparently free from bias attributable to morbidity related perception.

Table 1 depicts the morbidity rates, rates of restricted activity and rates of confinement to bed prevailing (all three rates are per 1,000 population) in India and the states for 2004. It shows that in India, all the rates are higher among females compared to males, but the differences are very high in respect of morbidity rates. It means that out of 1,000 people, around 84 males and 96 females suffer from some ailment, whereas, for the other two rates, the differences are meagre (less than one point). Among the states, all the rates are high in Kerala irrespective of gender except in the case of rate of confinement to bed among females, which is relatively high in Himachal Pradesh, indicating that all morbidity related cases do not end up with a restriction on daily activities. It may be interpreted that females exhibit high morbidities; they may experience the severity of its consequences to a lesser extent or they are forced into activity even with high morbidity.

Table 1: Rate of Ailments in India and Its Major States - 20014

State/India	Morbidity		Restricted Activity		Confined to Bed	
	Male	Female	Male	Female	Male	Female
Andhra Pradesh	90.8	101.8	26.3	25.5	9.3	10.3
Assam	77.0	85.6	32.7	39.0	13.9	17.0
Bihar	51.1	51.7	24.7	23.1	17.6	15.8
Chhattisgarh	66.1	70.5	36.4	38.6	17.2	18.6
Delhi	13.1	15.1	6.4	7.9	4.1	4.0
Gujarat	72.5	70.8	22.4	19.6	11.2	8.8
Haryana	84.7	101.3	35.3	26.1	23.0	17.3
Himachal Pradesh	68.9	97.8	37.1	51.8	22.8	31.2
Jammu & Kashmir	69.2	71.1	37.3	34.3	21.5	21.0
Jharkhand	24.9	42.3	12.4	20.0	8.4	17.5
Karnataka	60.5	63.2	27.6	29.0	10.9	9.5
Kerala	237.6	258.1	92.4	92.2	33.1	28.0
Madhya Pradesh	56.0	66.0	21.3	22.7	15.4	15.8
Maharashtra	96.0	109.8	26.5	31.2	13.1	13.9
Orissa	75.0	71.4	44.1	36.1	26.3	20.7
Punjab	105.4	142.1	26.0	24.5	16.1	17.4
Rajasthan	55.5	63.9	19.5	20.8	8.5	9.2
Tamil Nadu	86.7	104.1	27.7	31.8	11.4	14.0
Uttar Pradesh	94.1	107.4	24.3	26.1	11.0	13.4
West Bengal	119.6	127.4	60.5	52.9	24.4	20.8
India	84.4	95.5	30.6	31.5	14.7	15.0

Source: Authors ' Calculation

In a nutshell, the pattern of ailments in India shows four characteristics. First, there are vast variations between morbidity and disability among the states in India. Second, there are significant differences between the reported ailments and physical disabilities. Third, most of the states with very high morbidity rates are economically or demographically advanced in nature. Fourth, there is a huge difference based on gender in the prevalence of ailments – females are more prone to morbidity but hardly any disability.

Disability Free Life Expectancy [DFLE] in India and Its Major States DFLE by Morbidity Rates (DFLE_MORB¹)

A major drawback associated with the rate of ailments is its inadequacy in measuring the health status by considering the overall life span of the people. This apart, the overall rate of ailments is highly biased, while comparing the states that have dissimilar age structures. Notably, the states with a higher elderly population (demographically advanced states) have a higher chance of reported ailments. It could be due to the possibility of ailments increasing with advancing age of the people. At the same

¹ DFLE_MORB is the expected years of life lived without morbidity

time, a prominent alternative – LE does not consider morbidity rates for its estimation. Therefore, the expected years of healthy life lived by an average person is unknown even in the context of increasing LE in India. In this respect, DFLE can be taken as a relevant indicator for assessing the health status. Notably, DFLE is an index of a population's health status derived from mortality and morbidity rates. It addresses the question of whether improvement in LE has actually been accompanied by good health in the country.

Table 2 records LE and DFLE by morbidity (hereafter DFLE by morbidity termed as DFLE_MORB) at birth in India and its major states for 2004. LE at birth represents on an average the number of years a new-born baby is expected to survive at the existing age-specific mortality [ASMR] conditions. DFLE indicates the number of expected years of life of a person until death without having any ailment by considering similar death and ailment rates in the entire age interval in his/her life. Table 2 shows that, in India, DFLE represents, on an average, both males and females at birth who can be expected to live 56.0 and 56.8 years, respectively, without suffering any ailment. It should be noted that DFLE_MORB works out to about 88.2 per cent and 86.1 per cent of a life span for males and females. In other words, for 2004, as many as 7.4 healthy years (11.8% of LE) for males and 9.2 healthy years (13.9% LE) for females were lost due to morbidity.

Table 2: LE and DFLE_MORB at Birth in India,2004

State/India	Male			Female		
	LE	DFLE	DFLE/ LE (%)	LE	DFLE	DFLE/ LE (%)
Andhra Pradesh	62.9	54.3	86.3	67.8	56.6	83.5
Assam	58.8	51.9	88.2	60.9	52.0	85.3
Bihar	64.4	60.0	93.2	64.1	59.9	93.4
Chhattisgarh	62.0	56.0	90.3	64.9	58.9	90.8
Delhi	68.8	66.6	96.7	71.2	68.5	96.2
Gujarat	63.6	56.4	88.7	67.9	60.7	89.3
Haryana	65.1	57.7	88.6	68.7	59.2	86.2
Himachal Pradesh	68.0	60.9	89.6	72.4	62.0	85.6
Jammu & Kashmir	69.1	59.9	86.8	70.8	60.0	84.7
Jharkhand	63.1	61.0	96.6	62.7	59.7	95.3
Karnataka	64.2	57.6	89.7	68.8	60.4	87.8
Kerala	70.8	51.0	72.2	76.8	52.2	68.0
Madhya Pradesh	59.5	54.9	92.3	61.3	55.4	90.4
Maharashtra	66.6	57.6	86.4	70.3	59.1	84.0
Orissa	59.3	54.3	91.5	62.4	56.9	91.2
Punjab	67.6	58.1	86.0	70.5	55.7	79.0
Rajasthan	63.0	57.9	91.9	66.7	60.8	91.1
Tamil Nadu	65.8	58.1	88.3	69.1	59.2	85.7
Uttar Pradesh	60.9	53.3	87.6	61.5	52.4	85.3
West Bengal	65.9	55.2	83.8	69.3	56.6	81.6
India	63.4	56.0	88.2	66.0	56.8	86.1

Source: Authors' Calculation

LE and DFLE for major states in India are presented in Table 2. The table reflects significant variations in LE and DFLE across the states for males and females. Notably, a significant loss in DFLE_MORB for states with a high LE can be observed. For instance, states like Kerala with a higher LE for males and females, witnessed only a lesser percentage of their life span with good health. Another interesting feature is the gender disparities prevailing in LE and DFLE_MORB as shown in Table 2. There is a difference of about 3 years between male and female LE in India, indicating more years of survival for females. Nevertheless, in terms of DFLE_MORB, there is a difference of hardly one year between them. This is mainly because of a large reduction in the healthy years of females in the country. In other words, females survive with relatively low quality of life even though they have a higher life expectancy. A similar pattern of gender disparity in respect of LE and DFLE_MORB is visible across all the states. Thus, a mere increase in LE may not really indicate a better health status for females compared to males.

A similar pattern of DFLE_MORB at birth can also be seen for both rural and urban areas in the country as shown in the table given as Appendix -1. It shows that DFLE_MORB in rural areas is 55.3 for males and 55.8 years for females with 88.8 per cent and 87.1 per cent respectively of their corresponding LE at birth. Similarly, DFLE_MORB in the urban areas is 58.1 years for males and 58.7 years for females with 86.3 and 83.3 per cent of their LE in the same age. Notably, urban population has a better LE and DFLE_MORB than the rural population. However, the urban population has comparatively lower proportion of DFLE to LE than the rural population. There are gender disparities in LE and DFLE_MORB at birth for both rural and urban areas as shown in the table given as Appendix -1. Across all the states in urban (except Punjab) and rural (except Bihar, Jharkhand and Uttar Pradesh) areas in the country, females experience a better DFLE_MORB at their birth compared to males. However, with respect to DFLE_MORB percentage to LE, they accounted for a lesser proportion than males. It indicates a poor quality of life among females.

One of the relevant dimensions of DFLE_MORB is related to the health status of elderly in India. Such an analysis can shed more light on the health status of the elderly especially in the beginning of the aging scenario in India. Table 3 shows the pattern of LE and DFLE_MORB at the age of 60 years in India and its major states. It records a life expectancy of 16.5 years for males and 18.5 years for females at an exact age of 60 years for 2004. However, the DFLE_MORB records only 11.2 and 12.5 healthy years for males and females, respectively, for the same age.

Table 3 also portrays LE and DFLE_MORB at the age of 60 years among the states. Interestingly, the states with higher LE rates, accounts for a lesser share of DFLE_MORB to LE than others, indicating an inverse relationship between changes in LE and healthy life years in the older ages. In India and its major states, females experience a better LE and DFLE_MORB at the age of 60. It reflects that females at 60 enjoy better quality of life than males.

Table 3: LE and DFLE_MORB at the Age 60 in India,2004

State/India	Male			Female		
	LE	DFLE	DFLE/LE (%)	LE	DFLE	DFLE/ LE (%)
Andhra Pradesh	16.6	9.7	58.4	18.7	10.3	54.8
Assam	14.9	8.6	57.8	16.3	8.6	52.5
Bihar	16.9	13.8	81.8	17.4	14.8	85.0
Chhattisgarh	16.1	12.1	75.3	17.4	14.2	81.5
Delhi	17.5	15.2	86.9	18.8	16.3	86.7
Gujarat	16.2	10.1	62.5	19.4	14.4	74.2
Haryana	17.8	13.1	74.0	20.7	15.4	74.4
Himachal Pradesh	18.3	12.8	70.0	22.0	15.8	72.0
Jammu & Kashmir	19.0	11.0	58.2	20.4	11.4	55.9
Jharkhand	15.1	13.4	88.7	15.0	14.0	93.2
Karnataka	16.5	10.5	63.7	19.2	12.2	63.8
Kerala	17.4	7.5	43.2	21.0	8.5	40.5
Madhya Pradesh	15.2	11.6	76.6	17.2	13.2	76.8
Maharashtra	17.1	10.9	63.4	19.0	11.7	61.8
Orissa	15.4	12.7	82.2	17.0	14.0	81.9
Punjab	19.1	13.3	69.9	20.8	12.2	58.4
Rajasthan	16.9	13.5	79.8	20.2	16.9	83.7
Tamil Nadu	16.7	11.6	69.6	18.1	11.9	65.6
Uttar Pradesh	16.1	11.3	70.4	18.0	12.7	70.8
West Bengal	15.9	9.3	58.1	18.4	10.4	56.6
India	16.5	11.2	68.1	18.5	12.5	67.3

Source: Authors' Calculation

The pattern of DFLE at the age of 60 years in rural and urban areas of the country corresponds to that of the All-India scenario as shown in the table given as Appendix -2. However, DFLE_MORB shows that rural people experience a better DFLE_MORB than urbanites at that age. The DFLE_MORB for males is 11.4 years and for females 12.5 years in rural areas whereas the DFLE_MORB for males is 10.8 years and females 11.4 years in the urban areas. Considerable disparities in LE and DFLE_MORB at the older ages can be seen among the states in the country. Most of the advanced states have lower levels of DFLE_MORB at the age of 60 years. Notably, similar to the All-India level, most of the states accounts for a higher proportion of DFLE_MORB to LE ratio in the rural areas, reflecting a better quality of life even with low LE among them. Appendix-2 also portrays the gender disparities in DFLE_MORB at the age of 60 years in both the rural and urban areas. In almost all the states, females experience a better DFLE_MORB than males in the older ages. However, as percentage of DFLE_MORB to LE, their share is relatively low in rural and urban areas especially in the advanced states. It indicates that even though females enjoy a better LE, they also suffer from increasing disabilities at the same time.

DFLE by Rate of Restricted Activity (DFLE_RA²)

A proper understanding of morbidity, and thereby of the actual DFLE, may be undermined if one goes by only the perceived ailments as 'morbidity'. To tackle this problem, in the coming sections we treat the ailment as 'disability reported', while taking into account the number of persons reporting restricted activity and the rate of 'confined to bed' as proxies.

Table 4: LE and DFLE_RA at birth and 60 in India, 2004

State/India	DFLE at Birth				DFLE at Age 60			
	Male		Female		Male		Female	
	DFLE	DFLE/LE (%)	DFLE	DFLE/LE (%)	DFLE	DFLE/LE (%)	DFLE	DFLE/LE (%)
Andhra Pradesh	60.5	96.1	64.9	95.7	14.7	88.5	16.4	87.4
Assam	55.8	94.9	57.0	93.6	12.0	80.7	13.1	80.5
Bihar	62.4	96.8	62.5	97.4	15.6	92.2	16.5	94.9
Chhattisgarh	58.8	94.9	61.2	94.4	14.2	88.5	15.0	86.6
Delhi	67.2	97.6	69.7	97.9	15.6	89.4	17.4	92.8
Gujarat	61.5	96.7	65.9	97.0	14.6	90.4	18.0	92.6
Haryana	62.1	95.3	66.2	96.4	15.8	88.8	19.5	94.2
Himachal Pradesh	64.1	94.3	66.8	92.3	15.2	83.1	18.5	84.0
Jammu & Kashmir	64.0	92.6	65.4	92.5	14.7	77.3	15.9	78.2
Jharkhand	62.2	98.5	61.4	98.0	14.4	95.6	14.6	97.5
Karnataka	61.1	95.2	64.6	93.9	13.9	84.2	15.5	80.8
Kerala	63.2	89.3	68.3	88.9	13.5	77.8	16.9	80.4
Madhya Pradesh	57.9	97.3	59.3	96.9	14.1	92.5	16.0	93.1
Maharashtra	64.2	96.3	67.3	95.7	15.6	90.9	17.2	90.7
Orissa	56.3	95.0	59.5	95.4	14.0	90.6	15.4	90.4
Punjab	65.0	96.2	67.6	95.9	17.2	90.4	18.9	90.8
Rajasthan	61.3	97.4	64.6	96.9	16.0	94.9	18.8	93.4
Tamil Nadu	63.5	96.4	66.4	96.1	15.4	92.2	16.7	92.6
Uttar Pradesh	58.9	96.8	59.1	96.2	15.1	93.6	16.5	91.8
West Bengal	60.6	92.0	63.7	91.9	12.7	80.0	14.7	79.8
India	60.8	95.8	63.0	95.4	14.7	89.3	16.5	89.2

Source: Authors' Calculation

The status of DFLE by the rate of restricted activity (hereafter DFLE by the rate of restricted activity is termed as DFLE_RA) at birth is given in Table 4. As can be observed from this Table, the DFLE_RA is 60.8 years for males and 63.0 years for females in the country. This means that males and females can expect to live for 61 years (95.8 percent of their LE) and 63.0 years (95.4 per cent of their LE) respectively without any restriction on their major activities despite being morbid. Notably, both the DFLE_RA and its share in LE are significantly higher than that of DFLE at birth adjusted by self-reported ailments (morbidity). This indicates that morbidity does not end with a severe reduction in the quality of life, if one considers the restriction of major activities as a proxy for loss in the quality of life.

² DFLE_RA is the expected years of life lived without disabilities that lead to restricted activities

Considerable disparities in DFLE_RA among the states are reflected here. In all the Indian states, barring Kerala, more than 90 per cent life expectancy is DFLE_RA. Such a pattern of DFLE_RA among the states confirms our earlier findings that all the reported morbidity need not always end with a severe reduction in the quality of life. On the other side, there is a two-year male-female difference in DFLE_RA at birth in India for 2004. However, these differences vary across the states and these differences are similar to their LE, which can be due to almost equal reduction in healthy years at the age of birth for males and females.

The pattern of DFLE_RA at birth in rural and urban areas is almost similar to pattern at the All-India level as shown in Appendix - 3. Notably, the urban population exhibits a better DFLE_RA than their rural population. On par with the All-India average, the DFLE_RA to LE ratio is more than 95 per cent for both rural and urban areas. This is considerably higher than DFLE by morbidity rates. The urbanites show a better DFLE_RA than their rural counterparts across all the states. It also shows that females have recorded a better DFLE than males for both the rural and urban areas in all the states. However, when we consider the ratio of DFLE_RA to LE, males fare better than females in almost all the states in both the rural and urban areas.

The status of DFLE_RA in the older ages is also presented in Table 4. This Table portrays the DFLE_RA at the age of 60 years in India and its major states. It is seen that an additional 14.7 years for males and 16.5 years for females can be expected at age of 60 years without any severe restrictions on their daily activities. This difference is also visible in their DFLE_RA to LE ratio. The exact loss of healthy life with restricted activities constitutes only 11 per cent, whereas, it is more than 30 per cent by morbidity for both males and females in India.

State-wise disparities in DFLE_RA at the age of 60 years are also portrayed in Table 4. This Table reflects considerable differences in DFLE_RA at the age of 60 years among the states. This pattern among the states reiterates the possibility of loss in the quality of life with an improvement in LE in India. The proportion of DFLE_RA to LE for the urban people is lower than that of the rural people, i.e., a decline in the quality of life is more visible among them with an increment in LE. It indicates loss of quality life for the older ages in all the states. In addition, a male-female difference is visible among both rural and urban areas of the states in respect of DFLE_RA at the age of 60 years, as shown in Appendix -3. All the states (except Bihar for Urban areas) account for a higher DFLE_RA for females in the older ages. However, the share of DFLE_RA to LE is relatively lower for females.

DFLE by Rate of Confined to Bed (DFLE_CB³)

Confined to bed due to ailment can be considered as an extreme level of disability and hence loss of a healthy lifespan for an individual. In this sense, the expected lifespan can be adjusted with a life free of any disability, which restricts a person to the bed. Table 5 shows the DFLE adjusted with disability reported as confined to bed (hereafter DFLE_CB) during 2004. It is seen that males born in 2004 can expect to live 98.1 per cent and females can expect to live 97.8 per cent of their life without serious health problems. Notably, the DFLE_CB shows a lesser reduction in the quality of life, while comparing it with that of DFLE by morbidity as well as restricted activities.

³ DFLE_CB is the expected years of life lived without disabilities that caused confine to bed

Table 5 also records the DFLE_CB at birth across the states in India. It should be noted that more than 95 percent of DFLE_CB to LE is visible in all the states, indicating a relatively low reduction in the quality of life while examining the extreme level of disability in terms of confinement to bed. The disparity based on gender in DFLE_CB is also a matter for concern. Table 5 shows about a two-year difference in the DFLE_CB, which is less than that of their LE. These gender disparities can be observed in all the states. However, in terms of DFLE to the LE, most of these states show a higher proportion of loss in DFLE for females than males, indicating a worsening situation of their actual health status together with an improvement in LE.

Table 5: LE and DFLE_CB at Birth and Age at 60 in India

State/India	DFLE at Birth				DFLE at Age 60			
	Male		Female		Male		Female	
	DFLE	DFLE/LE (%)	DFLE	DFLE/LE (%)	DFLE	DFLE/LE (%)	DFLE	DFLE/LE (%)
Andhra Pradesh	62.0	98.5	66.4	97.9	15.8	94.9	17.4	92.7
Assam	57.6	97.9	59.2	97.2	13.7	92.4	14.9	91.2
Bihar	63.2	98.2	63.2	98.6	16.4	97.0	16.9	97.4
Chhattisgarh	60.5	97.5	63.1	97.3	14.8	92.4	16.3	93.7
Delhi	67.8	98.5	70.3	98.8	16.3	93.2	18.0	96.1
Gujarat	62.5	98.3	66.9	98.6	15.3	94.9	18.7	96.2
Haryana	63.2	97.1	67.2	97.8	16.4	92.6	20.1	97.1
Himachal Pradesh	65.8	96.7	68.8	95.1	16.6	90.6	19.7	89.8
Jammu & Kashmir	66.0	95.6	67.4	95.3	16.1	84.7	17.6	86.2
Jharkhand	62.6	99.1	61.6	98.2	14.7	97.6	14.7	97.7
Karnataka	63.1	98.3	67.5	98.1	15.7	95.2	18.1	94.5
Kerala	68.2	96.3	74.2	96.5	16.2	93.2	19.6	93.6
Madhya Pradesh	58.4	98.1	60.0	97.9	14.5	95.0	16.4	95.4
Maharashtra	65.4	98.1	68.9	98.0	16.3	95.0	18.2	95.6
Orissa	57.7	97.3	60.7	97.3	15.0	96.9	16.1	94.3
Punjab	65.8	97.5	68.6	97.3	17.8	93.1	19.7	94.8
Rajasthan	62.3	98.9	65.8	98.6	16.6	98.2	19.6	97.0
Tamil Nadu	64.9	98.6	67.9	98.3	16.2	96.5	17.6	97.5
Uttar Pradesh	60.1	98.7	60.2	98.0	15.7	97.6	17.1	95.3
West Bengal	64.0	97.1	67.0	96.7	15.1	94.9	16.9	91.8
India	62.2	98.1	64.6	97.8	15.8	95.5	17.6	95.0

Source: Authors' Calculation

The health status of the elderly in terms of DFLE_CB at the age of 60 years is given in Appendix - 4. The table shows that it is 95.5 per cent and 95.0 per cent for both male and females relative to their respective LE expectancy in the country, almost 3 per cent lower than that of DFLE_CB at the age of birth, indicating a worsening health status for both males and females.

The DFLE_CB is significantly higher than DFLE by morbidity and restricted activity, indicating that not all the reported morbidity and restricted activity may end with a severe loss in the quality of life in all the states. It shows that there is difference of 1.8 years in the DFLE_CB between males and females at older ages in India, which is slightly lower than that of their LE. Females have recorded a better DFLE_CB than males, while adjusting with the rate of confined to bed in all the states. However, the proportion of DFLE_CB to LE ratio in several states indicates that females have a relatively lower quality of life than males.

Contributions of Major Disease Groups to the Loss of DFLE in India

Dissimilarities in DFLE at major age intervals among the states could be due to variations in the prevalence of ailments. Therefore, an exploration of the contribution of each ailment and its causes to loss in DFLE can be useful to planners and public policy makers for appropriate policy responses aimed at curbing the decline in the quality of life in the country. In this section, the study analyses the healthy years lost because of major ailments in India for the year 2004, using NSS data. We place the causes of morbidity under broad categories using the criteria developed by Murray, Yang and Qiao (1992) with respect to an epidemiological perspective on healthcare (Xingming 1999). Although there are difficulties in individually identifying the diseases, a broad classification of diseases in terms of epidemiological perspective as communicable, non-communicable diseases as well as accidents and injuries can help design effective health interventions.

This study has broadly classified the diseases into four major groups considering the nature of diseases and the availability of information. The diseases coming under the first group are generally communicable and primary healthcare oriented ailments, such as diarrhoea/ dysentery, worm infestation, amoebiasis, hepatitis/jaundice, tuberculosis, sexually transmitted diseases, eruptive, mumps, diphtheria, whooping cough, fever of unknown origin, tetanus and filaria/elephantiasis. Similarly, the second group consists of all identified degenerative and chronic diseases such as cardiac diseases, gastritis/gastric or peptic ulcer, hypertension, respiratory including ear/nose/throat ailments, bronchial asthma, disorders of joints and bones, diseases of kidney/urinary system, prostatic disorders, gynaecological disorders, neurological disorders, psychiatric disorders, conjunctivitis, glaucoma, cataract, diseases of skin, goitre, diabetes mellitus, under-nutrition, anaemia, locomotor, visual including blindness (excluding cataract), speech, hearing, diseases of mouth/teeth/gum and also cancer and other tumours. The third group includes accidents, injuries, burns, fractures and poisoning. All other diagnosed and undiagnosed ailments have been considered as the fourth group in this study.

Decomposition of DFLE by Morbidity with Major Group of Ailments at the Age of Birth

Healthy years lost because of major groups of diseases in India in the major states are portrayed in Table 6. It is observed that 7.5 years for males and 9.2 years for females in DFLE at birth by morbidity have been lost in the country. The group of chronic/degenerative diseases (Group 2) is a major cause

for the loss of 4.3 years for males and 5.5 years for females at the age of birth. Notably, the share of this group accounts for 57.8 and 60.0 per cent for both males and females respectively.

Table 6: Healthy Years Lost Due to Major Groups of Diseases at Birth

State/India	Male					Female				
	Total	Group 1	Group 2	Group 3	Group 4	Total	Group 1	Group 2	Group 3	Group 4
Andhra Pradesh	8.6	1.3	5.5	0.3	1.5	11.2	1.4	7.7	0.3	1.9
Assam	6.9	2.6	3.6	0.0	0.7	8.9	3.5	4.5	0.0	0.9
Bihar	4.4	1.5	2.1	0.1	0.8	4.2	1.4	2.3	0.0	0.5
Chhattisgarh	6.0	1.8	3.0	0.2	1.1	6.0	2.1	3.0	0.0	0.8
Delhi	2.3	0.1	1.9	0.1	0.2	2.7	0.3	1.9	0.1	0.3
Gujarat	7.2	1.7	4.8	0.3	0.5	7.3	1.6	4.8	0.2	0.7
Haryana	7.4	1.6	4.3	0.4	1.1	9.5	1.9	6.1	0.1	1.4
Himachal Pradesh	7.1	1.6	4.1	0.3	1.0	10.4	1.6	6.8	0.6	1.4
Jammu & Kashmir	9.1	1.6	6.8	0.1	0.6	10.8	1.5	8.5	0.0	0.8
Jharkhand	2.1	0.9	0.7	0.0	0.5	3.0	1.2	1.2	0.0	0.6
Karnataka	6.6	1.1	4.5	0.1	0.9	8.4	1.3	5.7	0.1	1.3
Kerala	19.7	3.5	12.6	0.6	3.0	24.6	3.4	16.3	0.4	4.5
Madhya Pradesh	4.6	1.6	2.4	0.1	0.5	5.9	1.8	3.2	0.0	0.8
Maharashtra	9.1	1.6	5.9	0.3	1.3	11.2	2.1	7.6	0.1	1.5
Orissa	5.1	2.0	1.8	0.2	1.0	5.5	1.9	2.3	0.0	1.3
Punjab	9.4	2.2	5.8	0.3	1.2	14.8	2.2	10.1	0.1	2.4
Rajasthan	5.1	1.3	3.0	0.1	0.7	5.9	1.5	3.3	0.2	1.0
Tamil Nadu	7.7	1.4	4.7	0.3	1.3	9.9	2.1	5.8	0.4	1.6
Uttar Pradesh	7.6	2.4	3.6	0.3	1.4	9.0	3.0	4.2	0.1	1.6
West Bengal	10.7	1.9	6.3	0.5	2.1	12.7	2.1	7.8	0.3	2.5
India	7.5	1.7	4.3	0.2	1.2	9.2	2.0	5.5	0.2	1.5

Source: Authors' Calculation

The dominance of Group 2 diseases followed by Group 1 diseases in the loss of DFLE in the age at birth is visible for all the major states in the country for both males and females. However, the share of Group 2 in this respect varies across the states without any clear pattern. This also shows not only higher severity of chronic/degenerative diseases among females compared to males but also such ailments are the prominent causes behind gender disparities in DFLE in India. Most of the states show a similar pattern where females are badly affected by chronic/degenerative ailments as reflected in a proportionately higher share of DFLE loss for females than males.

Decomposition of DFLE by Morbidity with Major Groups of Ailments at the Age of 60 Years

The share of the major groups of ailments that cause loss in DFLE by morbidity at the age of 60 years in India in the major states is given in Table 7. It shows a loss of 5.3 years for males and 6.1 years for

females in DFLE because of various ailments. Notably, there is higher dominance of Group 2 ailments in the loss of DFLE. i.e., 3.9 years for males 4.6 years for female (chronic/degenerative group of diseases), accounting for 75.0 per cent of the total loss in DFLE at the age of 60 years in India. A higher share of Group 2 ailments in the loss in DFLE at the age of 60 years than at the age of birth indicates, a high degree of severity of chronic/degenerative diseases leading to loss in the quality of life of old people in the country.

Table 7: Healthy Years Lost Due to Major Groups of Diseases among Males at the Age of 60 Years in India

State/India	Male					Female				
	Total	Group 1	Group 2	Group 3	Group 4	Total	Group 1	Group 2	Group 3	Group 4
Andhra Pradesh	6.9	0.4	5.5	0.2	0.9	8.5	0.4	6.9	0.2	1.0
Assam	6.3	1.4	4.5	0.0	0.4	7.8	1.8	5.1	0.0	0.8
Bihar	3.1	0.5	2.1	0.0	0.5	2.6	0.4	2.1	0.0	0.2
Chhattisgarh	4.0	0.6	2.6	0.0	0.7	3.2	0.6	2.4	0.0	0.1
Delhi	2.3	0.0	2.2	0.0	0.1	2.5	0.0	2.2	0.1	0.2
Gujarat	6.1	0.5	5.1	0.2	0.3	5.0	0.6	4.0	0.1	0.3
Haryana	4.6	0.9	3.2	0.1	0.4	5.3	0.6	3.9	0.0	0.7
Himachal Pradesh	5.5	1.1	3.6	0.1	0.6	6.1	0.5	4.4	0.5	0.7
Jammu & Kashmir	7.9	0.7	6.8	0.0	0.4	9.0	0.3	8.3	0.0	0.4
Jharkhand	1.7	0.4	0.7	0.0	0.6	1.0	0.2	0.6	0.0	0.3
Karnataka	6.0	0.2	5.1	0.0	0.7	6.9	0.4	5.7	0.1	0.8
Kerala	9.9	0.3	8.1	0.2	1.2	12.5	0.4	9.9	0.1	2.0
Madhya Pradesh	3.6	0.7	2.5	0.0	0.4	4.0	0.7	2.9	0.0	0.4
Maharashtra	6.3	0.4	5.2	0.1	0.7	7.3	0.2	6.2	0.1	0.7
Orissa	2.8	0.4	1.8	0.1	0.4	3.1	0.5	2.0	0.0	0.5
Punjab	5.7	0.7	4.4	0.0	0.6	8.7	0.7	6.6	0.1	1.3
Rajasthan	3.4	0.5	2.6	0.0	0.3	3.3	0.5	2.4	0.1	0.4
Tamil Nadu	5.1	0.3	4.0	0.0	0.8	6.2	0.4	4.8	0.4	0.7
Uttar Pradesh	4.8	0.9	2.9	0.1	0.9	5.2	1.2	3.2	0.1	0.8
West Bengal	6.7	0.4	5.0	0.2	1.0	8.0	0.7	5.9	0.2	1.1
India	5.3	0.5	3.9	0.1	0.7	6.1	0.6	4.6	0.1	0.8

Source: Authors' Calculation

Table 7 reflects the state-wise disparities in the share of major groups of ailments to the loss in DFLE by morbidity at the age of 60 years in India. Among all the states, it is seen that Group 2 diseases are a major factor behind the loss in DFLE. In India and its major states, Group 2 diseases contribute to the differences between males and females in the loss of DFLE than the other groups of ailments. It can be seen that in all the states Group 2 diseases causes more loss for females than the males as reflected in their lower ratios of LE to DFLE.

Conclusion

All the way through, this paper analysed three major perspectives on DFLE in India. While identifying the pattern of DFLE, the study used three levels of ailments such as the rate of perceived morbidity, the rate of restricted activity and the rate of 'confined to bed' for analysis. An exploration of all the three levels of DFLE has clearly shown that there is a considerable amount of DFLE loss in India and its states. The highest loss was recorded for DFLE by the rates of reported morbidity followed by DFLE by the rates of restricted activity and 'confined to bed'. There is a vast difference between DFLE adjusted by morbidity and the other two levels of DFLE, indicating that all the perceived morbidities do not lead to severe loss in the quality of life. Notably, states that have attained high life expectancy also experienced a higher loss in DFLE than the other states. This paradoxical trend in LE and DFLE adjusted with all the three levels of ailments indicates that India is facing 'morbidity expansion' along with an improvement in LE. Moreover, it also points out that a mere increase in LE is not a reflection of an improvement in the quality of life in the country.

There are significant levels of reduction in the quality of life at older ages in India and all the states. Notably, states that are advanced in LE with a proportionately larger aged population have shown a relatively higher reduction in DFLE in the older ages. This alarming trend of loss in DFLE among the advanced states is a major concern for the country in the context of expected aging population in most of the states in the near future. However, females and urbanites show higher longevity compared to their counterparts, besides a higher loss in the quality of life, considering the proportion of DFLE to LE especially at the older ages.

A decomposition analysis of a loss in DFLE (adjusted with the rate of morbidity) by major groups of ailments has shown a considerable dominance of chronic/degenerative diseases in low quality of health in India and among major states. The share of healthy years lost because of this group of ailments is substantially higher towards the older ages, indicating that elders suffer more from chronic/degenerative ailments compared to the youngsters. This phenomenon gains importance in the context where most of the states are registering high proportion of elderly population because of a demographic transition.

In short, the analysis of DFLE shows a considerable decline of quality in life due to ailments in India and among major states, especially in respect of the older ages. This decline in healthy years is considerably higher for females and urbanites. Further, this phenomenon is comparatively higher in the states with high life expectancies, while the decline is mainly due to chronic/degenerative diseases. The study concludes that a mere increase in longevity does not mean a better life especially at the older ages in the country.

A disability-free life expectancy is actually only an estimation. There are several elements such as awareness of healthy life, the availability and accessibility of health care systems etc., that act as contributory factors in achieving a better quality of life. In the context of a substantial loss in DFLE in India, there is a need for devising policies that promote preventive, curative as well as promotional strategies to curb the loss in the quality of life especially due to chronic/degenerative ailments. In the context of high disparities in DFLE among the states, policies need to give high priority to state interventions rather than the nationwide programmes considering the categorical relevance of factors

such as age, sex and region. Moreover, there is a need for continuous monitoring and evaluation for the proper functioning of the health care programmes and policies in the country.

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