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Original Research Article

Changing morbidity-free life expectancy in India by gender and place of residence

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ABSTRACT

Background: With declining fertility and increasing life expectancy, India faces a growing burden of chronic diseases. Therefore, research in morbidity-free life expectancies (MFLE) is gaining importance in India. This study explores the changes in MFLE among males and females and rural and urban residents in India between 2004 and 2017-18.
Methods: The Sullivan method was used for estimating MFLE. Age-specific morbidity rates were computed from the 60th and the 75th round of the National Sample Survey (NSS) data. The information on mortality was collected from the Sample Registration System life tables of India for the periods 2002-06 and 2014-18.
Results: In India**,** the morbidity-free life expectancy of both genders improved between 2004 and 2017-18, except for the population 80 years and above. Life expectancy (LE) and MFLE were higher among women in India, but the proportion of MFLE to total LE was higher among men in most age groups in 2004 and 2017-18. This contradiction is known as the gender health paradox. The study found that LE was higher in urban areas, but MFLE was lower among the urban population except for infancy and early childhood.
Conclusions: The gender health paradox prevails in India for most age groups. As the proportion of MFLE to total LE can be viewed as an indicator of the quality of life, it is crucial to set the target of lowering the morbidity rates among women and the urban population.

Keywords: Gender health paradox, Morbidity-free life expectancy, Rural-urban difference

INTRODUCTION

In India, the average life expectancy at birth has increased from 49.7 years in 1970-75 to 69.4 years in 2014-18.[1] The proportion of senior citizens in India was 5.6 per cent in 1961. It is likely to grow to 12.4 per cent of the total population by 2026.[2] As a result, the prevalence of non-communicable diseases (NCDs) is expected to rise. In 2016, communicable and non-communicable diseases were responsible for 35 per cent and 55 per cent of India's total death toll, respectively.[3] A recent study found that the share of young adults suffering from hypertension is much higher than the previous estimations.[4] The liberalisation of the Indian economy and increased urbanisation has changed the lifestyle and dietary pattern of the Indians, which are associated with India's growing burden of diabetes and hypertension, obesity, mental stress, and physical inactivity - the common risk factors of NCDs.[5-7] Under India's present demographic and socio-economic situation, mortality indicators alone are inadequate to express the population's health status. Therefore, in India, public health researchers are paying considerable attention to the burden of chronic diseases along with mortality. Disability-free life expectancy is a widespread measure of health that combines mortality and morbidity rates into a single index.[8] DFLE has gained importance globally because it emphasises both mortality and non-fatal health outcomes in health policies.

Otherwise, if we take only mortality indicators (say, infant mortality rate) for budgetary allocation in health, the southern states of India (where the infant mortality rate is lower and the percentage of elderly is higher than in the rest of India) will be deprived to a large extent.

Previous studies documented that, generally, women live longer than men. Still, men enjoy higher disability-free life expectancy/ healthy life expectancy and a higher proportion of life in good health than women, as the reporting of poor health and the prevalence of disability or morbidity are higher among women.[9-11] This is called the "male-female health-survival paradox", or "gender paradox in mortality and morbidity", or simply "gender health paradox".[12-14] Such paradox is observed in both developed and developing countries. In France, females showed higher life expectancy than males, but the proportion of DFLE to total life expectancy was higher for the male population in 2008.[10] One study compared the DFLE of six developing economies (China, Ghana, India, Mexico, the Russian Federation, and South Africa) based on the WHO-SAGE data (2007-2010). The lowest prevalence of disability was observed in China and the highest in India. In all six countries, women had higher life expectancies. Still, their percentage of DFLE at age 50 and over was lower than men.[11]

Evidence suggests that various biological, socio-economic, and psychological factors are responsible for the observed gender health paradox.[12-14] Due to biological reasons, girls enjoy a stronger immune system and are less likely to be born prematurely and suffer from respiratory illness than boys; as a result, infant mortality rates are higher among boys than girls.[15-17] Among socio-economic factors explaining the gender health paradox, the social construction of masculinity and femininity and food consumption-related cultural practices are significant.[18,19] Men's higher mortality rate due to lung cancer, cirrhosis of the liver, sexually transmitted diseases, and road accidents are often related to risky health behaviours (such as excessive smoking, consumption of alcohol and drugs, having multiple sex partners and reckless driving), which are seen as the symbol of masculinity.[14,19,20] On the other hand, women are more prone to mental distress and mild physical illness.[21] Physiological changes in the life cycle, such as women's menopause, are associated with symptoms like mood swings, sleep disturbance, night sweats, and diseases like osteoporosis.[18,22] Gender discrimination in food distribution in the family favouring men and boys, and the resultant nutritional inequality is a reality in many countries, particularly in South Asia and Latin America.[18,23-25] Combining all the factors mentioned above culminates in the gender health paradox.

Along with gender differences in DFLE, several studies focused on the prevalent rural-urban disparity in mortality and disability-free life expectancies. The general trend shows that people in urban areas enjoy higher life expectancies and DFLE than their rural counterparts.[26-28] Based on the Beijing Multidimensional Longitudinal Study of Ageing (1992 and 1997 waves), Zimmer et al, found that the urban population had higher LE and active life expectancy (ALE) than people living in rural settings. The higher socio-economic standard of the urban people and better availability and accessibility to health facilities in urban areas were highlighted as the major causes of such differences.[26]

In India, using the data of the Sample Registration System (SRS) and the 60th round of the National Sample Survey, Thomas et al, observed that the morbidity-free life expectancy (MFLE) was higher among females. At age 60, MFLE was 11.2 years for males and 12.5 years for females in India in 2004. However, the shares of MFLE to total life expectancy were 67.3 for females and 68.1 for males.[29] Another study observed that in 2011, the life expectancy and DFLE were higher among the females, but they lived a higher proportion of their lives with a disability.[30] Bora and Saikia calculated the gender-specific DFLE in India based on the WHO Study on Global Ageing and Adult Health (SAGE) data for India, 2007.[31] In contrast to the previous studies, they found that the disability-free life expectancy for any number of disabilities was higher among men than women at each age. They also observed that the percentage of DFLE to total life expectancies was higher among men, irrespective of age. Based on 2011 census data, Mishra et al, compared the DFLE between rural and urban areas of India.[30] They found urban people enjoyed 3.7 years higher disability-free life expectancy than their rural counterparts. Sajwan and Singh also reported higher life expectancy and DFLE in urban India.

It is observed that limited studies have tried to explore the gender health paradox in India using the National Sample Survey (NSS) data. Therefore, my objective is to analyse whether the gender paradox in mortality and morbidity prevails in India using the NSS data of 2004 and 2017-18. This research is significant in assessing the gender gap in the quality of life. In India, there are few studies on the rural-urban disparity in morbidity-free life expectancy (MFLE). Therefore, we aim to examine the difference in morbidity-free life expectancy in India by place of residence between the said time periods.

METHODS

For the calculation of morbidity-free life expectancy, the mortality-related information was collected from the Sample Registration System (SRS) life tables of India for the periods 2002-06 and 2014-18.[32,1] The morbidity rates were computed from the unit-level data of the 60th and the 75th round of the National Sample Survey. The unit-level data of NSS round 60 on health can be obtained from ICSSR Data Service.[33] One can download the unit-level data of NSS round 75 from the National Data Archive of India.[34]

Calculation of morbidity prevalence rate

The morbidity and health care schedule (25.0) of the NSS round 60 and the household social consumption on health schedule (25.0) of the 75th round collected data on the "status of ailment" of household members during 15 days before the survey. In the 60th round, the total household population was 383338; in the 75th round, it was 555352. They constitute the sample population for the study. During the 60th and the 75th rounds, information on the ailment status was collected from 36510 and 39902 respondents, respectively. NSS has grouped the status of ailment into four categories. These are:

Status 1: Started more than 15 days ago and is continuing (on survey date)

Status 2: Started more than 15 days ago and has ended (before survey date)

Status 3: Started within 15 days and is continuing (on survey date)

Status 4: Started within 15 days and has ended (before survey date).

Status 1 and 3 of any ailments are used to estimate point prevalence. To compute the morbidity prevalence rate, we have used the information on the proportion of the ailing population at a particular point of time (survey date). The proportion of the population without any ailment on the survey date was considered non-morbid or healthy. The point prevalence has been calculated as:

Morbidity prevalence rate = (Number of persons reporting any ailment at the time of survey/ Total population) *100,000.

Calculation of morbidity-free life expectancy

We used the Sullivan method for estimating morbidity-free life expectancy. Mathematically, disability-free life expectancy/morbidity-free life expectancy is expressed as:

$$e'_x = 1/l_x \sum_{x}^{w} (1 - {}_n\pi_x)\, {}_nL_x$$

where, e'_x = MFLE at age x; l_x = number of survivors at age x; w = oldest age category; ${}_nL_x$ = total number of person-years lived between exact ages x and x+n; ${}_n\pi_x$ = prevalence of ailment between the ages x and x+n; and $(1- {}_n\pi_x)$ = age-specific rate of being healthy (morbidity-free).

The expected years of life in poor health= $e_x - e'_x$, where e_x represents life expectancy at age x, and e'_x represents MFLE at age x. The mortality components l_x and ${}_nL_x$ by age and sex (and by age and place of residence) are available from the SRS life tables, and the corresponding morbidity component ${}_n\pi_x$ was computed from the NSS data.

RESULTS

Morbidity-free life expectancy by sex: India, 2004 and 2017-18

In India, the life expectancy at birth was 63.5 years for males and 66.1 years for females in 2004. Between 2004 and 2017-18, it increased by 4.7 years for males and 4.6 years for females. Morbidity-free life expectancies at birth increased from 58.0 years to 63.1 years among males and from 59.2 years to 64.4 years among females between 2004 and 2017-18. Except for the population 80 years and above, both gender's morbidity-free life expectancy improved in India between 2004 and 2017-18 (Table 1).

Life expectancies and morbidity-free life expectancies of males and females in India in 2004 are shown in Figure 1. It is observed from Figure 1 that both life expectancies and morbidity-free life expectancies remained higher for women than men at any stage of life. A similar trend was also found in 2017-18 (Figure 2). The gender differences in LE and MFLE gradually converged towards old age. In 2004, at age 20, the gender gap in life expectancy was 3.5 years (49.9 years for males and 53.4 years for females), and in MFLE was 1.9 years (44.4 years for males and 46.3 years for females). In 2017-18, at age 20, the gender differences in life expectancies and MFLE were 2.9 years and 1.5 years, respectively. At age 60, the gender gap in life expectancy was 2.0 years (16.6 years for males and 18.6 years for females), and in MFLE was 1.3 years (11.9 years for males and 13.2 years for females) in 2004. In 2017-18, the male-female differences in life expectancy and MFLE at age 60 were 1.5 years (17.4 years for males and 18.9 years for females) and 1.0 years (13.0 years for males and 14.0 years for females), respectively. Therefore, the gender differences in life expectancies and MFLE is smaller in 2017-18 than in 2004.

Table 1: Gender difference in life expectancies and morbidity-free life expectancies in India: 2004 and 2017-18.

Age (x)	Male (2004)		Female (2004)		Male (2017-18)		Female (2017-18)	
	e_x	e'_x	e_x	e'_x	e_x	e'_x	e_x	e'_x
0	63.5	58.0	66.1	59.2	68.2	63.1	70.7	64.4
1	66.7	60.9	69.6	62.3	69.8	64.5	72.5	66.0
5	63.8	58.0	67.1	59.9	66.1	60.9	69.0	62.5

Continued.

Age (x)	Male (2004)		Female (2004)		Male (2017-18)		Female (2017-18)	
10	59.2	53.6	62.6	55.4	61.3	56.2	64.2	57.7
15	54.5	48.9	57.9	50.8	56.5	51.4	59.4	52.9
20	49.9	44.4	53.4	46.3	51.7	46.7	54.6	48.2
25	45.3	39.9	49.0	41.9	47.0	42.0	49.9	43.5
30	40.9	35.5	44.5	37.5	42.4	37.4	45.2	38.8
35	36.5	31.1	40.0	33.2	37.8	32.8	40.5	34.3
40	32.2	26.9	35.5	28.9	33.4	28.4	35.8	29.7
45	27.8	22.7	30.9	24.7	29.1	24.2	31.3	25.4
50	23.9	18.9	26.7	20.7	24.9	20.1	26.9	21.3
55	20.1	15.3	22.5	16.9	21.0	16.4	22.8	17.5
60	16.6	11.9	18.6	13.2	17.4	13.0	18.9	14.0
65	13.5	9.3	15.1	10.4	14.1	10.2	15.3	11.1
70	10.9	7.2	12.1	8.0	11.1	7.7	12.1	8.6
75	8.7	5.5	9.7	6.3	8.5	5.8	9.2	6.3
80	7.0	4.5	7.6	5.0	6.2	4.1	6.6	4.4
85+	5.6	3.6	6.0	3.8	4.5	2.8	4.7	2.9

Note: e_x (life expectancies) based on SRS Life Table, India, Male and Female, 2002-06 and 2014-18; e'_x (morbidity-free life expectancies) based on the prevalence of ailment between the ages x and x+n, which is computed from the unit level data of NSS, Round 60, 2004 and NSS, Round 75, 2017-18.

Table 2: Rural-urban difference in life expectancies and morbidity-free life expectancies in India: 2004 and 2017-18.

Age (x)	Rural (2004)		Urban (2004)		Rural (2017-18)		Urban (2017-18)	
	e_x	e'_x	e_x	e'_x	e_x	e'_x	e_x	e'_x
0	63.5	57.9	68.9	60.6	68.0	63.3	72.6	64.6
1	67.2	61.3	70.7	62.2	70.0	65.1	73.5	65.3
5	64.7	58.8	67.4	59.0	66.4	61.6	69.7	61.6
10	60.2	54.4	62.6	54.3	61.7	56.9	64.9	56.8
15	55.5	49.8	57.8	49.6	56.9	52.1	60.0	51.9
20	51.0	45.3	53.1	45.0	52.1	47.4	55.2	47.2
25	46.5	40.9	48.5	40.4	47.4	42.7	50.5	42.4
30	42.1	36.6	43.9	35.9	42.8	38.1	45.7	37.7
35	37.7	32.3	39.3	31.4	38.2	33.6	41.0	33.1
40	33.4	28.1	34.8	27.1	33.7	29.2	36.4	28.6
45	28.9	23.9	30.3	22.8	29.4	25.0	31.9	24.3
50	24.9	20.1	26.1	18.9	25.1	20.9	27.5	20.2
55	21.0	16.3	22.1	15.1	21.2	17.2	23.3	16.4
60	17.3	12.8	18.3	11.7	17.6	13.8	19.4	12.9
65	14.1	10.1	14.9	9.1	14.3	11.0	15.8	10.1
70	11.4	7.8	11.9	7.0	11.2	8.4	12.5	7.7
75	9.1	6.2	9.4	5.3	8.5	6.3	9.7	5.6
80	7.3	4.9	7.3	4.2	6.0	4.3	7.3	4.2
85+	5.9	3.9	5.6	3.2	4.2	2.7	5.4	3.1

Note: e_x (life expectancies) based on SRS Life Table, India, Rural and Urban, 2002-06 and 2014-18; e'_x (morbidity-free life expectancies) based on the prevalence of ailment between the ages x and x+n, which is computed from the unit level data of NSS, Round 60, 2004 and NSS, Round 75, 2017-18.

We have also examined if the proportion of years lived with morbidity (PYLM) to total life expectancy is higher among females than males in India. Figure 3 represents the gender differences in the percentage of years lived with morbidity in India. We observed that the PYLM was higher among men aged 70 to 84 in 2004 and 2017-18. However, the gender paradox in health sustained for the rest of the age groups. Our analysis shows that older men (70-84 years) were particularly vulnerable because their life expectancy and MFLE were lower than the females. They also spent a higher proportion of their life in morbid conditions than their female counterparts. Except for the oldest age group (> 85 years), we observed a reduction in the PYLM in India between 2004 and 2017-18. Such improvement was particularly prominent among older adults below 80, irrespective of gender. We also found that the gender difference in the proportion of years lived with morbidity has also reduced between 2004 and 2017-18 in most cases.

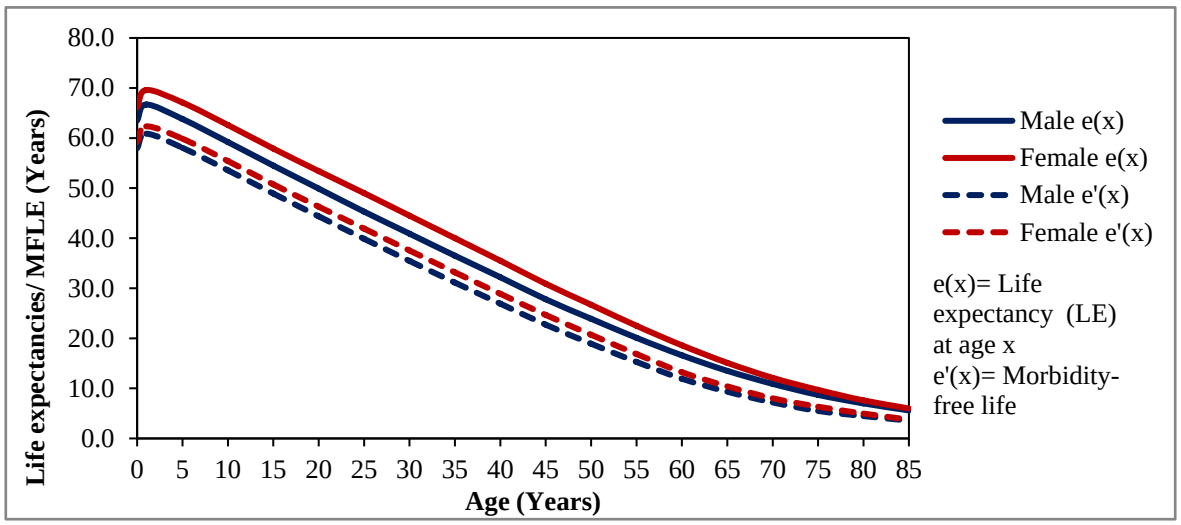

Figure 1: Life expectancies and morbidity-free life expectancies by sex: India, 2004.

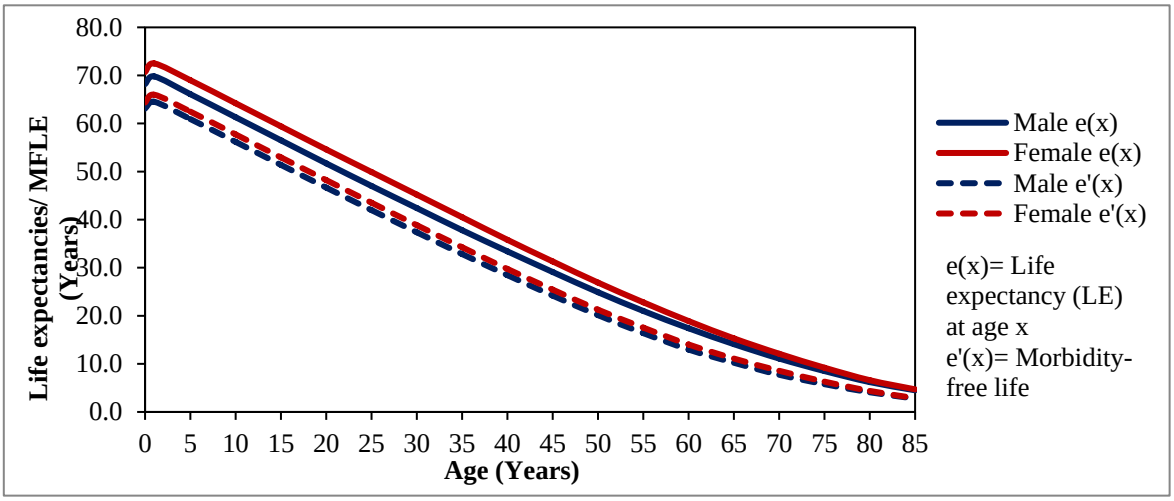

Figure 2: Life expectancies and morbidity-free life expectancies by sex: India, 2017-18.

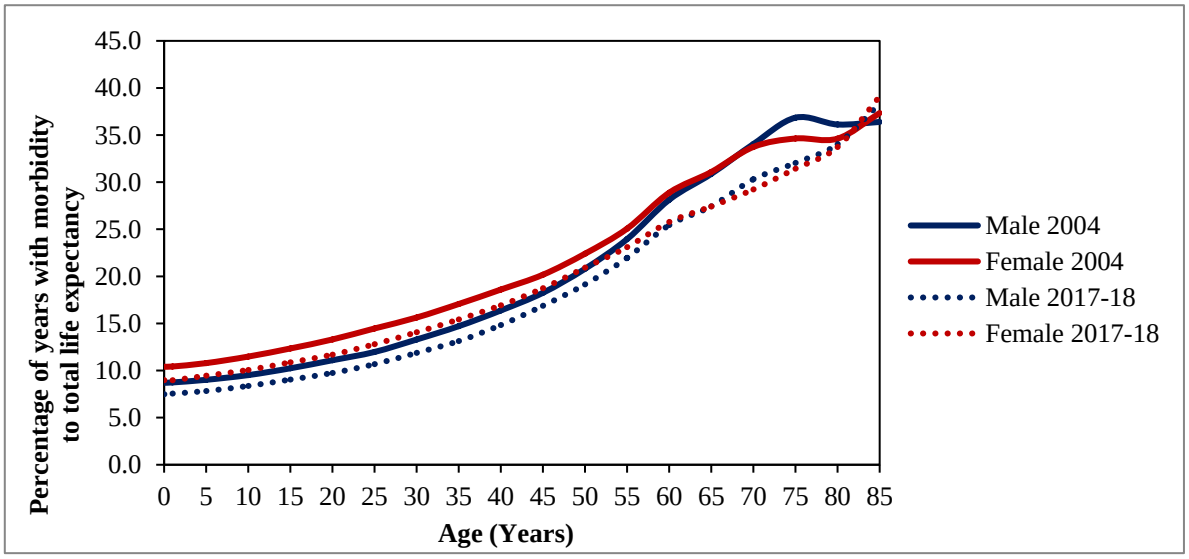

Figure 3: Gender difference in the proportion of years lived with morbidity to total life expectancy in India: 2004 and 2017-18.

Morbidity-free life expectancy by place of residence: India, 2004 and 2017-18

In India, life expectancy at birth increased from 63.5 years in 2004 to 68.0 years in 2017-18 among the rural population. Life expectancy at birth increased from 68.9 to 72.6 years among the urban population between 2004 and 2017-18. So, life expectancy is higher in urban areas than in rural areas.

In 2004, life expectancy was 2.1 years higher at age 20 and 1.0 years higher at age 60 in urban areas than in rural areas. In 2017-18, urban areas witnessed 3.1 years and 1.8 years higher life expectancy than rural areas at age 20 and 60, respectively. Therefore, the rural-urban gap in life expectancies increased in 2017-18 compared to 2004. Our study observed higher ailments among children in rural areas than in urban areas. After the initial years of life, the reported illness was higher in urban areas. As a result, except for infancy and early childhood, MFLE was higher among the rural population than the urban population in India in 2004 and 2017-18 (Figure 4 and Figure 5). In 2004, in rural India, MFLE were 45.3 years at age 20 and 12.8 years at age 60. In 2017-18, it became 47.4 and 13.8 years at ages 20 and 60, respectively. In urban areas, MFLE increased from 45.0 years in 2004 to 47.2 years in 2017-18 at age 20. At age 60, the MFLE improved from 11.7 to 12.9 years between 2004 and 2017-18. Our analysis suggests that the MFLE has increased in rural and urban areas between 2004 and 2017-18. However, the rural-urban difference in morbidity-free life expectancies marginally decreased between the time periods (Table 2). At Age 20, the rural-urban difference in 2004 was 0.3 years; in 2017-18, it became 0.2 years. At age 60, the rural-urban differences were 1.1 years and 0.9 years in 2004 and 2017-18, respectively.

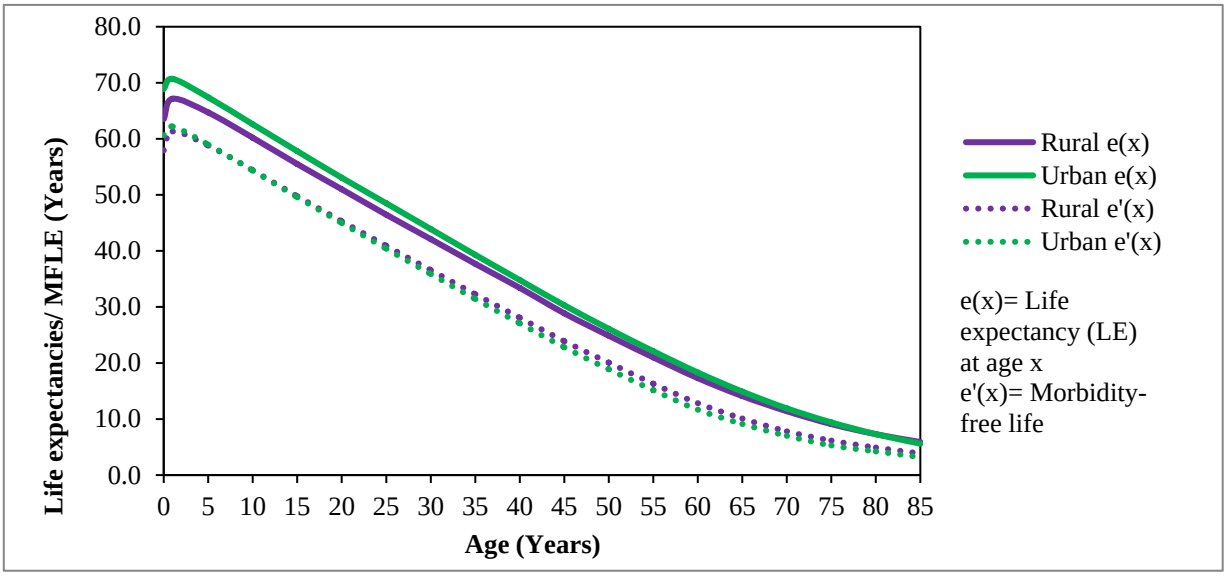

Figure 4: Life expectancies and morbidity-free life expectancies by place of residence: India, 2004.

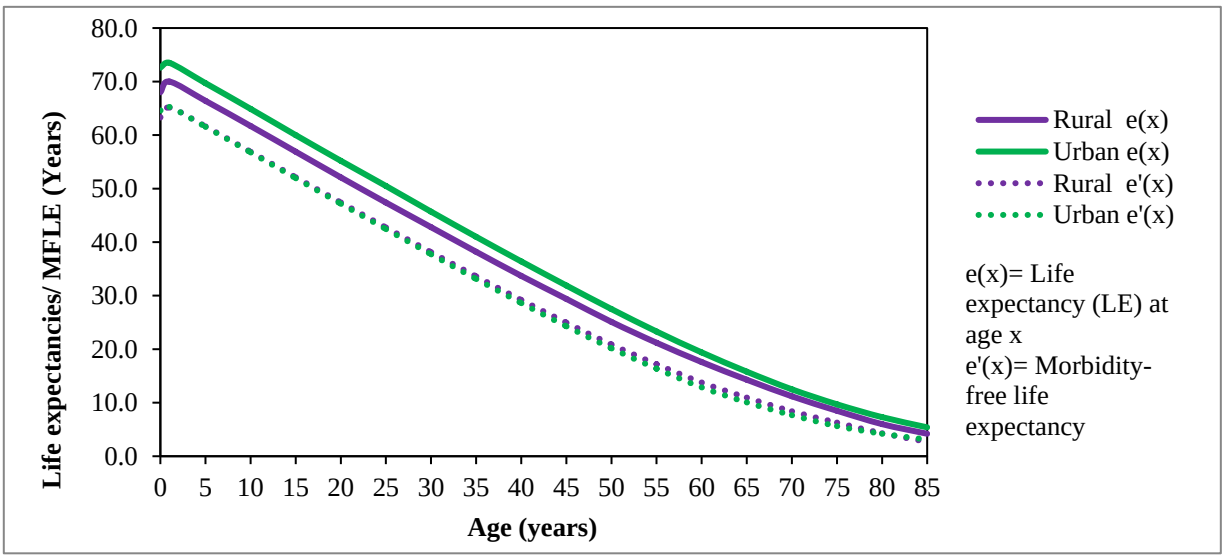

Figure 5: Life expectancies and morbidity-free life expectancies by place of residence: India, 2017-18.

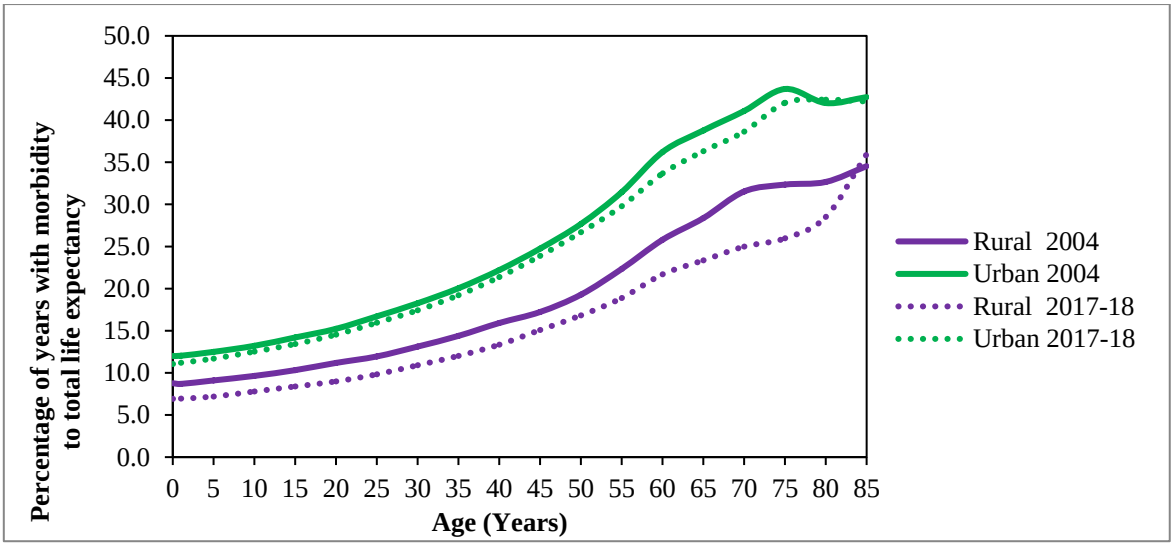

Figure 6: Rural-urban difference in the proportion of years lived with morbidity to total life expectancy in India: 2004 and 2017-18.

Figure 6 shows the proportion of years lived with morbidity to total life expectancy in rural and urban India. It was observed that the PYLM reduced between 2004 and 2017-18, except for the age groups 80-84 years in urban areas and 85+ in rural areas. It indicates an overall improvement in the quality of life in rural and urban areas in the mentioned period. Between 2004 and 2017-18, at age 20, the proportion of years lived with morbidity decreased by 2.2 percentage points in rural areas and 0.7 percentage points in urban areas. The PYLM at age 60 reduced by 4.1 percentage points in rural areas and 2.5 percentage points in urban areas between 2004 and 2017-18. The PYLM prevailed substantially higher in urban areas among all the age groups. This trend was observed in 2004 and 2017-18.

DISCUSSION

The quality of life of any society is often judged by the health status of its population. Conventionally, we use life expectancy, infant or child mortality rates and incidence or prevalence of diseases to assess the health conditions of the people. In the 20th century, developed countries experienced a continuous decline in mortality rates and a rise in life expectancies. Still, the increase in the length of life was mostly experienced as the years of disability.[35] Consequently, debates and discussions started on whether longer life means better health. These considerations led to the formulation of Summary Measures of Population Health (SMPH), which combines morbidity and mortality data to show the health status of a population as a single numerical index.[36] Morbidity-free life expectancy is a familiar SMPH used by researchers and public health policy analysts in developed and developing countries. As India is experiencing population ageing, we have used MFLE to examine changes in the health status of Indians between 2004 and 2017-18. We have also analysed the gender and rural-urban differences in MFLE in India.

We observed that life expectancies, morbidity-free life expectancies, and the proportion of healthy life expectancy to total life expectancy increased between 2004 and 2017-18 in India. It reflects the improvement in the health status of the population in India. Between 2004 and 2019, the infant mortality rate (IMR) reduced from 58 to 30.[37,38] The maternal mortality ratio (MMR) declined from 254 in 2004-2006 to 103 in 2017-19, although a vast regional disparity is observed in IMR and MMR in India.[39,40] Various governmental initiatives are responsible for the observed health improvement of the population of India. Much credit for this achievement goes to the success of the Reproductive and Child Health (RCH) Programme launched in 1997 and the National Rural Health Mission (NRHM) launched in 2005 by the Government of India. The RCH programme aimed to expand the choice and coverage of family welfare services and reduce maternal and child deaths. The NRHM aimed to provide inexpensive primary healthcare facilities to poor and marginalised people. Under NRHM, the health sector was decentralised as the Village Health and Sanitation Committee was given the power to develop a health plan for the local community; and the sub-centres, primary health centres and community health centres were provided with direct government funds as per norm. Besides, non-governmental organisations were involved in various disease control programmes, RCH programmes, and the training of Accredited Social Health Activists (ASHAs).[41] In this way, a better health service has been ensured for the commoner by the NRHM. Another flagship programme under NRHM is Janani Suraksha Yojana (JSY) which has helped to reduce maternal and neonatal death rates by promoting institutional delivery.

In recent years, the role of the Swachh Bharat Mission (SBM) in improving population health in India has been overwhelming. Under the Swachh Bharat Mission

launched in 2014, India has achieved enormous success in universalising sanitation coverage. Better sanitation means a lower rate of open defecation, hence a lower prevalence of acute diarrhoea. Therefore, although the burden of non-communicable diseases is accelerating in India, a substantial reduction in IMR, MMR, and the incidence rate of many infectious diseases has led to the rise in life expectancy and morbidity-free life expectancy of the Indian population in the last two decades. It should also be mentioned that through various initiatives, like introducing the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (launched in 2010) and the National Programme for Health Care of Elderly (launched in 2010-11), the Government of India is trying to control the non-communicable diseases.

We found that life expectancy and MFLE is higher among women. Also, following the general trend, the proportion of years lived with morbidity to total life expectancy was higher among women for most age groups. Therefore, it is crucial to set the target of lowering the gender disparity in morbidity rates. We found that men aged 70 to 84 experienced a higher proportion of years lived with morbidity in 2004 and 2017-18. Therefore, men in this age group require particular care regarding their health-related issues.

Most of our findings corroborate the study of Thomas, James and Sulaja, who observed that both life expectancy and MFLE were higher among women.[29] On the other hand, Bora and Saikia found that men had higher DFLE and a higher proportion of DFLE to total life expectancies than women.[31] It can be pointed out that Bora and Saikia considered 20 ADL (activities of daily living) measures to compute DFLE, which included information regarding pain and discomfort, sleep and energy, interpersonal relationship etc. As ailment is only one aspect of disability, our findings may differ from those considering ADL to estimate DFLE.

We observed that life expectancy was higher in urban areas, but morbidity-free life expectancies were higher among the rural population except for children below five years. It is difficult to say whether a higher level of air pollution, contaminated drinking water and poor sanitation facilities in slum areas, the presence of underprivileged migrant workers with high-risk behaviour, stressful life, and lower level of physical activities contributed to higher morbidity rates in urban areas; or the reporting of ailment was lower in the rural areas as people are less aware/sensitive about their illness in rural areas, and they have a lesser opportunity for the diagnosis of diseases compared to their urban counterpart. Our study finds that the rural-urban gap regarding the proportion of years lived in poor health tends to increase with age. A wider rural-urban gap was observed in 2017-18 than in 2004, particularly among those aged 60 to 80. It suggests that non-communicable diseases are more widespread in urban areas at older ages.

CONCLUSION

Gender disparity in health in India has many facets. Using nationally representative sample surveys, we have highlighted the gender disparity in morbidity-free life expectancy and the proportion of years lived with morbidity. The gender paradox in mortality and morbidity persists in India except for the age group 70-84 years. To reduce the gender gap in quality of life (as expressed by the percentage of life in good health), it is necessary to reduce the morbidity rates among women. Besides various disease-specific measures, constant preaching against gender-biased social and cultural practices is needed to improve women's health conditions. We also recommend that the public health policymakers in India pay special attention to older men's health problems and needs while formulating policies and programmes for elderly care. Between 2004 and 2017-18, males and females aged 85+ experienced an increase in the proportion of life with morbidity. Therefore, more research is required to identify the health problems of the oldest old age group and the social determinants of health associated with those problems.

We have analysed India's rural-urban disparity in health over two periods. Our analysis demonstrates that life expectancy was higher in urban areas, but MFLE was lower among the urban populations except for infancy and early childhood. Lower MFLE in urban areas can be explained by a rapid increase in non-communicable diseases in urban areas compared to rural areas. Lower reporting of ailments in rural areas may contribute to the observed differences in MFLE between rural and urban areas. Lack of accessibility and availability of healthcare and diagnostic centres in rural regions influence the diagnosis and reporting of ailments. For a better explanation, further empirical research is needed.

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