Understanding Regional Differences in healthy life-years among Older-adults of India and its Major States: An Application of 'Years of Good life (YoGL)' index

Abstract

This study is an application of the novel concept of 'Years of Good Life (YoGL)' proposed by Lutz and colleagues (2021) to understand sub-national patterns of human well-being for older-adults in India. According to the YoGL approach, a person-year is counted as 'good' if it is spent out of poverty, free from severe activity limitations and cognitive impairments, and with subjectively reported positive life satisfaction. The different dimensions of YoGL become more sensitive at older ages, where physical limitations and cognitive impairments are more prevalent compared to younger age groups. In particular, withdrawal from workforce due to age may lead to increasing poverty and poor life satisfaction. Building on individual-level data, YoGL at a particular age is computed using the well-known Sullivan's method at aggregated-population level. Our results for India suggest that at age 50, YoGL for males is 13.3 years (53.2% of remaining life expectancy) and 9.9 years (36.7% of remaining life expectancy) for females. YoGL's share in remaining life expectancy at age 50 varies from between 64% in Punjab to 34% in Odisha. Despite enabling higher life expectancy, people in a few states of India spend considerably more years in an 'unhealthy state' and vice versa. Decomposition analysis, employed to understand regional variation in YoGL share, indicates that functional limitations are the main component explaining up to 32% of that difference, while the contribution of cognitive impairments and age amounts to 20% and 18%, respectively. YoGL can potentially be a more effective composite socio-demographic tool for measuring and monitoring human well-being at the sub-national level in India and also for other countries.

Keywords: Aging, Healthy Aging, Poverty, Human Wellbeing, Years of Good Life, India

1. Introduction

As a consequence of the unprecedented rise in life expectancy and the resulting population ageing, research on life years spent in different health conditions, as well as the implications for human well-being has gained significant importance globally. Some even speak of a 'Silver Dividend', referring to the potential for development brought about by older people's unrealized labor productivity (Park & Shin, 2023). Although rising life expectancy can serve as an indicator of human development in its own right, mere survival does not, in general, ensure human well-being. Understanding well-being, especially in later life, holds major importance for one of the fastest ageing countries like India. Whether the increased share of the older population can contribute to productivity gains or rather lead to rising dependency through an increase in the economic and health care burden has been a central theme in studies on active and productive ageing of recent times (Visaria & Dommaraju, 2019; Dommarju & Wong, 2021).

The overall impact of aging on human well-being has typically been captured using different macro-level indicators, such as Gross Domestic Product (GDP) per capita or the Human Development Index (HDI), as well as other, micro-level, composite indices, such as the Multi-dimensional Poverty Index (MPI), Disability-adjusted or Healthy Life Years and Happy Life

Expectancy. Along with these, the literature has proposed various multi-dimensional indices, adjusting for the health and economic status of the elderly persons to better understand the future ageing burden and quality of human capital (Balachandran & James, 2019; Rani et al., 2023; Skirbekk et al., 2012, 2022). Moreover, among different summary measures of population health; reporting of disability, presence of any non-communicable diseases or multimorbidity, self-rated health, limitations in daily activity, or prevalence of institutionalisation are widely used to compute health expectancy (Jagger et al., 2020).

Healthy life years is one of the most prevalent methods to monitor changes in population health and healthy longevity (Salomon et al., 2012). But there have also been suggestions to divide the total life span using other subjective indicators of well-being, such as happiness, which led to the formulation of Happy Life Expectancy (Veenhoven, 1996) and the Happy Planet Index (Abdallah & Marks, 2022), that combines information on life expectancy with subjective evaluations of life, as well as the ecological footprint. The major objective of these indicators is to understand changes in the aggregate health and well-being of populations. Researchers have studied cross-national variations and concluded that inequality in terms of health and well-being persists, e.g., variability in healthy life years is higher than variation in life expectancy among 25 European Union countries (Jagger et al., 2008). Over time, this variation has increased (Fouweather et al., 2015). The Global Burden of Disease (GBD) Study of 204 countries for the 1990-2019 period suggests health inequalities across countries have subsided a little, but on the contrary, within the country, health inequalities have increased (Permanyer & Bramajo, 2023). For Asian countries, there have been studies on Japanese and Chinese data focusing on temporal patterns and intra-regional variation in health expectancies (Minagawa & Saito, 2018; Yong & Saito, 2009; Zimmer et al., 2010).

An indicator that has recently been proposed specifically for the purpose of assessing the sustainability of human well-being is 'Years of Good Life (YoGL)' (Lutz et al., 2021). Contrary to some of the established indicators (e.g., GDP per capita, HDI, or MPI), YoGL follows a bottom-up approach, i.e., it starts from individual-level characteristics. Its theoretical basis is the concept of capable longevity (Desai et al., 1992), which requires economic, physical as well as cognitive capability. These objective dimensions of well-being are measured by being out of poverty, free of functional activity limitations and cognitive impairment and they are complemented by the subjective dimension of overall life satisfaction, which captures dimensions of human well-being that deny themselves to objective measurement. In deriving YoGL, these four components are exclusive and not complementary to each other, i.e., a person-year contributes to YoGL (and can thus be said to have been 'good') if and only if that year is lived simultaneously out of poverty without severe activity and cognitive limitations, as well as with positive life satisfaction (Lutz et al., 2021). This distinguishes YoGL from other indices of human well-being in several ways. Firstly, rather than emphasizing one of the two, YoGL blends both subjective as well as objective dimensions of human well-being, reflecting that either one can be the reason for a person-year not being counted as "good." Secondly, other macro-level indicators like HDI or MPI focus on the fulfillment of certain basic needs like health care and schooling as an indicator of well-being and the absolute length of life to assess development. Whereas the YoGL index is more focused on actual capabilities, e.g., cognitive (dis)ability, rather than only counting years of schooling. Thirdly, YoGL requires each person-year to fulfill each of the four above-mentioned criteria rather than arbitrarily weighing one criterion over the other. If any one of the four criteria is not fulfilled, that year is not counted as a good year without any compromises.

Though YoGL has also been previously applied to 26 European countries, as well as in Africa to capture variation in well-being (A. Kc et al., 2024; Reiter & Spitzer, 2021), to date, no study has tried to assess variation in YoGL sub-nationally. This is particularly germane in India, which is characterized by vast geographical and political heterogeneity across its 35 states and districts

within states (James et al., 2020; Kc et al., 2018). Many of these states find themselves at very different stages of the demographic transition process, resulting in significant differences in shares of the elderly population and life expectancy, but also the disease burden: State-wise disease-specific burden from the GBD studies display a considerable inter-regional variation in disease profile, where the states are highly divergent in terms of communicable and non-communicable disease prevalence (Dandona et al., 2017; ICMR et al., 2017). On the other hand, trend analysis in mortality and life expectancy shows a gradual convergence in inequality of life span among the states of India (Goli & Arokiasamy, 2013; Pal et al., 2022). Using data from the National Sample Survey Office (NSSO), Thomas et al. (2014) have examined the pattern of morbidity among the Indian elderly population and found an inverse relationship between life expectancy and healthy life years. However, due to a lack of comprehensive sub-national socioeconomic, demographic, and public health data by characteristics, the scope of population health and well-being research in India has been severely limited so far. Especially, there are not many efforts toward generating more effective multidimensional population well-being indicators at the subnational level.

In this study, for the first time, we apply the novel concept of 'Years of Good Life' (YoGL) to India and its 21 major states. We study the heterogeneity in YoGL by gender, as well as by place of residence (rural-urban). While YoGL, in principle, can be computed for any age (Lutz et al., 2021), the biggest differences in YoGL between the two populations invariably will derive from differences in the elderly populations, where physical limitations and cognitive impairments tend to become more prevalent. Similarly, life satisfaction (as an expression of subjective well-being) can be seen as a cumulative experience of subjective evaluations of one's life over time. Hence assessing a person's life satisfaction becomes more meaningful at higher ages. As people are also more likely to withdraw from the workforce later in life, the prevalence of poverty increases with age, especially in the unorganized sector. Therefore, we focus specifically on the population above the age of 50.

The major research questions this study tries to answer are: (1) What fraction of the average life span can be expected to be spent as 'good years'? (2) Due to which factors are people losing potentially good life years? (3) How do the states of India differ in terms of YoGL? Understanding the heterogeneity in the quality of life of older people is particularly important in the case of India, which is one of the fastest ageing countries in the world today, albeit still at relatively low levels of socio-economic development coupled with poor social security. Computing YoGL for India allows us to improve our assessment of the quality of human capital, which is a major prerequisite for reaping the demographic dividend, especially the silver dividend. YoGL can potentially be a more effective composite socio-demographic tool for measuring and monitoring human well-being at the sub-national level in India. In sum, our research contributes to the literature on health and well-being in later life, healthy and active aging, and the quality of human capital.

2. Methods

2.1 Data Sources

The age-specific information required to calculate YoGL for the 21 major states of India is obtained from the Longitudinal Ageing Study in India (LASI), 2017-18, wave 1 (IIPS et al., 2020). It is a sister survey of the US Health and Retirement Studies (HRS) and The Survey of Health, Ageing, and Retirement in Europe (SHARE). LASI covers different aspects of economic well-being, as well as health-related aspects for individuals aged 45 years and above, with a total sample size of 72,250 respondents. The survey is also representative at the Indian state level. The number of respondents for which complete information on all the dimensions of YoGL accounts for 66,606 individuals.

The age-specific survival information required for the calculation of YoGL is taken from the Sample Registration System (SRS), 2015-19, published by the Registrar General of India, which provides sub-national, abridged life tables for India and its major states, separately by gender and rural-urban residence. As death registration is not yet universal for the Indian population, SRS is the most reliable and complete data source regarding mortality and the only source of lifetables for major states. Finally, to compare the states' relative rank in YoGL with their corresponding ranks in HDI and MPI, as a robustness check, we use information from NITI Aayog, a policy think tank of the Government of India (Government of India, 2021; NITI Aayog, 2023).

2.2 Threshold values for different dimensions of YoGL

While we try to stick to the theoretical framework of the YoGL measure as described in Lutz et al. (2021). However, considering the data constraints as well as the socio-economic and cultural context of India, the nature of indicators and their threshold values for the different well-being dimensions had to be modified slightly. To assess the validity of our results given the choice of these thresholds, we perform multiple robustness checks (see Figure S1, S2 & S3).

Being out of poverty

As individual-level income data is scarce and not very reliable in India, consumption expenditure data is used as a proxy to identify an individual's economic status. LASI provides household per capita consumption expenditure for different food and non-food items. After generating a factor score of all expenditures, the relative economic rank of all households is computed. Individuals belonging to a single household are assigned the same rank as the households they belong to in terms of economic status. LASI identifies the bottom 20% of the expenditure distribution as 'poor'. We set our poverty cut-off in line with the average multi-dimensional poverty estimates of NITI Aayog for India (NITI Aayog, 2023), which reports 24.8% as poor in 2015-16 and 14.9% in 2019-21. To get an estimate for the year 2017, we use linear interpolation, which yields a value of 20%. As an additional robustness check, regression analysis with cognitive score and wealth status has been opted, to establish the relationship of detrimental health and level of consumption. The coefficient plot shows a cognitive health condition improves significantly between the bottom 20th quintile and the next quintile. Instead of consumption, a previous study has used relative poverty to compute YoGL (Vicerra, 2022). However, one can also assess poverty by the availability or the household's access to critical infrastructure, e.g., a flush toilet (Lutz et al., 2021), where having no proper sanitary facility indicates poor status. Our final estimates are not very sensitive to using this alternative variable to define being 'poor' (see Figure S1).

Being free from cognitive limitations

Cognitive performance is assessed in LASI using a set of tests, covering various domains, e.g., memory (immediate word recall and delayed word recall), orientation (date, time, place), retrieval fluency (verbal fluency), arithmetic, as well as executive functioning and object naming. An overall cognitive score is generated by aggregating scores from each domain (IIPS et al., 2020). This score is relevant for both literate as well as illiterate populations (Pandav et al., 2002) and ranges between 0-43. The cut-off for being free from cognitive limitations is set to the bottom 10th percentile, corresponding to a score of 19. As a robustness check, an OLS regression coefficient plot is computed between cognitive score and self-rated health status. At score 19, the regression coefficient displayed a significant improvement in self-rated health status than the cognitive score below 19.83% of the population aged 45 years and above are out of cognitive impairment (Table 1).

Being free from severe activity limitations

To measure physical capability, survey participants are interviewed on activity limitations in daily living (ADL). These include limitations in getting dressed, walking across the room, bathing and eating, getting out of bed, and using a toilet (including getting up and down). People reporting no limitation in all of these basic activities are considered to be free from severe activity limitations. This is in line with previous studies that have captured physical limitations by performance tests, such as rising from a chair without using the arms (Lutz et al., 2021), as well as self-reporting of activity limitations (Buathong et al., 2021). Table 1 shows 85% of the population did not report any severe activity limitation.

Having positive life satisfaction-

To capture respondents' life satisfaction, LASI used 5 sets of questions with a seven-step Likert scale response. The five survey items were 1) In most ways, my life is close to ideal; 2) the conditions of my life are excellent; 3) I am satisfied with my life; 4) so far, I have got the important things I want in life; and 5) if I could live my life again, I would change almost nothing. Each of these questions came with seven response options: '(1) strongly disagree', '(2) somewhat disagree', '(3) slightly disagree', '(4) neither agree nor disagree', '(5) slightly agree', '(6) somewhat agree' , and '(7) strongly agree' . A score between 5-10 is considered to represent negative or low life satisfaction (IIPS et al., 2020). To test the stability of using this cut-off value, another single question used to record the respondent's life satisfaction at the beginning of the interview is used as a sensitivity check. "Please think about your life as a whole. How satisfied are you with it? Are you completely satisfied (1), very satisfied (2), somewhat satisfied (3), not very satisfied (4), or not at all satisfied (5)?". A score below 4 is considered to have positive life satisfaction. Replacing this variable is producing similar Years of good Life (Supplement Figure 4). About 94.6 % of the population aged 45 years and above reported having positive life satisfaction (Table 1).

Table 1. Descriptive Statistics

Variables	N	Mean	SD
Age	66606	59.73	10.66
Monthly per capita consumption expenditure (in rupees)	66606	3419.98	3948.79
Activity limitation	66323	0.854	0.353
Cognitive limitation	54490	0.830	0.375
Life satisfaction	64787	0.946	0.226
Population belongs to SC category	64267	0.171	0.376
Population belongs to ST category	64267	0.182	0.386
Population in urban area	66606	0.351	0.477
Population widowed	66603	1.985	0.417
Population literate	66603	0.471	0.499
Population belonging to Hindu religion	66600	0.731	0.443

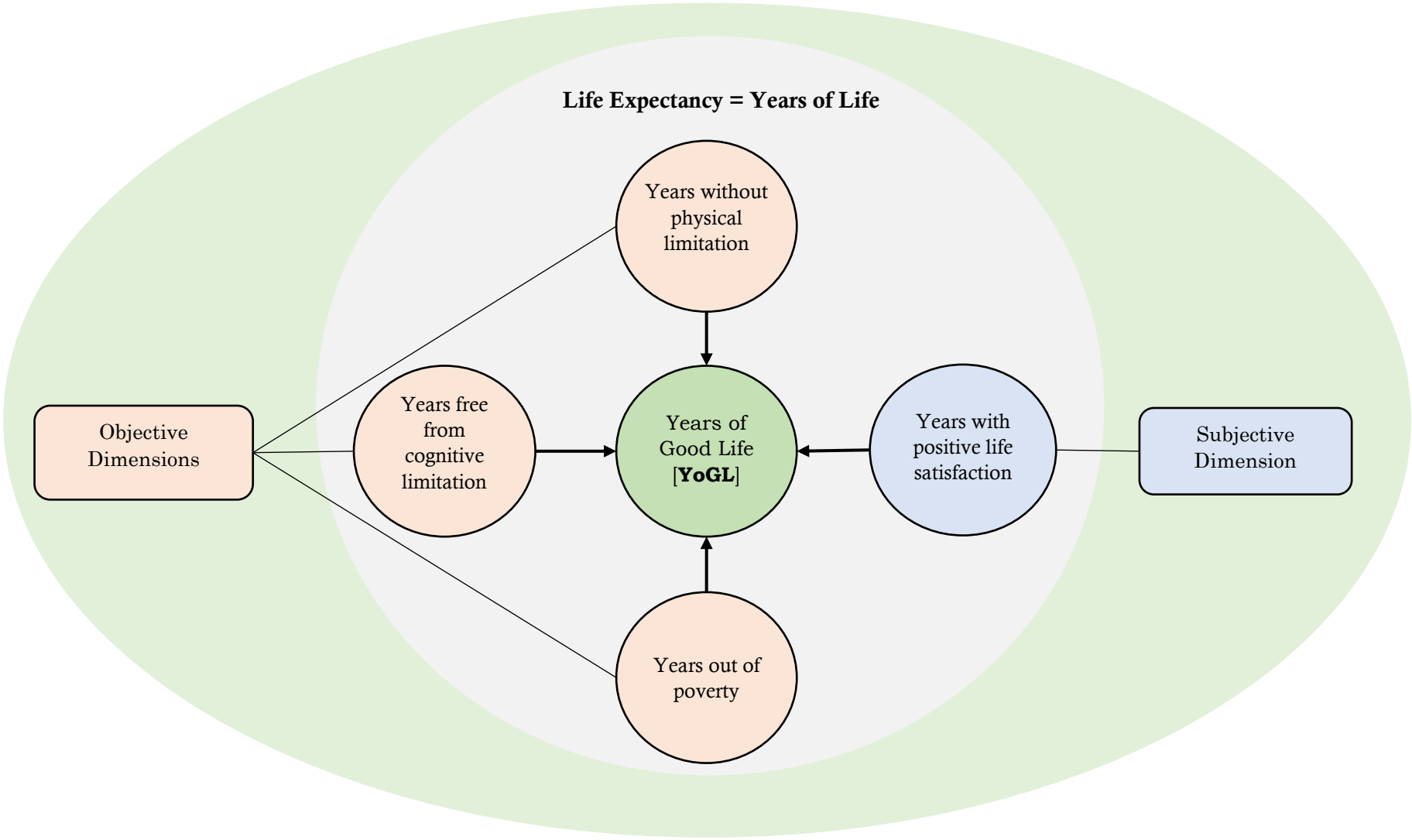


Figure 1- Conceptual framework for YoGL construction based on Lutz et al., 2021

Using these four dimensions, we create a binary index of 'good-life' (yes/no); where, if the individual is simultaneously above the threshold of poverty, free from severe activity limitations and cognitive limitations, reporting positive life satisfaction in a particular year, that person-year is counted as a 'good' year. From the survey dataset, the prevalence of the 'good life' is calculated for 5-year age intervals for the population aged 45 years and above, for males and females, and for rural and urban residents separately.

Alongside the computation of YoGL using the abovementioned threshold of components, another objective of this research article was to understand the relative contribution of different components of YoGL, along with other key socio-economic and demographic parameters, in explaining the state-level variance in YoGL. Among the different socio-economic attributes, the share of the population from marginalized castes, workforce participating, population widowed, Hindu population, and population educated is further considered for decomposition analysis. These parameters have the potential to create differences in the socio-economic environment, thereby, YoGL across the states of India.

3. Statistical Analysis

3.1. Calculation of years of good life

To count the remaining years of the 'good-life,' Sullivan's method of life table construction is adopted (Sullivan, 1971). This method is widely used to calculate health expectancy (Jagger et al., 2020). Health expectancy is derived by weighing person-years lived at each age with the respective proportion of disability-free population. In this research, the age-specific proportion of people living a 'good life' is multiplied by person-years lived at that age. The years of good life are then compared to the remaining life expectancy of that specific age to understand the share of 'good life' in remaining life expectancy. To capture the gap between life expectancy and healthy life years for demographic and socio-economic strata, the years of good life are calculated for both genders and for rural and urban groups separately. The following steps are applied to construct YoGL (Supplement S1).

a. Prevalence of age-specific 'good year' (μ_{ij}) is calculated for a 5-year age interval, as SRS-based life tables are of abridged form and available for 5-year age intervals up to age 85 years for India and its states separately. This prevalence is used in calculating good person-years lived.
b. To calculate 'good person-years lived,' the person-years lived at age x is multiplied by the age-specific prevalence of 'good life' of the same age interval.

$$\frac{1}{l_x}\sum_{i=x}^{A}\mu_{ij}\ L_{ij}$$

Where, l_x means number of survivors at age x; L_{ij} denotes number of person-years lived in age group i belonging to region j. μ_{ij}indicates the proportion of population above critical threshold level of 'good year' in region j.

c. Following the basic life table construction, the T_x column is calculated summing up the values of person-years lived in 'good' state.
d. 'Expected years of good life' at age x is calculated dividing the values of total-person years lived at age x (T_x) by number of people surviving at age x.

To understand regional variation of YoGL, absolute years spent as 'good life' cannot be compared across states of India, as life expectancy across the states also varies. Thus, after calculating the YoGL for 21 states and India for age group 45 years onwards, the share of 'good life' years at age (x) ($YoGL_x$) within the remaining life expectancy at age (x) (RLE_x) has been calculated.

$$\text{Share of YoGL in RLE} = (YoGL_x / RLE_x)*100$$

3.2 Decomposition and Relative contribution of the components

To understand the relative contribution of different components along with other external distal factors in explaining the heterogeneity in 'years of good life' among different states in India, the regression-based decomposition model proposed by Shorrocks (1982) and further extended by Fields (2003) is adopted. The major aim of using this method is to explain the relative contributions of different correlates to overall variance in good life across the states. In addition to the four YoGL components, this decomposition model allows incorporation and control for other associated distal factors like the proportion of the population belonging to marginalized castes, religious groups, the share of the working population, widowed population, educated population, *etc.* The relative contributions of each factor can be used to explain differences in YoGL across states.

In mathematical terms, the decomposition model can be described along the following steps. To begin with, the function generating the age-specific proportion of 'good life' $\boldsymbol{s_{ij}}$ can be described as

$$\ln(s_{ij}) = \alpha + \sum_{i=1}^{k} \beta_i x_i + \varepsilon \quad \ldots\ldots\ldots\ldots (1)$$

for i=45, …, k of a particular region j. $\boldsymbol{x_i}$ is a vector of the explanatory variables. $\boldsymbol{\beta_i}$ are the corresponding regression coefficients calculated using OLS regression, and $\boldsymbol{\varepsilon}$ is the residual term.

Along with that,

$$\ln(s_{ij}) = \alpha + \sum_{i=1}^{k} Z_i + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots (2)$$

Here, each $\boldsymbol{Z_i}$ is a 'composite' variable, equal to the product of an estimated regression coefficient and an explanatory variable.

In the estimation of inequality decomposition $\boldsymbol{\alpha}$ is constant for every observation. Thus, this equation can be modified as,

$$\ln(\widehat{s_i}) = \alpha + \sum_{i=1}^{k} Z_i \quad \ldots\ldots\ldots\ldots (3)$$

where, $\widehat{(\boldsymbol{s_i})}$ is the predicted value of the age-specific proportion of 'good life' from the multivariate regression model.

The relative contribution of the YoGL components and control variables can be written as –

$$\sigma^2(s) = \sum_{i=1}^{k} \beta_i \ \mathrm{cov}(s, x_i) + \sigma^2(\varepsilon) \quad \ldots\ldots\ldots\ldots (4)$$

Here, $\boldsymbol{\sigma^2(s)}$ is the variance of $\mathbf{s}$, $\mathbf{cov}(\boldsymbol{s, x_i})$ is the covariance of $\mathbf{s}$ with each variable $\boldsymbol{x_i}$ (poverty, cognitive and functional limitation, the proportion of working population *etc.*). The sum of the relative contributions should be 100 percent after accounting for the residuals.

4. Results

4.1 'Years of good-life' among Indian older-adults by age, sex and residence

Figure 2 shows the proportion of the population out of poverty, without physical limitations, and having positive life satisfaction are almost similar for all the sub-sections (male-female & rural-urban population). Figure 3 & Figure 4 display the trend in the age-wise proportion of the population above the combined threshold of 'good life' for Indian states by gender and residence, respectively.

Figure 2. Radar graph showing the prevalence of all the dimensions of YoGL for India

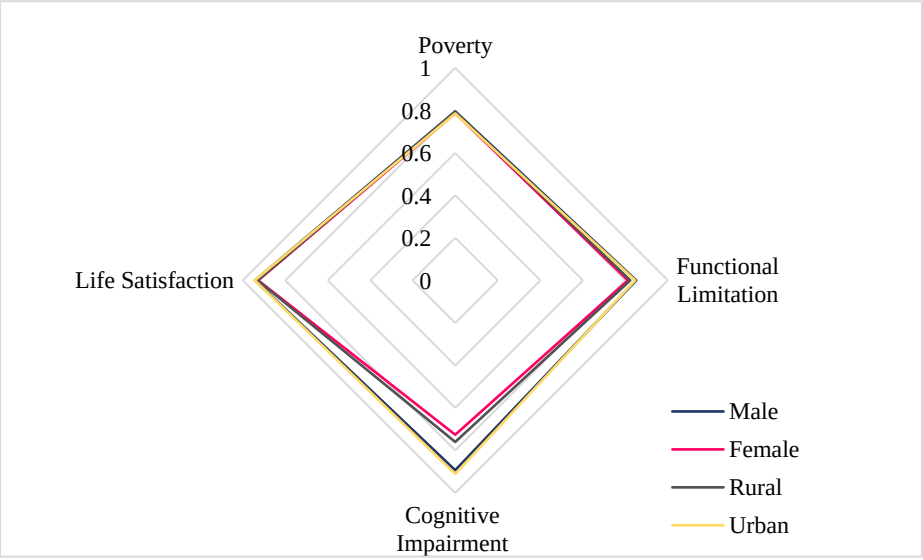


Table 2 displays YoGL and remaining life expectancy (RLE) for each age by gender and residence at the national level. At age 50, around 11.6 years is expected to be counted as 'good' years for the total population, while RLE is around 30 years. It decreases up to 7.2 years after age 60 and 3·7 years after attaining age 70. For the male population, at age 50, nearly 13.3 years can be counted as 'good years', whereas for females, only 9.9 years, though females are expected to live 2 more years than males (Female RLE 27 years; Male RLE 25 years). For a rural population of age 50, 10.6 years would be 'good years', which is slightly higher, around 14 years, for the urban population of the same age.

4.2 Regional differences in YoGL

Figure 5 shows age-wise YoGL and RLE across the major states of India. At age 50, the YoGL ranges between 9 years to 18 years where as the variation in life expectancy is 22 years to 29 years. To further stratify the intra-regional differences, YoGL is computed across gender and residence for 21 states (See appendix Table S4). The states are also ranked in order of both YoGL and RLE at age 50 years to understand the concordance and discordance in relative ranks among the states and to examine how far higher life expectancy coincides with higher 'years of good life' (Figure 6). By concordance level between YoGL and RLE, the top states are Punjab, Jammu & Kashmir, Himachal Pradesh, and Kerala, while Odisha, Maharashtra, West Bengal, and Gujarat show the highest discordance. However, we observe a slightly heterogeneous regional pattern in YoGL by gender and place of residence. To compare the regional differences in YoGL across states by gender and place of residence, we have mapped the share of YoGL in remaining life expectancy at age 50 in Figure 7. For instance, among the males, the northern states like Jammu and Kashmir, Himachal Pradesh, Punjab, Rajasthan, etc., and the state of Kerala from the southern region are

Table 2. Age wise Years of Good Life (YoGL) at national level by gender and residence

Age-group	YoGL (T)	LE (T)	YoGL (M)	LE (M)	YoGL (F)	LE (F)	YoGL (R)	LE (R)	YoGL (U)	LE (U)
45-49	14.33 (14.07-14.60)	30.3	16.1 (15.80-16.49)	29.1	12.6 (12.18-13.02)	31.5	13.1 (12.92-13.37)	29.4	17.1 (16.44-17.76)	32.1
50-54	11.60 (11.34-11.85)	26	13.3 (12.95-13.63)	25	9.9 (9.54-10.35)	27	10.6 (10.36-10.78)	25.2	14.0 (13.38-14.67)	27.7
55-59	9.21 (8.98-9.44)	21.9	10.8 (10.51-11.04)	21	7.7 (7.30-8.07)	22.9	8.3 (8.09-8.49)	21.2	11.5 (10.89-12.02)	23.5
60-64	7.15 (6.93-7.37)	18.3	8.4 (8.15-8.65)	17.5	5.9 (5.48-6.25)	19	6.4 (6.17-6.56)	17.7	9.1 (8.55-9.65)	19.7
65-69	5.29 (5.06-5.52)	14.8	6.3 (6.09-6.60)	14.2	4.2 (3.78-4.58)	15.5	4.6 (4.45-4.82)	14.3	6.9 (6.32-7.47)	16.1
70-74	3.71 (3.49-3.94)	11.8	4.6 (4.36-4.88)	11.3	2.8 (2.37-3.15)	12.3	3.2 (3.02-3.41)	11.3	5.0 (4.41-5.55)	12.9
75-79	2.44 (2.25-2.64)	9.1	3.2 (2.94-3.52)	8.8	1.6 (1.36-1.89)	9.5	2.1 (1.89-2.28)	8.7	3.4 (2.88-3.84)	10.1
80-84	1.53 (1.32-1.74)	6.8	2.1 (1.76-2.39)	6.6	1.0 (0.71-1.34)	7	1.2 (1.06-1.42)	6.4	2.3 (1.72-2.85)	7.8
85+	0.95 (0.75-1.15)	5	1.5 (1.13-1.87)	4.9	0.4 (0.28-0.62)	5.2	0.9 (0.63-1.07)	4.6	1.2 (0.73-1.68)	6

Figure 3. Age-wise decline in the proportion of population having a good life by gender

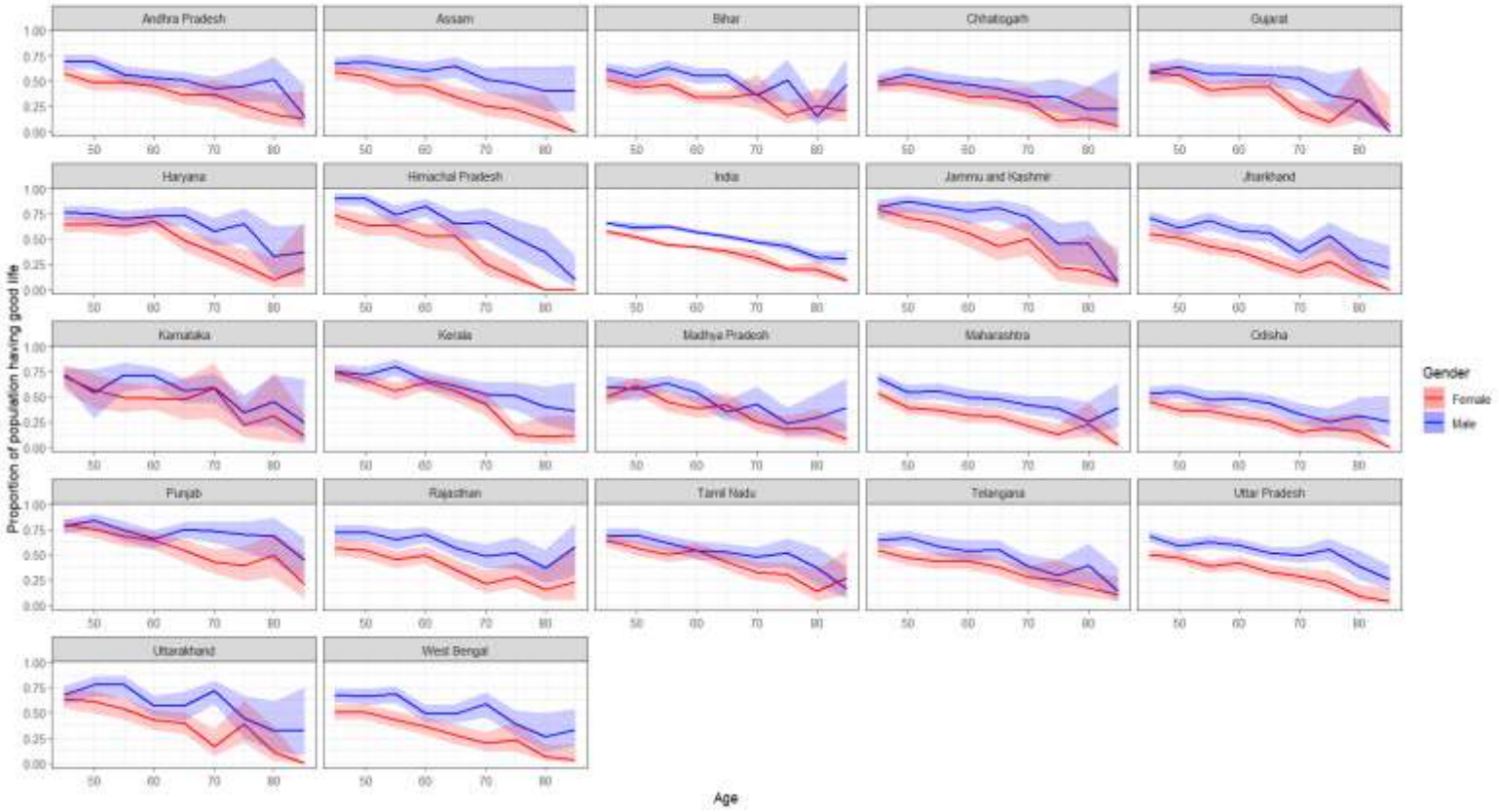
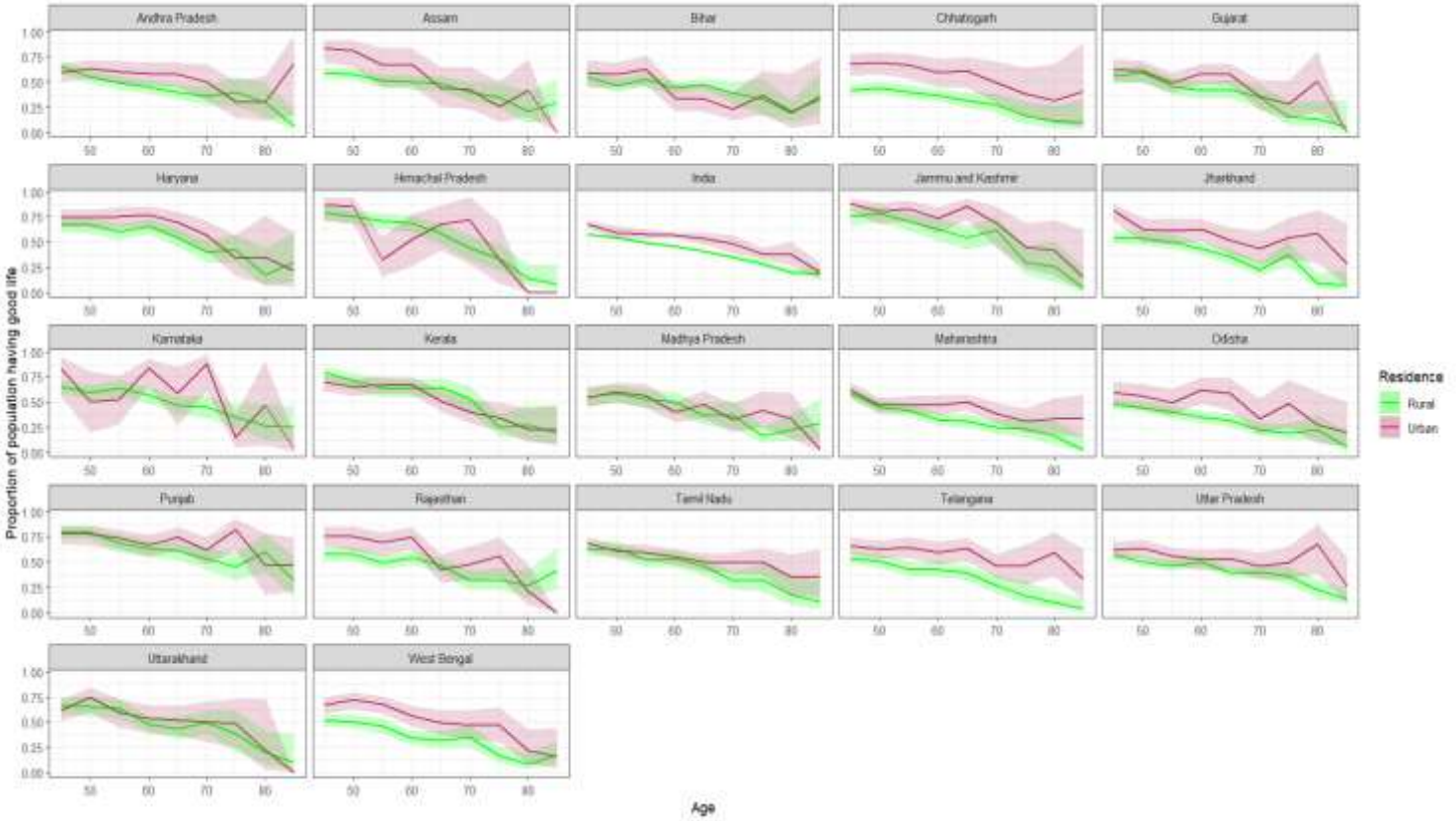


Figure 4. Age- wise decline in the proportion of population having a good life by residence



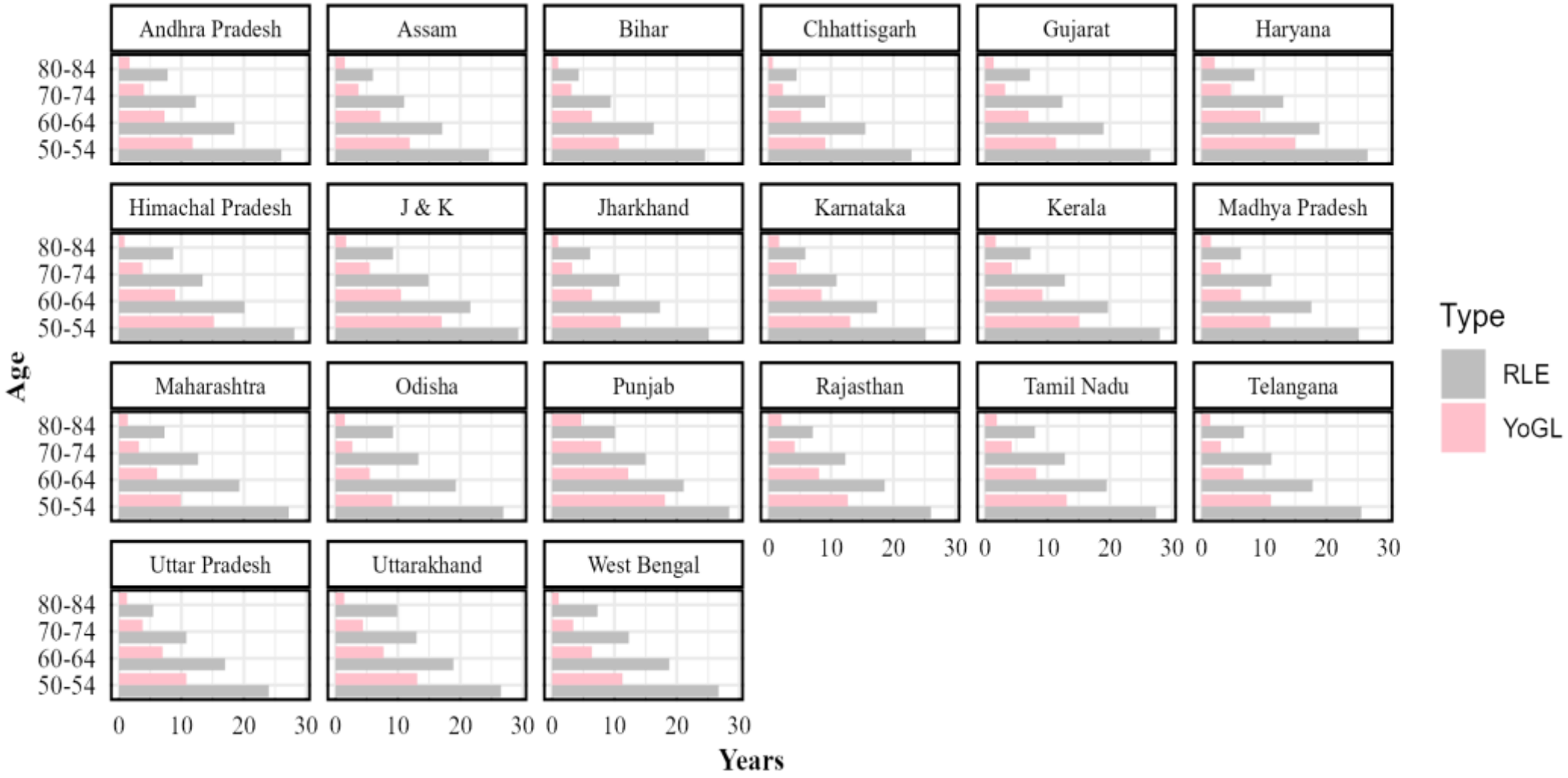
expected to spend more than 60% of their remaining life expectancy above the critical threshold of good life. For females aged 50 years, the highest share of good life is around 55% for the state of Punjab. While for males, no states show a share of YoGL of RLE below 30%, for females, the share decreases to below 30% of the remaining life years in the states of Maharashtra and Odisha. In the case of the rural population aged 50 years, once again, states like Maharashtra, Chhattisgarh, Gujarat, Telangana, West Bengal, and Odisha show that around 1/3rd of their remaining life expectancy (35%-31%) is estimated to be years of good life. In Urban areas, we didn't find any states showing a share of YoGL below 30% of RLE, although the state-level pattern of year of good life resembles what was observed in other characteristics.

Figure 8 plots the correlation between 'years of good life' and years spent out of poverty, years spent without activity limitation, years spent without cognitive impairment, and life years spent with positive life satisfaction separately for the population aged 50 years. States of Punjab and Jammu & Kashmir, which showed relatively high rank in years of good life, also stood high in two out of four dimensions: proportion of life years spent out of poverty and proportion of life years with positive life satisfaction. However, these two states do not rank better in life years spent out of cognitive impairment, whereas the southern states, like Kerala and Tamil Nadu, top in the same. Despite better rank in life-years spent out of cognitive impairment, the relative rank of southern states dropped down in terms of 'years of the good life', largely due to their poor standing in terms of proportion of life without ADL limitation and proportion of life with positive life satisfaction. This led us to estimate the relative contribution of different dimensions to YoGL in the next section.

4.3 Relative contribution of different YoGL components along with the state-level distal factors

As YoGL comprises four dimensions on top of life expectancy, decomposing their individual relative contributions can give a more nuanced picture of which dimension is more responsible for the heterogeneities in YoGL observed across states. Table 3 reports the relative contribution of different components adjusted for the selected control variables for the total population separately. For the overall population, activity limitations solely account for 33·17% of the difference in YoGL. The contribution of cognitive impairment and age is almost the same (around 19%). Among all the components, poverty contributes around 5% of the state-level inequality in YoGL, whereas life satisfaction is not significantly responsible for explaining the same. In the separate models for males and females, we observed a slight variation across relative contributions of different dimensions in explaining state-level inequality in YoGL. The relative contribution of functional limitation is much higher (38%) than other dimensions for males, whereas age contributes the highest (29%) in explaining regional inequality in YoGL among females. Among the separate models for rural and urban populations, functional limitation makes a higher contribution than other factors. The relative contribution of poverty (13 %) and positive life satisfaction also make significant contributions in explaining differences in YoGL among the urban populations across the states.

Figure 5. Years of Good Life (YoGL) and Remaining Life Expectancy (RLE) for states of India by age, 201



5. Discussion and Conclusion

This study tried to understand regional variability in human well-being by applying the novel approach of 'Years of Good Life' to data from India and its different states. While we tried to stick to the dimensions stipulated in the original formulation of YoGL, owing to data availability and the cultural context of India, some of the critical threshold values had to be modified slightly.

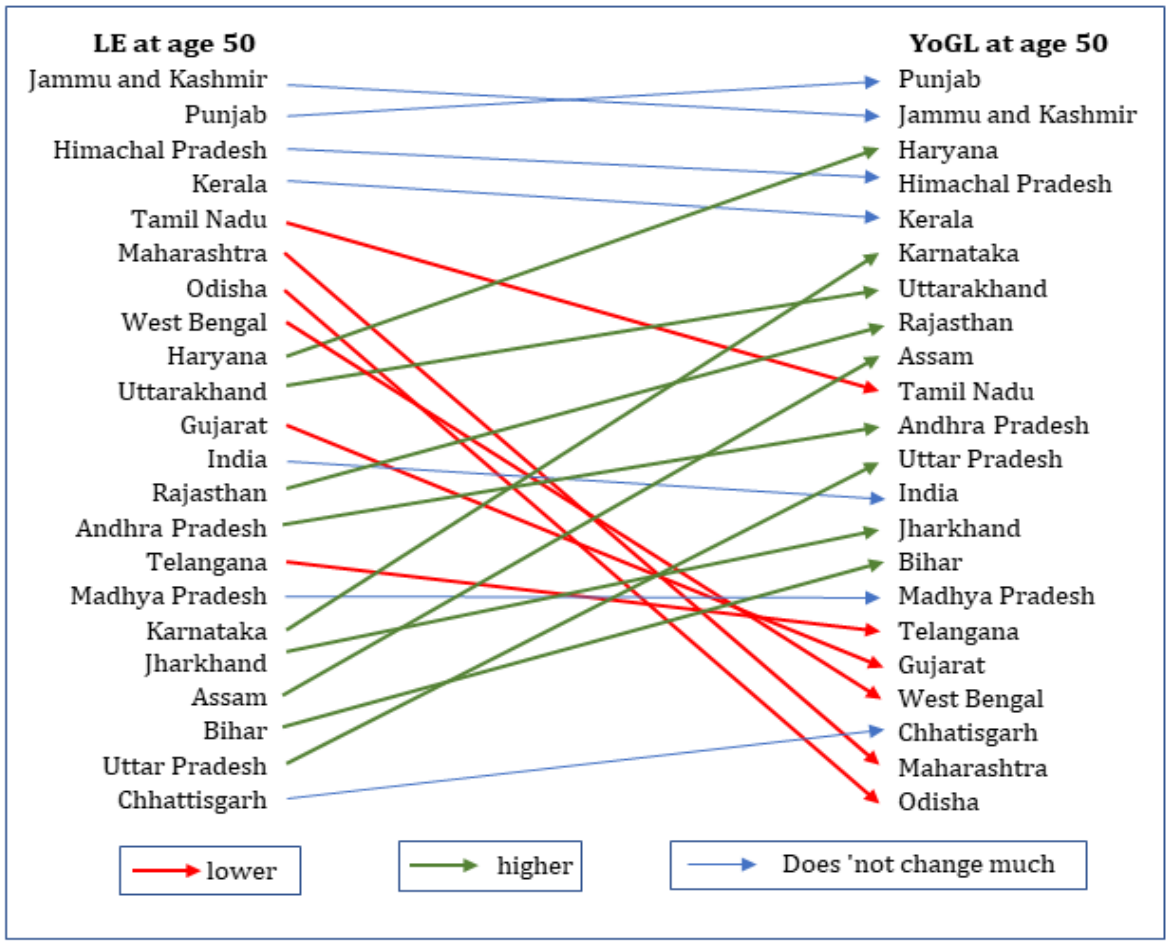
Besides successfully applying the YoGL approach to the Indian context amid suitable data constraints, the study makes a few key additional contributions as well. First, we report regional variation in YoGL among older adults in India and for its 21 major states. Second, along with differences in well-being among subpopulations, this study also decomposes the determinants of regional variation using macro-level indicators and reports their relative contribution.

For the period of 2015-19, life expectancy at age 50 ranges from between 22-28 years across the states of India. According to our results, only 11.6 years of that can be expected to be good years in the YoGL at the national average, which ranges between 9-18 years across the states. Gender differences exist throughout the age group and across the states in terms of good life years, which increases with the progression of age. Female life expectancy in India has surpassed male life expectancy in 1981. However, the findings from YoGL suggest that the share of good life continues to be much smaller for females compared to men, supporting the 'male-female-health-mortality' paradox (Di Lego et al., 2020). The advantage in life expectancy is turning into more 'unhealthy years' in case of quality of life for females; as at age 50 only one-third of the remaining years are 'good years' for females but more than half of the remaining years is expected to be counted as good years for males. This finding also aligns with the findings reported in the parent study (Lutz et al., 2021) and other studies of YoGL in European countries (Reiter & Spitzer, 2021). Although female life expectancy is higher than male's in all those countries, women can expect to live less years as good life.

Understanding the gender differentials in well-being among older adults is important for several reasons. Primarily, the supposed reversal in life expectancy does not necessarily translate to the well-being level. Also, widowhood in old age is predominantly a female phenomenon, which can put them in vulnerable situations, particularly with respect to financial dependency. In the absence of strong social and economic support, this can impact other aspects of well-being, including objective and subjective ones (Hossain & James, 2023; Lloyd-Sherlock et al., 2015). In India, poverty among the older female population is widespread and they become more vulnerable to lead a very poor-quality life. Along with gender, also the rural-urban difference shows the expected results, indicating the rural population as more disadvantaged than their counterparts.

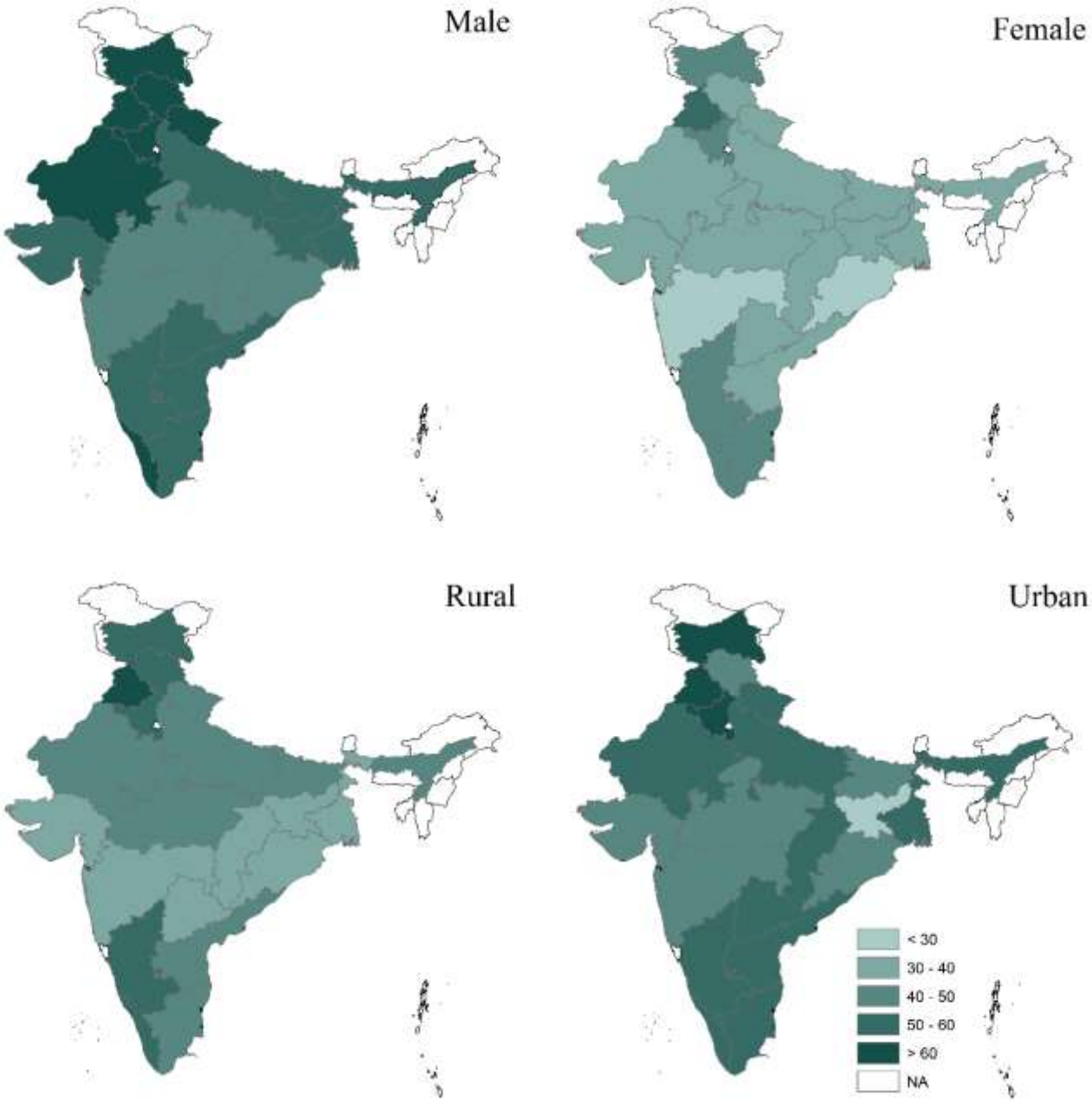
One of the major research questions examined by this study was whether patterns in life expectancy match the scenario in YoGL. The comparison of the relative ranking of states shows that some of the states which enable people to live longer lives do indeed also provide more YoGL. This is particularly true for northern states like Punjab and Jammu & Kashmir. States like West Bengal, Maharashtra, Odisha etc., though, rank comparatively higher in life expectancy for older age groups, but they rank among the bottom-most states in terms of YoGL. Southern states of India are more advanced demographically and have a higher life expectancy, but this does not necessarily ensure they have higher years of the good life. The variation in years of good life among different states of India is quite obvious, as the socioeconomic and political conditions are quite divergent across states. The research shows that other than biological factors, social factors had a huge impact on deciding the quality of life (Jagger et al., 2020). The study shows higher regional variability in terms of years of good life than variability in life expectancy for older age groups. The

Figure 6 Concordance-Discordance in relative rank (descending order) of states according to life expectancy (LE) and YoGL at age 50, respectively



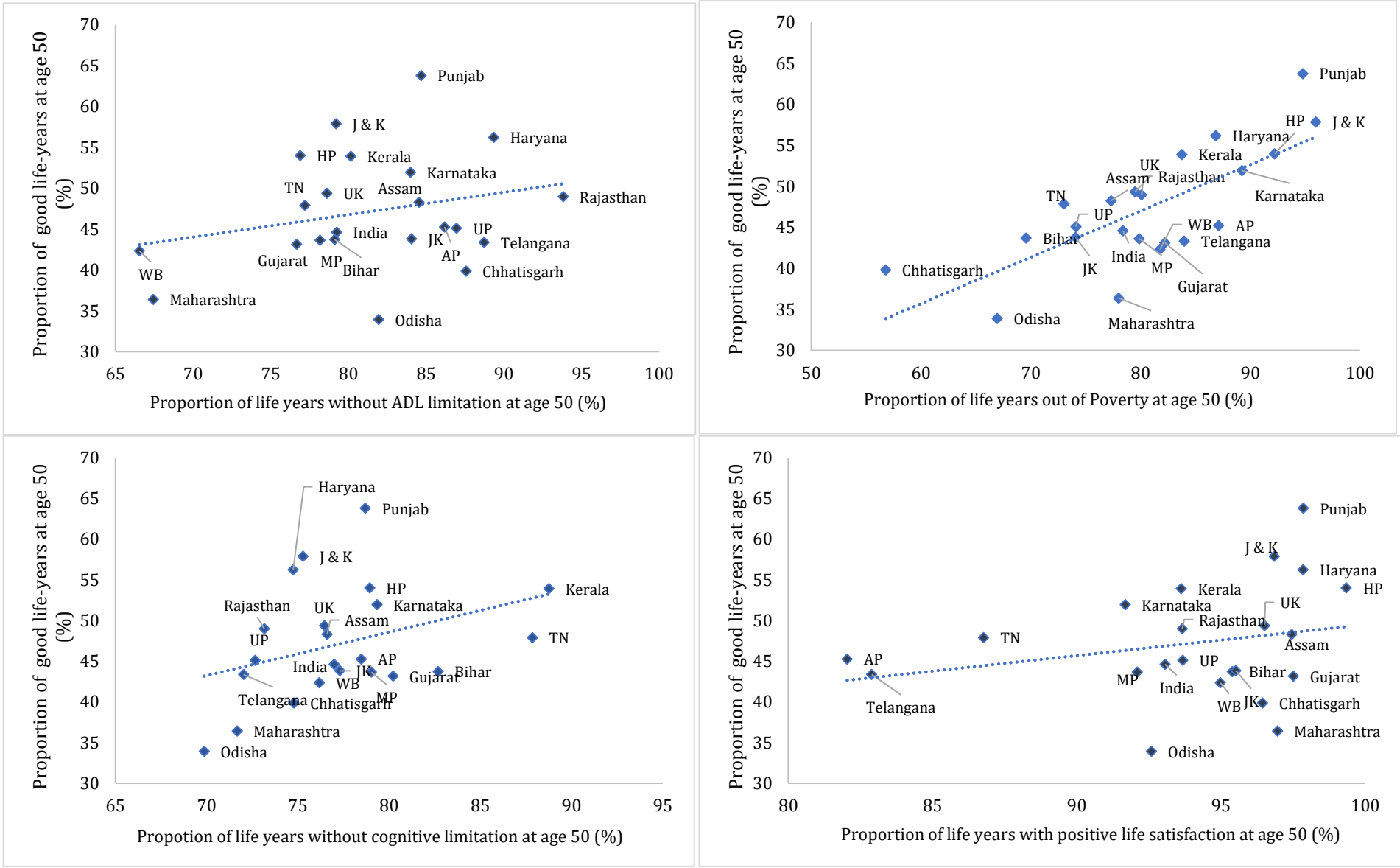
study also presented the relative contributions of different dimensions in explaining YoGL. The findings suggest that states having higher life years spent without poverty make the top contribution in explaining the rank of YoGL, followed by the states having higher literacy rates, especially female literacy, like Kerala and Tamil Nadu. The relationship between level of education and cognitive ability is positive to some level (Cha et al., 2024; Garcia et al., 2018). Among the 4 components of YoGL, variation in functional limitations and cognitive impairment are the top two reasons causing regional inequality in good life years, as the decomposition result suggests. Separately among males, functional limitation contributes maximum in regional variations. On the other hand, cognitive health varies among females, as female level of education varies highly across the states. Poverty has also made a major contribution to improved health conditions due to the accessibility and affordability of better healthcare facilities. Among the states, especially in urban areas, wealth inequality is very high, keeping the urban poor in worse conditions than the rural poor. Thus poverty contributes a significant amount to inequality of YoGL among the urban population across states (Vakulabharanam & Motiram, 2018).

Figure 7 Regional differences in the share of YoGL within the Remaining Life Expectancy (RLE) across the states of India by gender and residence, 2017



Though the availability of LASI data has facilitated the construct of YoGL, including the subjective and objective dimensions, the limitation of vital statistics data made the analysis of regional variation limited to gender and rural/urban strata. Educational attainment could be a very good component to capture another dimension of heterogeneity, but the unavailability of mortality data by educational attainment, caste, or religion restricted the scope of the study at present. Similarly, as the data is available for only a single cross-sectional wave, each health state is considered as saturated, i.e., ones considered as cognitively impaired, it is assumed that there is no recovery in

Figure 8 Correlation plot to show the relationship between YoGL and its 4 components for major states of India, 2017



the successive ages. The availability of longitudinal data would give a wider scope to construct a multi-state life table to understand the transition rate and would give a more precise count for years of good life. Though the index is capable of computing trends in improvement or deterioration in well-being (Striessnig et al., 2021), monitoring of temporal improvement or whether the states are converging or diverging in 'years spent as good life' is not possible at present using the available datasets. Another less significant shortcoming might have occurred in this study as some of the variables, e.g., activity limitation in daily life, are self-reported. Self-reporting of diseases and health status is skewed towards socioeconomic condition and educational attainment in India (Thomas et al., 2014), which may introduce little bias in capturing inequality in the good life. Similarly, per capita income calculation is still not reliable; thus, consumption-based relative poverty at the household level is the only option to understand the wealth status of individuals, though individual-level poverty varies by gender within the household.

Despite the above-mentioned limitations, this article tried to add significant value to literature related to capturing the quality of life and inequality in well-being across a sub-national population of Indian older adults. It concludes that heterogeneity exists in good life-years spent across administrative territory as well as social and demographic stratum. Economic dimensions contribute strongly to persisting inequality in well-being, as the rank concordance in YoGL and years spent without poverty shows that states having higher expected years of good life are economically richer, and the inclusion of poverty indicator enriched the index of quality of life. Similarly, cognitive impairment would initiate cognitive degenerative diseases like dementia and Alzheimer's disease. That would increase the disease burden of the Indian population in the coming days. Understanding the contribution of cognitive diseases in unhealthy life years would help in chalking out more necessary healthcare policies. Mapping the good life-years at the sub-national level population, this study provided input for states to formulate more decentralised policies to improve the retirement age according to the magnitude of healthy and unhealthy life years as well as to plan aids for the older population. In the future, this study can be further extended to monitor temporal changes in good life and convergence or divergence between the states, depending on the availability of more harmonized data. YoGL can potentially be a more effective composite socio-demographic tool for measuring and monitoring human well-being at the sub-national level in India and also for other countries.

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Table 3. Relative contribution of different covariates in explaining state-wise inequality of YoGL

Covariates	Relative Contribution (in %)				
	Total Population	Male Population	Female Population	Rural Population	Urban Population
State	2.387***	3.636***	1.081***	2.299***	0.955**
Cohort (Age)	19.266**	1.761	29.406*	18.893*	14.675
Poverty	5.399***	7.069***	3.935***	6.611***	12.377***
Functional Limitation	33.165***	38.103***	22.506***	27.267***	33.018***
Cognitive Impairment	19.959***	20.533***	25.660***	22.391***	13.138***
Life Satisfaction	0.400	0.400	0.318	0.491	2.076**
SC population (%)	0.656	0.088	0.254	0.191	0.064
ST population (%)	1.118**	0.749**	1.039**	1.704**	0.229*
Percentage population working	2.222	4.833	1.591**	2.924	3.289
Percentage population in urban areas	0.683	-0.096	-8.864	…	…
Percentage population widowed	-0.016	5.655	9.169	1.567	-1.481
Percentage population literate	5.201**	3.839*	5.256*	5.252**	4.254
Percentage population Hindu	2.368***	2.309**	-0.457	2.092**	0.524
Total Explained	92.8	88.9	92.1	91.7	83.1
Residual	7.2	11.1	7.92	8.32	16.88

*Note – significance level: *p≤0.05; **p≤0.01; ***p≤0.001*

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Supplementary

Table S1. Calculation of YoGL at different age-group for India

(1)	Age Group (2)	SRS-Abridged life table		Sullivan's method of DFLE				e_x (9)	Proportion of remaining life years in 'good' state (e_x/YoGL)*100 (10)
		lx (3)	nLx (4)	Proportion living good life (GL) (5)	GL*nLx (6)	T*x* (7)	YoGL at age*x* (8)		
India	45-49	90200	445791	0.565878	252263.3	1208743	13.40	30.3	44.2
	50-54	87967	431690	0.517671	223473.3	956479.2	10.87	26	41.8
	55-59	84444	409322	0.49173	201275.8	733005.9	8.68	21.9	39.6
	60-64	78955	377589	0.459575	173530.6	531730.1	6.73	18.3	36.8
	65-69	71717	334882	0.409657	137186.6	358199.5	4.99	14.8	33.7
	70-74	61781	278708	0.376418	104910.8	221012.9	3.58	11.8	30.3
	75-79	49325	211964	0.296408	62827.83	116102.1	2.35	9.1	25.9
	80-84	35190	137627	0.245395	33772.95	53274.3	1.51	6.8	22.3
	85+	20111	101155	0.192787	19501.35	19501.35	0.97	5	19.4

Note:

- life table information from SRS abridged life table for 2017 is shown in column (3)-(4) & (9);
- proportion of GL (5) is the proportion of population out of poverty; out of ADL limitation; out of cognitive impairment & with positive life satisfaction simultaneously.
- Column (6)-(7) & (8) follows Sullivan's method of Disability free life expectancy calculation
- YoGL is calculated separately Male-Female and Rural-Urban Population for India and all the major states
- Decomposition of the index can be done replacing the values in column (5) with age wise proportion of population out of poverty, out of activity limitation, out of cognitive impairment and with positive life satisfaction separately.

Table S2. Percentage distribution of all the dimensions of YoGL for population aged 45 and above

States	Out of Poverty				Out of Cognitive Limitation				Out of Physical Limitation				Having Positive Life Satisfaction			
	M	F	R	U	M	F	R	U	M	F	R	U	M	F	R	U
Jammu & Kashmir	97.82	95.9	98.97	92.43	93.69	77.88	82.97	94.31	100	85.43	90.97	97.82	98.33	95.74	96.57	97.87
Himachal Pradesh	95.5	94.34	95.35	90.82	94.52	84.38	89.71	86.61	100	91.63	96.31	91.21	100	99.28	99.54	100
Punjab	97.25	94.99	97.22	93.7	92.31	85.74	85.81	94.14	98.56	93.84	96.5	94.97	98.57	98.97	99.74	97.09
Uttarakhand	83.66	87.19	88.56	78.45	97.59	82.09	87.28	95.27	98.04	89.02	90.9	98	99.34	100	99.58	100
Haryana	85	83.42	85.47	82.55	94.34	80.74	84.05	91.74	99.34	90.23	92.61	97.38	97.02	97.78	96.03	99.14
Rajasthan	81.52	81.52	80.7	83.99	94.91	75.81	82.76	92.28	97.43	87.09	90.52	95.63	96.46	94.62	94.9	96.97
Uttar Pradesh	73.72	74.49	74.63	72.12	91.86	73.36	80.40	92.72	94.25	82.85	87.18	94.29	94.52	93.62	94.61	91.79
Bihar	62.55	66.4	64.97	62.72	95.00	83.79	88.45	96.23	98.8	90.15	93.2	100	96.73	94.87	96.28	92.75
West Bengal	83.34	87.15	83.22	88.82	93.14	77.61	83.76	94.11	98.09	91.99	92.19	99.86	96.52	94.13	94.38	96.91
Jharkhand	69.25	73.99	72.97	68.02	93.62	76.48	78.44	94.78	97.65	91.87	93.11	100	97.3	94.91	95.28	98.32
Odisha	72.04	71.3	72.13	68.82	95.47	80.66	84.75	97.57	95.66	78.3	84.9	100	92.9	90.96	91.98	91.27
Chhattisgarh	62	65.55	58.19	77.74	88.22	72.82	78.53	93.12	98.43	85.07	88.82	97.43	98.98	96.47	97.42	98.04
Madhya Pradesh	76.92	82.54	81.16	76.21	93.39	78.81	82.34	97.12	96.42	91.8	92.79	97.52	92.91	91.18	89.87	97.12
Gujarat	81.01	84.34	87.79	74.65	88.96	83.78	83.78	93.61	93.3	91.34	88.74	97.05	98.44	95.64	98.05	95.19
Maharashtra	75.08	79.19	81.6	72.34	93.72	85.00	84.46	94.35	96.04	85.55	86.63	94.17	99	97.23	98.36	97.63
Andhra Pradesh	89.32	83.32	87.89	82.39	92.05	74.82	76.73	89.98	98.08	87.35	92	93.73	87.1	81.04	83.11	85.24
Karnataka	82.55	88.17	93.32	76.22	93.50	81.43	84.96	93.10	96.98	87.92	87.09	99.6	96.72	92.17	91.72	97.3
Kerala	86.26	84.18	90.52	78.93	91.12	85.67	83.85	97.35	98.88	97.23	97.16	98.87	92.05	95.19	94.1	93.74
Tamil Nadu	79.85	76.67	84.67	72.2	96.19	93.49	95.08	94.27	99.66	97.08	97.27	99.2	93.52	86.39	89.49	89.63
Telangana	88.98	85.35	84.74	90.44	97.28	92.89	92.94	97.07	99.33	88.51	89.79	99.06	91.42	81.05	87.73	82.43
India	79.48	78	79.10	77.76	92.87	80.43	83.07	94.08	83.25	78.78	80.32	82.09	94.21	92.67	92.93	94.42

Note- M=Male F=Female R=Rural U=Urban; Individual-level survey weights are applied.

Figure S1. Robustness check: computation of poverty using Monthly Per Capita Income Expenditure (MPCE) and Toilet Facility

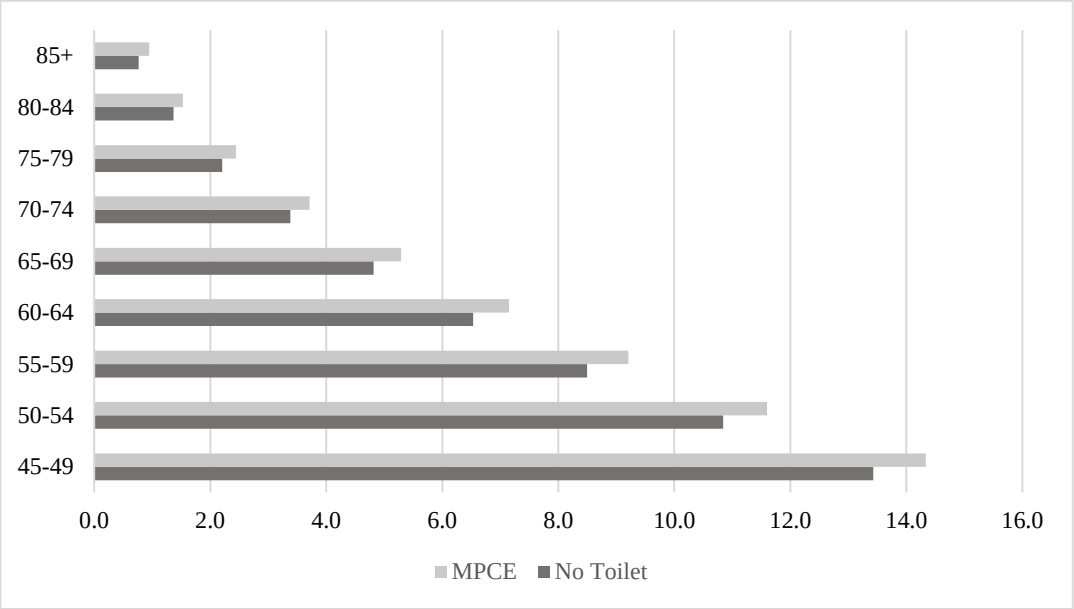

Figure S2. Robustness check: Coefficient plot to identify deflecting point of relationship between MPCE quintiles and Cognitive Health

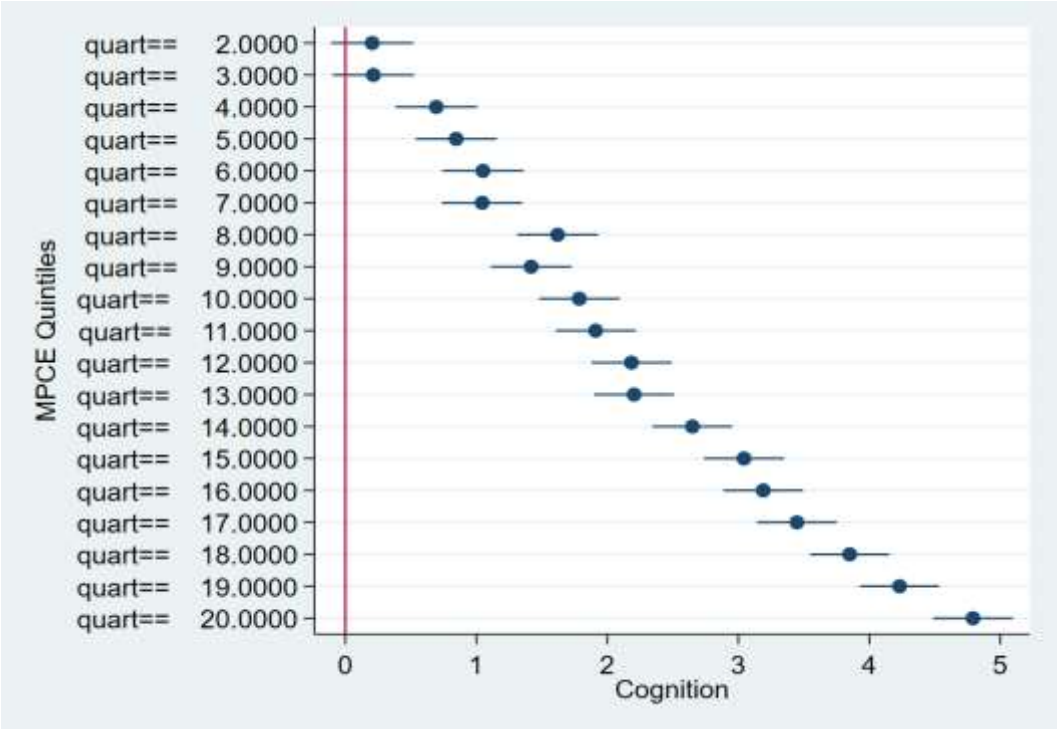

Figure S3. Robustness Check: Coefficient plot to identify deflecting point of relationship between Cognitive Health and Self-rated Health

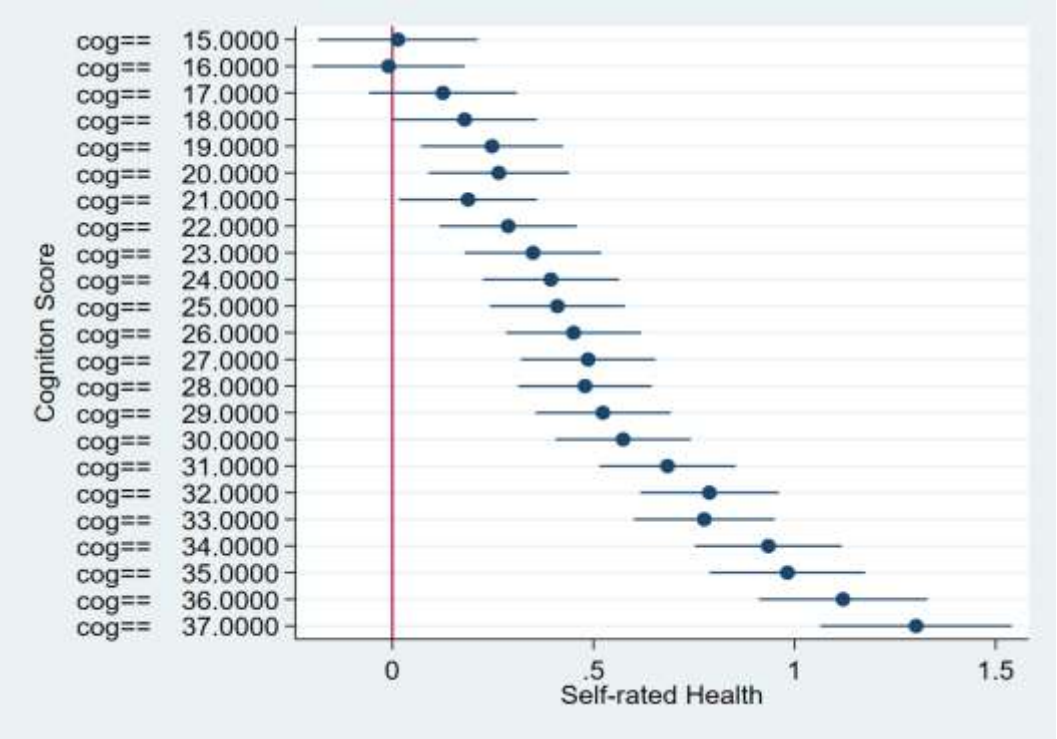

Figure S4. Robustness Check: Replacing Life satisfaction using two different questions to understand reporting stability

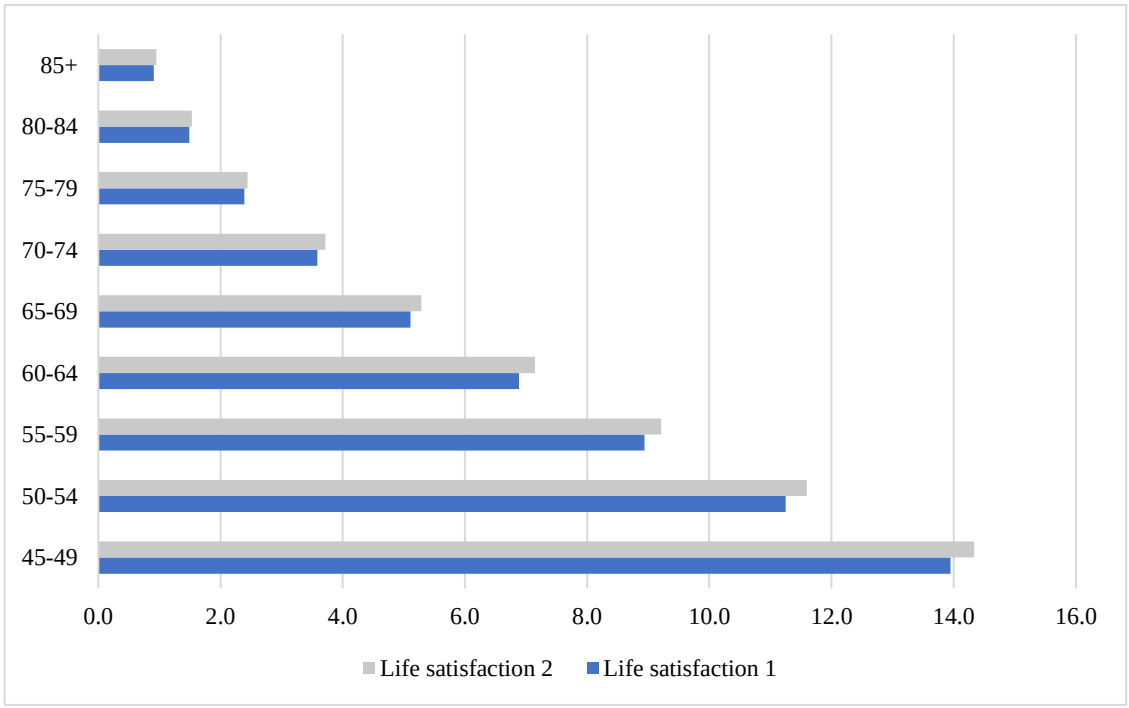

Figure S5. Correlation between HDI and YoGL at age 50 for the states of India

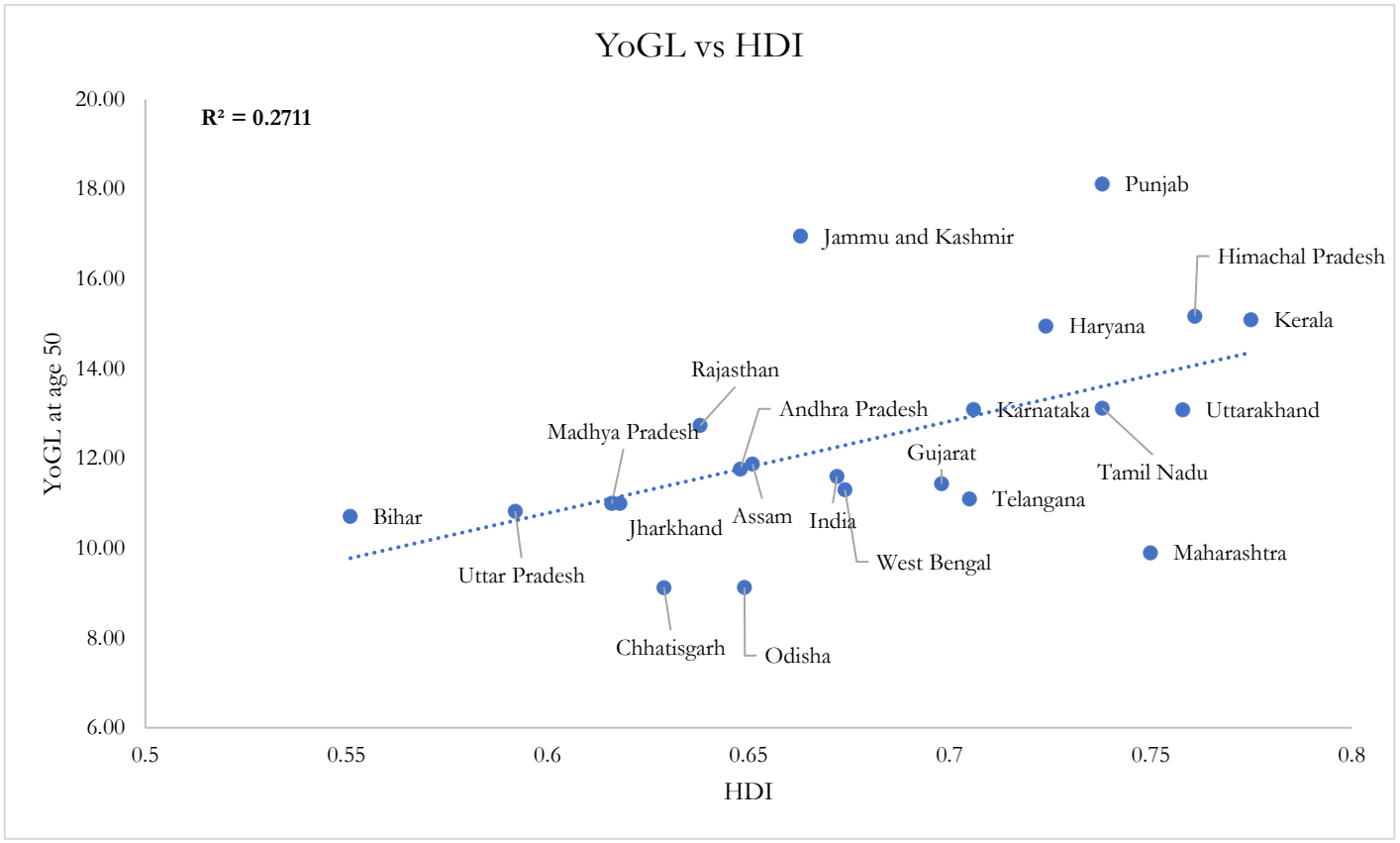

Figure S6. Correlation between MPI and YoGL at age 50 for the states of India

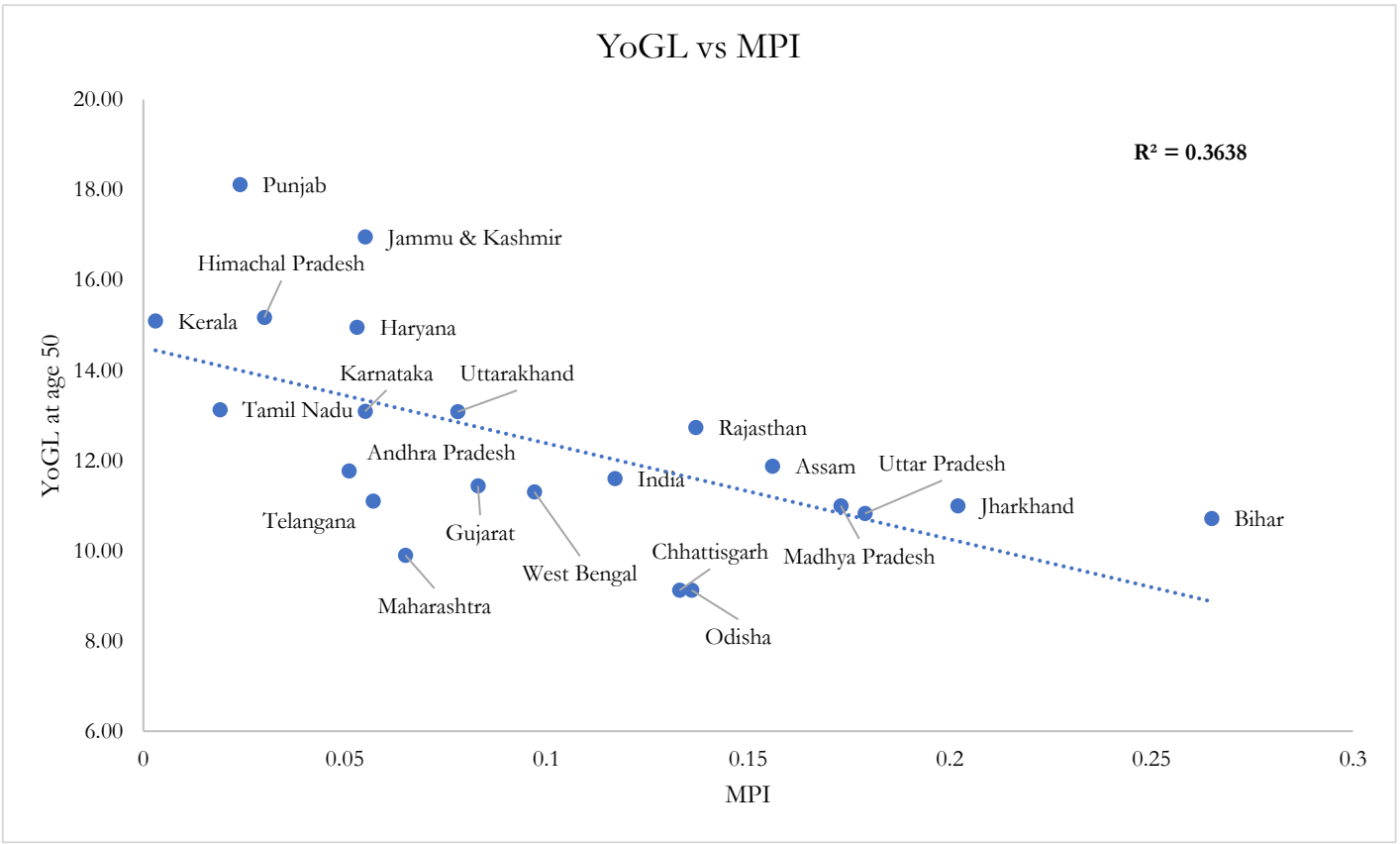

Table S8. Decomposition of YoGL according to all four dimensions for age 50

Total population

Determinants	Coef.	se	p>0.001	% contribution
State	**-0.002**	0.001	0.000	**2.387**
Cohort (Age)	**0.003**	0.001	0.004	**19.266**
Poverty	**0.227**	0.046	0.000	**5.399**
Functional Limitation	**0.453**	0.045	0.000	**33.165**
Cognitive Impairment	**0.286**	0.054	0.000	**19.959**
Life Satisfaction	0.069	0.095	0.472	0.400
SC population (%)	0.068	0.051	0.178	0.656
ST population (%)	**-0.187**	0.058	0.001	**1.118**
Percentage population working	0.016	0.052	0.755	2.222
Percentage population in urban areas	0.049	0.044	0.269	0.683
Percentage population widowed	-0.000	0.055	0.998	-0.016
Percentage population literate	**0.099**	0.035	0.005	**5.201**
Percentage population Hindu	**-0.084**	0.023	0.000	**2.368**
Residual				7.191
_Cons	-6.337	3.159	0.046	100.00
R^2	0.928			

3 (b) Male population				
State	**-0.002**	0.001	0.000	**3.636**
Cohort (Age)	0.001	0.001	0.851	1.761
Poverty	**0.311**	0.047	0.000	**7.069**
Functional Limitation	**0.568**	0.047	0.000	**38.103**
Cognitive Impairment	**0.375**	0.053	0.000	**20.533**
Life Satisfaction	0.051	0.098	0.604	0.400
SC population (%)	0.009	0.054	0.860	0.088
ST population (%)	**-0.190**	0.067	0.005	**0.749**
Percentage population working	0.037	0.052	0.482	4.833
Percentage population in urban areas	-0.010	0.042	0.812	-0.096
Percentage population widowed	-0.085	0.055	0.124	5.655
Percentage population literate	**0.095**	0.039	0.016	**3.839**
Percentage population Hindu	**-0.085**	0.026	0.001	**2.309**
Residual				11.121
_Cons	-1.097	3.180	0.731	100.00
R^2	0.889			

3 (c) Female population				
State	**-0.002**	0.001	0.000	**1.081**
Cohort (Age)	**0.005**	0.001	0.011	**29.406**
Poverty	**0.171**	0.050	0.000	**3.935**
Functional Limitation	**0.311**	0.041	0.000	**22.506**
Cognitive Impairment	**0.273**	0.037	0.000	**25.660**
Life Satisfaction	0.072	0.095	0.395	0.318
SC population (%)	0.033	0.053	0.896	0.254
ST population (%)	**-0.160**	0.059	0.007	**1.039**
Percentage population working	**0.099**	0.043	0.001	**1.591**
Percentage population in urban areas	-0.078	0.043	0.069	-8.864
Percentage population widowed	-0.070	0.049	0.107	9.169
Percentage population literate	**0.084**	0.033	0.012	**5.256**
Percentage population Hindu	-0.034	0.027	0.206	-0.457
Residual				7.919

_Cons	-0.043	0.128	0.738	100.00
R^2	0.921			

3 (d) Rural Population				
State	**-0.002**	0.000	0.000	**2.299**
Cohort (Age)	**-0.016**	0.008	0.042	**18.893**
Poverty	**0.242**	0.048	0.000	**6.611**
Functional Limitation	**0.395**	0.046	0.000	**27.267**
Cognitive Impairment	**0.308**	0.051	0.000	**22.391**
Life Satisfaction	0.071	0.084	0.394	0.491
SC population (%)	0.023	0.047	0.329	0.191
ST population (%)	**-0.193**	0.054	0.002	**1.704**
Percentage population working	0.023	0.052	0.938	2.924
Percentage population in urban areas	-0.016	0.056	0.354	1.567
Percentage population widowed	**0.099**	0.033	0.003	**5.252**
Percentage population literate	**-0.072**	0.021	0.001	**2.092**
Percentage population Hindu				8.318
Residual	-0.228	0.129	0.078	100.00
_Cons	0.917			

3 (e) Urban population				
State	**-0.001**	0.001	0.035	**0.955**
Cohort (Age)	-0.015	0.009	0.111	14.675
Poverty	**0.428**	0.047	0.000	**12.377**
Functional Limitation	**0.459**	0.053	0.000	**33.018**
Cognitive Impairment	**0.221**	0.056	0.000z	**13.138**
Life Satisfaction	**0.321**	0.098	0.001	**2.076**
SC population (%)	0.011	0.069	0.874	0.064
ST population (%)	**-0.250**	0.126	0.048	**0.229**
Percentage population working	0.030	0.058	0.605	3.289
Percentage population in urban areas	0.017	0.053	0.747	-1.481
Percentage population widowed	0.086	0.046	0.064	4.254
Percentage population literate	-0.039	0.039	0.317	0.524
Percentage population Hindu				16.882
Residual	**-0.611**	0.139	0.000	100.00
_Cons	0.831			

Table S10. Age wise YoGL and Life expectancy by gender and residence for 21 major states in India, 2017

States	Age-group	YoGL (T)	LE (T)	YoGL (M)	LE (M)	YoGL (F)	LE (F)	YoGL (R)	LE (R)	YoGL (U)	LE (U)
	45-49	14.5	30.1	16.2	29.2	12.9	31.2	13.7	29.7	17.3	31.4
	50-54	11.8	26	13.3	25.2	10.3	26.8	10.9	25.6	14.7	27.1
	55-59	9.3	22.1	10.5	21.5	8.2	22.7	8.6	21.8	12.0	22.9
Andhra	60-64	7.3	18.5	8.4	18.1	6.2	18.9	6.7	18.3	9.6	19.1
Pradesh	65-69	5.5	15.2	6.6	15	4.5	15.5	5.1	15.1	7.4	15.7
	70-74	4.0	12.3	4.9	12	3.2	12.6	3.8	12.3	5.4	12.4
	75-79	2.8	9.8	3.8	9.5	2.0	10.1	2.7	9.8	3.8	9.6
	80-84	1.7	7.8	2.5	7.2	1.3	8.4	1.5	8	3.3	7.1
	85+	0.9	6.1	0.8	5.5	0.9	6.9	0.4	6.4	3.6	5.2
	45-49	14.6	28.8	17.1	28.1	12.2	29.7	13.8	28.1	18.8	32.5
	50-54	11.9	24.6	14.3	24.1	9.5	25.3	11.2	24	15.0	28.2
	55-59	9.3	20.8	11.5	20.2	7.1	21.5	8.9	20.2	11.3	24
Assam	60-64	7.2	17.1	9.2	16.7	5.2	17.6	6.9	16.6	8.5	20
	65-69	5.3	13.9	7.2	13.6	3.4	14.2	5.2	13.4	5.6	16.4
	70-74	3.7	11	5.1	10.9	2.1	11.2	3.6	10.7	4.0	13.1
	75-79	2.5	8.5	3.7	8.3	1.3	8.7	2.5	8.2	2.4	10.2
	80-84	1.5	6	2.4	5.9	0.5	6.1	1.4	5.8	1.7	7.5
	85+	1.0	4.3	1.7	4.2	0.00	4.4	1.2	4.1	0.0	5.6
	45-49	13.3	29	15.6	29.3	11.3	28.8	13.1	28.6	13.8	31.4
	50-54	10.7	24.5	12.8	24.8	8.8	24.1	10.6	24.1	11.1	26.9
	55-59	8.6	20.2	10.5	20.5	6.9	19.8	8.6	19.8	8.5	22.6
Bihar	60-64	6.4	16.3	7.9	16.6	5.0	16.1	6.5	16	5.7	18.6
	65-69	4.8	12.7	5.7	12.9	3.8	12.5	4.8	12.4	4.3	14.7
	70-74	3.1	9.4	3.6	9.6	2.6	9.2	3.1	9.1	3.1	11.2
	75-79	2.0	6.9	2.8	7	1.3	6.7	1.9	6.7	2.6	8.3
	80-84	1.0	4.3	1.0	4.4	1.0	4.2	0.9	4.1	1.5	5.9
	85+	1.0	2.7	1.3	2.8	0.5	2.7	0.9	2.5	1.4	4.2
	45-49	11.2	27.1	12.0	25.8	10.3	28.4	9.5	26.7	17.3	28.7

	50-54	9.1	22.9	10.0	21.8	8.1	23.9	7.7	22.5	14.2	24.3
Chhattisgarh	55-59	6.9	18.9	7.6	17.8	6.2	20	5.8	18.5	11.3	20.3
	60-64	5.2	15.5	5.8	14.5	4.5	16.4	4.3	15.2	8.6	16.4
	65-69	3.7	12.1	4.1	11.2	3.1	12.9	3.0	11.9	6.3	12.9
	70-74	2.3	9.1	2.7	8.2	1.9	9.9	1.8	9	4.1	9.5
	75-79	1.3	6.6	1.8	6.1	0.8	7.1	0.9	6.6	2.5	6.8
	80-84	0.7	4.5	0.9	4	0.5	5.1	0.5	4.3	1.8	5.3
	85+	0.4	3.1	0.6	2.7	0.2	3.6	0.3	2.9	1.6	3.9
	45-49	14.1	30.8	15.4	28.9	12.9	33	12.8	30.8	15.5	30.8
	50-54	11.4	26.5	12.9	24.7	10.1	28.5	10.3	26.5	12.8	26.5
	55-59	8.8	22.5	10.2	20.8	7.6	24.4	7.7	22.5	10.1	22.5
Gujarat	60-64	7.0	19	8.2	17.4	5.9	20.6	5.9	19.1	8.3	18.8
	65-69	5.1	15.5	6.1	14.1	4.1	17	4.3	15.6	6.0	15.4
	70-74	3.2	12.4	4.2	11.3	2.3	13.6	2.6	12.5	3.9	12.4
	75-79	2.0	9.7	2.4	8.7	1.6	10.7	1.2	9.8	2.7	9.5
	80-84	1.4	7.2	1.2	6.2	1.6	8.2	0.7	7.3	2.0	7.1
	85+	0.2	5.3	0.0	4.4	0.4	6.2	0.3	5.4	0.0	5.2
	45-49	18.0	30.8	19.6	28.9	16.6	33	16.6	30	20.4	32.2
	50-54	15.0	26.6	16.4	25	13.7	28.5	13.7	25.9	17.2	27.9
	55-59	12.0	22.6	13.4	21.2	10.8	24.3	11.0	22.1	13.9	23.7
Haryana	60-64	9.4	18.9	11.0	17.8	8.1	20.2	8.7	18.6	10.7	19.8
	65-69	6.7	15.8	8.6	14.8	5.3	16.8	6.2	15.4	7.9	16.8
	70-74	4.7	13.1	6.4	12.5	3.4	13.7	4.4	12.7	5.4	14
	75-79	3.3	10.8	5.0	10.6	2.1	11	3.3	10.4	3.5	11.7
	80-84	2.1	8.5	3.0	8.5	1.3	8.5	1.9	7.9	2.7	9.9
	85+	1.9	6.8	2.6	7	1.4	6.6	1.8	6.1	1.8	8.4
	45-49	18.85	32.5	21.6	29.8	15.8	35.9	18.8	32.3	18.8	35.7
	50-54	15.17	28.1	17.6	25.5	12.3	31.3	15.2	27.9	14.7	31.2
	55-59	11.78	24	13.8	21.5	9.3	27	11.9	23.8	10.7	26.8
Himachal	60-64	8.97	20.1	11.0	18	6.4	22.8	8.9	20	9.5	22.8
Pradesh	65-69	6.15	16.5	7.8	14.5	4.0	18.9	6.0	16.4	7.4	19.1
	70-74	3.82	13.4	5.7	11.7	1.6	15.6	3.7	13.3	4.7	16.2

	75-79	2.13	10.9	3.3	9.1	0.6	13	2.1	10.7	1.5	13.1
	80-84	0.90	8.7	1.8	7.1	0.00	10.5	0.9	8.6	0.1	10.5
	85+	0.48	7	0.5	5.5	0.00	8.6	0.5	6.9	0.1	8.3
	45-49	20.52	33.6	22.6	32.1	17.9	35.3	18.9	32.5	24.4	36
	50-54	16.96	29.3	19.2	27.9	14.2	30.8	15.6	28.4	20.3	31.4
	55-59	13.57	25.3	15.5	24	11.1	26.8	12.2	24.4	16.9	27.4
Jammu &	60-64	10.51	21.6	12.3	20.3	8.2	23	9.4	20.8	13.3	23.4
Kashmir	65-69	7.92	18.2	9.5	17.3	5.9	19.2	7.0	17.5	10.5	20
	70-74	5.50	14.9	6.4	14.2	4.2	15.8	4.9	14.3	7.0	16.6
	75-79	2.98	12	3.8	11.5	2.1	12.5	2.4	11.3	4.4	13.7
	80-84	1.74	9.2	2.2	9	1.2	9.3	1.3	8.5	2.8	10.9
	85+	0.54	6.9	0.5	7	0.6	6.7	0.3	6.2	1.3	8.7
	45-49	13.9	29.6	17.1	30.3	10.9	29	12.2	28.9	18.8	31.6
	50-54	11.0	25.1	13.9	25.9	8.4	24.5	9.7	24.4	15.1	27.2
	55-59	8.6	21.1	11.3	21.8	6.2	20.6	7.4	20.5	12.4	23
Jharkhand	60-64	6.4	17.3	8.6	18.1	4.3	16.6	5.3	16.6	10.0	19.1
	65-69	4.6	13.9	6.5	14.9	2.8	13.2	3.7	13.4	7.5	15.5
	70-74	3.2	10.8	4.5	11.7	1.9	10.2	2.4	10.4	5.6	12
	75-79	2.4	8	3.5	9.1	1.4	7.2	1.8	7.6	4.5	9.2
	80-84	1.0	6.1	1.9	7.3	0.4	5.3	0.5	5.9	3.1	6.8
	85+	0.5	4.6	1.2	5.8	0.00	3.8	0.3	4.5	1.4	5
	45-49	16.2	29.5	17.1	28.2	15.4	30.8	15.3	28.3	19.1	31.9
	50-54	13.1	25.2	14.1	24.1	12.2	26.3	12.4	24.2	15.2	27.4
	55-59	10.8	21.1	11.9	20	9.7	22.1	10.0	20.2	13.1	23.1
Karnataka	60-64	8.5	17.4	9.2	16.5	7.8	18.3	7.5	16.6	11.2	19.4
	65-69	6.2	14	6.6	13.4	5.9	14.7	5.4	13.4	7.8	15.8
	70-74	4.5	10.9	4.7	10.3	4.2	11.4	3.8	10.3	5.6	12.5
	75-79	2.5	8.6	3.0	8.3	2.0	8.9	2.5	8	2.2	10.3
	80-84	1.7	5.9	2.2	5.9	1.4	5.9	1.4	5.2	2.0	8
	85+	0.7	4.2	1.1	4.4	0.4	4	0.8	3.4	0.2	6.3
	45-49	18.5	32.5	19.6	30	17.5	35	19.1	32.7	17.9	32.4

	50-54	15.1	28	16.3	25.6	13.9	30.4	15.4	28.2	14.6	27.9
	55-59	12.1	23.8	13.2	21.5	10.9	26	12.3	24	11.8	23.6
Kerala	60-64	9.2	19.7	9.9	17.6	8.4	21.7	9.6	20	8.8	19.4
	65-69	6.5	16	7.3	14	5.6	17.7	7.1	16.4	5.9	15.5
	70-74	4.3	12.8	5.4	11.2	3.2	14.2	4.5	13.3	4.0	12.4
	75-79	2.6	9.9	3.8	8.5	1.3	11	2.5	10.5	2.6	9.3
	80-84	1.7	7.3	2.4	6.3	0.9	8	1.8	7.8	1.5	6.8
	85+	1.1	5.4	1.7	4.6	0.7	5.7	1.1	5.8	1.1	4.9
	45-49	13.4	29.5	14.2	28.3	12.5	30.9	13.2	29	14.3	31.1
	50-54	11.0	25.2	11.6	24.2	10.1	26.3	10.7	24.7	11.9	26.7
Madhya	55-59	8.4	21.1	9.1	20.1	7.4	22.2	8.2	20.6	9.2	22.6
Pradesh	60-64	6.3	17.6	6.8	16.8	5.5	18.4	6.1	17.2	6.9	18.9
	65-69	4.5	14.2	4.7	13.6	4.0	14.8	4.2	13.8	5.4	15.3
	70-74	3.1	11.2	3.7	10.8	2.3	11.6	3.0	10.9	3.7	12.3
	75-79	1.9	8.4	2.3	8.2	1.4	8.6	1.6	8.1	2.7	9.5
	80-84	1.5	6.3	2.0	6	1.0	6.6	1.4	5.8	1.5	7.9
	85+	1.1	4.6	1.7	4.3	0.4	4.9	1.2	4.1	0.2	6.2
	45-49	12.6	31.5	15.5	30.6	10.4	32.4	11.1	30.8	14.9	32.4
	50-54	9.9	27.2	12.4	26.4	7.9	28	8.5	26.6	12.0	28
	55-59	7.9	23.1	10.2	22.5	6.2	23.7	6.5	22.6	10.1	23.8
Maharashtra	60-64	6.1	19.3	8.1	18.9	4.6	19.8	4.8	19	8.1	19.8
	65-69	4.6	15.8	6.3	15.6	3.3	16	3.6	15.6	6.3	16.2
	70-74	3.2	12.7	4.7	12.6	2.1	12.7	2.4	12.5	4.5	13
	75-79	2.2	9.7	3.5	10	1.3	9.5	1.6	9.6	3.2	10
	80-84	1.4	7.3	2.5	7.7	1.0	7	0.7	7.1	2.5	7.6
	85+	0.7	5.4	2.3	5.9	0.1	5	0.1	5.2	1.9	5.6
	45-49	11.3	31.2	13.4	30.3	9.2	32.1	10.5	31.1	15.8	31.5
	50-54	9.1	26.9	11.1	26.2	7.1	27.7	8.4	26.8	13.2	27.3
	55-59	7.2	23	8.8	22.3	5.5	23.7	6.5	22.9	10.9	23.1
Odisha	60-64	5.5	19.3	7.0	18.7	4.0	19.9	4.8	19.3	8.9	19.2
	65-69	4.0	15.9	5.1	15.3	2.7	16.5	3.5	15.9	6.4	15.7
	70-74	2.7	13.3	3.8	12.9	1.8	13.8	2.4	13.4	4.4	13.2

	75-79	2.0	10.7	2.8	10.4	1.3	11	1.7	10.8	3.4	10.1
	80-84	1.5	9.2	2.6	9.2	0.6	9.2	1.2	9.3	2.1	8.9
	85+	0.8	7.7	2.0	7.8	0.00	7.5	0.4	7.7	1.5	7.3
	45-49	21.5	32.5	22.6	31.3	19.9	34	20.1	31.4	23.9	34.6
	50-54	18.1	28.4	19.5	27.5	16.2	29.5	16.7	27.4	20.6	30.5
	55-59	14.9	24.6	16.2	23.8	13.0	25.5	13.5	23.7	17.3	26.4
Punjab	60-64	12.2	21.1	13.7	20.5	10.2	21.7	11.0	20.4	14.5	22.7
	65-69	10.0	17.8	11.7	17.5	7.6	18.2	8.8	17.2	12.2	19.5
	70-74	7.9	15	9.5	14.9	5.8	15.2	6.8	14.4	10.0	16.8
	75-79	6.3	12.5	7.6	12.6	4.4	12.3	5.3	11.9	8.2	14.1
	80-84	4.7	10.1	5.6	10.4	3.3	9.9	4.2	9.5	5.5	11.9
	85+	3.1	8.2	3.8	8.6	1.6	7.8	2.4	7.6	4.6	10
	45-49	15.6	30.3	17.8	28.1	13.3	32.7	14.2	29.5	18.8	32.8
	50-54	12.7	26	14.7	23.9	10.7	28.2	11.6	25.2	15.3	28.4
	55-59	10.1	22	11.7	19.9	8.3	24.1	9.2	21.3	12.1	24.4
Rajasthan	60-64	8.1	18.6	9.5	16.9	6.4	20.4	7.5	18	9.2	20.8
	65-69	5.8	15.3	7.0	13.7	4.4	16.8	5.4	14.7	6.2	17.5
	70-74	4.2	12.3	5.4	11.1	3.0	13.4	3.7	11.7	4.8	14.6
	75-79	3.2	9.5	4.2	8.6	2.3	10.3	2.8	8.7	3.2	12.3
	80-84	2.1	7.1	2.9	6.5	1.4	7.6	2.0	6.2	0.9	10.2
	85+	1.8	5.2	2.8	4.9	1.3	5.4	1.8	4.3	0.0	8.5
	45-49	16.0	31.6	17.0	30.1	15.3	33.3	14.4	29.8	18.1	33.5
	50-54	13.1	27.4	14.1	26	12.3	28.8	11.7	25.6	15.1	29.2
	55-59	10.4	23.3	11.2	22.2	9.7	24.5	9.0	21.7	12.4	25
Tamil Nadu	60-64	8.2	19.5	8.8	18.7	7.6	20.4	6.9	18	10.0	21.1
	65-69	6.0	15.9	6.8	15.2	5.3	16.6	4.7	14.5	7.9	17.4
	70-74	4.3	12.8	5.1	12.3	3.7	13.3	3.0	11.5	6.2	14.2
	75-79	3.1	10.1	3.7	9.7	2.6	10.5	2.1	9	4.6	11.2
	80-84	1.9	8	2.1	7.7	1.7	8.2	1.0	6.8	3.2	9.2
	85+	1.4	6.2	1.0	6	1.7	6.4	0.5	5.2	2.6	7.3
	45-49	13.7	29.8	15.4	28.8	12.2	30.9	11.5	29.5	17.9	30.2

	50-54	11.1	25.6	12.7	24.8	9.7	26.5	9.2	25.5	14.8	25.7
	55-59	8.7	21.6	10.0	21	7.6	22.3	7.0	21.6	12.1	21.5
Telangana	60-64	6.7	17.8	7.6	17.3	5.8	18.3	5.3	17.9	9.4	17.4
	65-69	4.9	14.4	5.7	14	4.1	14.9	3.6	14.5	7.3	14.1
	70-74	3.1	11.2	3.6	10.9	2.6	11.6	2.0	11.3	5.1	10.9
	75-79	2.0	8.7	2.4	8.2	1.8	9.2	1.0	8.7	4.1	8.7
	80-84	1.4	6.8	1.9	6.4	1.1	7.3	0.5	6.7	3.4	7.1
	85+	0.6	5.2	0.7	4.8	0.6	5.7	0.2	5.1	1.9	5.7
	45-49	13.4	28.3	15.8	27.4	10.8	29.2	12.6	27.6	16.8	30.3
	50-54	10.8	24	12.9	23.2	8.6	24.9	10.1	23.5	14.0	25.9
	55-59	8.7	20.3	10.6	19.4	6.6	21.2	8.1	19.7	11.4	21.9
Uttar Pradesh	60-64	7.0	17	8.5	16.3	5.2	17.6	6.6	16.6	9.3	18.3
	65-69	5.2	13.8	6.5	13.3	3.5	14.3	4.7	13.5	7.4	14.7
	70-74	3.8	10.8	4.9	10.5	2.3	11.2	3.5	10.6	5.7	11.7
	75-79	2.6	8.2	3.6	8	1.3	8.5	2.3	8.1	4.5	8.9
	80-84	1.3	5.5	1.9	5.4	0.4	5.7	1.0	5.3	3.2	6.3
	85+	0.6	3.7	0.9	3.6	0.2	3.8	0.5	3.5	1.1	4.4
	45-49	15.9	30.6	17.8	27.9	13.8	33.4	15.6	30.5	16.5	30.5
	50-54	13.1	26.5	15.1	24.1	10.8	28.9	12.8	26.5	13.7	26.2
Uttarakhand	55-59	10.1	22.4	12.0	20.3	8.0	24.6	9.9	22.5	10.4	22
	60-64	7.7	18.9	9.1	17.1	5.7	20.9	7.4	19	8.1	18.5
	65-69	5.7	15.3	7.2	13.7	3.9	17	5.5	15.4	6.1	15
	70-74	4.4	13	6.0	11.8	2.4	14.1	4.3	13.1	4.4	12.3
	75-79	2.6	10.4	3.5	9.4	1.9	11.3	2.5	10.6	2.6	9.7
	80-84	1.4	9.9	2.9	9	0.5	10.7	1.5	10.3	0.9	8.4
	85+	0.8	8.5	2.5	7.7	0.00	9	0.9	8.9	0.0	6.9
	45-49	13.9	31.1	17.0	30.2	11.0	32.1	11.5	30.2	18.0	32.8
	50-54	11.3	26.7	14.0	26	8.7	27.5	9.1	25.7	15.0	28.4
	55-59	8.7	22.6	11.1	21.9	6.4	23.4	6.9	21.7	11.8	24.2
West Bengal	60-64	6.4	18.8	8.3	18.1	4.5	19.5	5.0	17.9	8.9	20.3
	65-69	4.8	15.3	6.6	14.7	3.0	15.8	3.7	14.5	6.6	16.6
	70-74	3.4	12.3	5.1	11.8	2.0	12.7	2.6	11.6	4.8	13.3

75-79	2.0	9.5	3.1	9.2	1.3	9.8	1.3	9	3.2	10.4
80-84	1.1	7.3	2.1	7.1	0.4	7.5	0.8	6.8	1.5	8
85+	0.9	5.6	1.8	5.5	0.2	5.7	0.9	5.2	1.0	6.1

Note- YoGL= Years of Good Life, LE= Life Expectancy, T= Total, M=Male, F=Female, R=Rural, U=Urban