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Linkages between Living Arrangements, Social Positioning and Economic Conditions with the Physical and Mental Health of the Elderly

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Abstract

This study explores the intersection of living arrangements, socio-economic positioning, and the physical and mental health of elderly individuals in India, using data from the Longitudinal Ageing Study in India (LASI) Wave-1 (2017-18). Analysis reveals marked disparities in functional independence, mobility restrictions and mental health conditions across socio-demographic and economic groups. Advanced age, living alone, low education level and poor economic well-being significantly correlate with higher prevalence of limitations in Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL), mobility issues and chronic morbidities. Mental health outcomes, including depression and cognitive impairment, were notably worse among widowed individuals, those dissatisfied with living arrangements and socio-economically disadvantaged groups. Regional differences highlight varying access to healthcare and social support networks with urban areas showing lower mobility restrictions but higher morbidities than rural regions. Logistic regression and Propensity Score Matching (PSM) confirm these patterns, emphasizing the multifaceted role of socio-economic inequalities. The findings underscore the urgent need for targeted health interventions, enhanced social support systems and policy reforms to address the diverse health challenges faced by India's aging population.

Keywords: *Living Arrangements, social positioning, economic conditions, physical and mental health, elderly.*

I. Introduction

India has emerged as an "aging India" at the beginning of the 21st century (Liebig & Rajan, 2003). According to the United Nations, the criterion for a country to be defined as aging is an elderly population of more than 7 per cent of its population. This means that India has a relatively short time to prepare for the sharp expansion of problems related to health, welfare, housing and long-term care of the older population (Chaudhury, 2004; Rajan, 2001). These include more expenditure on pensions and health care, a heightened need for social security reforms, a shrinking workforce and the shortage of active persons to support a dependent older population.

Studies in developing countries like India show a high level of old-age dependency in terms of economic and physical support because the social protection system is premature (Alam, 2004; Perera, 2004; Rajan, 2004). As a result, workforce participation, for example, is central to supporting oneself, particularly as intergenerational support once the traditional and widespread means of old-age support in India is becoming less common (Bloom et al., 2010). Given that less than 11 per cent of older people in India have access to some sort of pension or social security, economic activity is critical. Additionally, private savings are often difficult or entirely infeasible for many Indians for several reasons: earnings are low, a significant portion of economic activity is informal and may not be tied to cash exchange, and given that 70 per cent of the aging population lives in rural areaswhere bank accounts are often not available (Uppal & Sarma, 2007).

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The aging process has resulted in the emergence of a new epidemiological act as a significant cause of death, disability and lack of mobility (Zwi, 1999; Smith & Bares, 1991). However, the mechanisms by which social networks and social support impact well-being may include individual factors such as psychological and health behaviour pathways (Berkman et al., 2000). In particular, psychological factors such as psychological well-being and life satisfaction are positively associated with social networks and support (Cheng & Chan, 2006; Liu et al., 1995) and can promote or impede individuals' health behaviours. Additionally, health promotion practice is essential for healthy aging and directly relates to positive or optimal health outcomes for the individual in all stages of life (Pender et al., 2006).

However, the exact mechanisms of the positive influence of social networks and social support on well-being remain elusive (Litwin, 2006; Pender et al., 2006). Only a few studies have explained how social networks and social support influence physical and mental health (Seeman et al., 2004; Mittelmark, 1999). Also, the causal relationship between social relations and health is not clearly defined because social networks link to well-being through several pathways (Melchior et al., 2003; Berkman et al., 2000). Pender et al. (2006) state that despite various researches examining the association between social networks, social support and well-being, there are inconsistencies in the findings. Various questions still need to be investigated such as mechanisms of social relations to well-being. Additionally, the relationship between social networks and well-being may vary according to the sociocultural contexts of the community (Litwin, 2006).

The past decade's modernization, urbanization and industrialization have caused a rapid change in Indian society and contributed to social support's weakening structure and function (Alam & Karim, 2006). The available literature has established the relationship between social networking and well-being of the elderly in the western world. However, in the Indian context, there is a lack of literature on the issue. Measuring socio-economic positioning in India will help to understand the situation of the elderly in a patriarchal society. This study is considering several aspects of socio-economic positioning and evaluates its impacts on the mental health of the elderly population in India. Its main purpose is to understand and linkages between the living arrangement and socio-economic positioning (social positioning and economic conditions) through special focus on physical and mental health of the elderly.

II. Materials and methods

Data

The primary data source for this research is the Longitudinal Ageing Study in India (LASI) Wave-1 (2017-18) (IIPS, 2020), encompassing a comprehensive representation of Indian adults and elderly individuals aged 45 and above, along with their spouses residing in the same household, regardless of age. The inclusion of individuals starting from the age of 45 serves multiple purposes: (a) aligning with global surveys such as the Health and Retirement Study (HRS); (b) facilitating the examination of pre-retirement behaviours, recognizing the early shifts in labour market dynamics, health patterns and consumption behaviour before retirement and (c) capturing the early onset of chronic diseases among adults before reaching advanced age.

Consistent with established practices in population-based surveys, LASI focused its sampling frame on the household population, including all age-eligible individuals in LASI eligible households (LEHs). Wave 1 of LASI involved a panel sample of 73,396 individuals aged 45 and above and their spouses, encompassing 31,902 elderly individuals aged 60 and above and 6,880 oldest-old persons aged 75 and above from all 36 states and union territories of India. The data collection process employed Computer-Assisted Personal Interviewing (CAPI)-based schedules administered by trained interviewers with the International Institute for Population Sciences (IIPS), Mumbai acting as the nodal agency overseeing data quality and the collection process.

In pursuit of study's objective, it undertook the construction of variables utilizing the rich dataset provided by LASI. This process involved the transformation and derivation of new variables based on the pre-existing variables within the LASI dataset. The constructed variables were designed to capture nuanced aspects relevant to research goals, ensuring a comprehensive analysis of the factors under investigation. This strategic variable process forms a critical component of methodological approach, enhancing the depth and specificity of study outcomes. The study included several background variables like age, gender, marital status, education, occupation, wealth quantile, living arrangements, caste, religion and place of residence. The major response variables are described below;

Physical health

Evaluation of physical health of the elderly within this study encompasses a holistic approach, utilizing a set of comprehensive variables to provide a nuanced and thorough understanding of their overall well-being. Among these variables, the assessment of mobility restriction serves to illuminate any limitations or constraints in the elderly's ability to move and engage in physical activities. This dimension offers valuable insights into the impact of mobility on their daily lives.

Activities of Daily Living (ADL) form another crucial aspect of the physical health evaluation, delving into the elderly's independence in performing essential tasks like dressing, bathing, eating and personal hygiene. This variable provides a clear snapshot of their functional autonomy and self-care abilities. Complementing this, Instrumental Activities of Daily Living (IADL) further enrich the evaluation by examining their proficiency in managing more complex daily activities such as meal preparation, housekeeping, shopping and financial management. This dimension offers a comprehensive overview of their daily functioning beyond basic self-care tasks. The inclusion of morbidities as a variable adds a crucial layer to the assessment, considering various health conditions or illnesses affecting the elderly. This component contributes to a well-rounded understanding of their physical health status by considering the presence and impact of specific health issues.

By incorporating these multifaceted variables, the assessment of physical health within the study goes beyond a singular metric, offering a comprehensive exploration of the elderly's mobility, functional independence and overall health conditions. This holistic approach ensures a thorough examination of the intricate interplay between various dimensions of physical health among the elderly participants in the context of the study.

Mental health

Mental health within the scope of this study is comprehensively characterized through the dimensions of cognition and depression. These two facets serve as integral components for gauging the mental well-being of the elderly participants. Cognition is a fundamental aspect that delves into various cognitive functions, encompassing memory, reasoning, attention and problem-solving skills. The assessment of cognition offers insights into the cognitive capabilities of the elderly, contributing to a holistic understanding of their mental health. In tandem with cognition, the study also considers depression as a crucial indicator of mental well-being. Depression, a complex mental health condition, is examined to discern the emotional and psychological aspects of the elderly participants. The assessment includes a comprehensive exploration of depressive symptoms, shedding light on potential challenges in emotional well-being.

By concurrently evaluating cognition and depression, the study aims to provide a nuanced and multifaceted perspective on the mental health status of the elderly. This dual approach recognizes the intricate interplay between cognitive functioning and emotional well-being, offering a comprehensive framework for understanding the complexities of mental health in the aging population.

Statistical analysis

As per need of the study, various statistical tools such as descriptive analysis, bivariate, multi-variate analysis, logistic regression and PSM are used in the study.

Logistic regression

The study has used logistic regression to find the probability of occurrence of dependent variable among independent variable or background characteristics.

The logistic regression equation is:

$$\text{Logit (p)} = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots b_kX_k$$

The logit transformation defined as the logged odds: Odds = (p / 1-p) snd Logit (p) = Ln (p/1-p)

Where,

p: the probability of the presence of the characteristic of interest (Dependent variable)

b_0: intercept when there is no effect of any predictor variable on the dependent variable.

b_1, b_2, b_3………… bk are co-efficient of predictor variables.

Propensity score matching

The propensity score-matching technique was used to find the actual prevalence of the mental condition among the elderly caused by physical health after controlling the potential background characteristics. PSM is the statistical technique that estimates the effect of a treatment or intervention by adjusting covariates that predict receiving the treatment or intervention. In this case, PSM reduces the bias due to confounding variables found in estimates of mental condition obtained from comparing outcomes for the elderly with both unhealthy and healthy physical conditions. PSM is based on counterfactual modelling. A counterfactual model is estimated to compute the average treatment effect (i.e., an estimate of physical health). Counterfactual is the potential outcome that we would have obtained in the case of the elderly with an unhealthy physical condition. With the help of the counterfactual model, the average treatment effect on treated (ATT) is estimated as,

$$ATT = E\ (Y1/D = 1) - E\ (Y0/D = 1)$$

Where, E (Y1/D=1) gives the outcome for the elderly with unhealthy physical conditions and E (Y0/D=1) is the expected outcome if the elderly with unhealthy physical conditions becomes an elderly with a healthy physical condition.

Similarly, the average treatment effect on the untreated (ATU) is defined mathematically as:

$$ATU = E\ (Y1/D=0) - E\ (Y0/D=0)$$

Where, E(Y1/D=0) is the expected outcome if the elderly with a healthy physical condition becomes elderly with unhealthy physical conditions, and E(Y0/D=0) is the outcome for the elderly with a healthy physical condition. The average treatment effect (ATE) is the difference between the expected outcome for the elderly with unhealthy physical conditions and the elderly with a healthy physical conditions.

$$ATE = E\ (Y|D = 1) - E\ (Y|D = 0) = \triangle$$

$$\text{We can } \triangle = ATT + E\ (Y0|D = 1) + E\ (Y0\ |D = 0)$$

Other issues that are important in PSM are "common support," "balancing property" and "quality of matching." Common support ensures that migration with the same "X" values has a positive probability of being both migrated and non-migrated (Heckman, et al., 1999). Common support improves the quality of estimates by excluding migration for which there is no matched sample. Balancing property tests whether the matching procedure can balance the distribution of relevant covariates. The quality of matching examines whether the distribution of the propensity score of migrants and non-migrants overlaps. Sirgy (2012) suggests comparing the pseudo – R2 before and after matching. The pseudo -R2 indicates how well the repressors "X" explain the participation probability (Caliendo and Kopeinig 2008). The pseudo-R2 should be fairly low after matching because after matching, there should be no systematic differences in the distribution of covariates between the elderly with LTC and the elderly without LTC. Additionally, an "F" test may be performed. It should not be rejected before and should be rejected after matching (Caliendo and Koeing, 2008). Notably, PSM does not account for a potential hidden bias due to unobserved factors that might affect the estimates of key relationships of interest. More information about the PSM methods used in this study can be found in Rosenbaum and Rubin (1983).

III. Results

Prevalence of ADL & IADL limitations, mobility restrictions and morbidities among the elderly

Table 1 presents a comprehensive view of the prevalence of ADL & IADL limitations among individuals aged 60 and above in India, shedding light on the intricate interplay between demographic factors and functional abilities. Age emerges as a pivotal determinant with a discernible progression of ADL and IADL limitations corresponding to advancing years. Individuals aged 75 and above exhibit significantly higher rates of ADL and IADL limitations, with figures reaching 38.6 per cent and 64.3 per cent respectively, underlining the pronounced impact of aging on functional independence. Living arrangement proves to be another influential factor with those residing alone or solely with children displaying elevated rates of limitations. For instance, ADL limitations are higher among individuals living alone at 27.3 per cent, while IADL limitations reach 59.5 per cent in the same group, underscoring the significance of familial support structures. Educational attainment emerges as a defining variable with individuals completing 10 or more years of education showcasing lower rates of ADL and IADL limitations. The data indicates a substantial contrast with ADL limitations standing at 15.9 per cent and IADL limitations at 27.1 per cent among this cohort, suggesting a potential link between education and functional independence in later life. Work status also emerges as a noteworthy predictor with currently employed individuals exhibiting lower rates of ADL and IADL limitations compared with their retired or unemployed counterparts. This disparity highlights the potential benefits of continued engagement in productive activities for maintaining functional abilities among the elderly population. Marital status and satisfaction with living arrangements further delineate variations in ADL and IADL limitations. Widowed individuals and those expressing dissatisfaction with their living conditions manifest higher rates of limitations, underscoring the importance of social support structures and environmental factors in maintaining functional independence. Regional disparities are also evident with the western region exhibiting higher rates of ADL and IADL limitations compared with other regions. This hints at potential differences in access to healthcare services and social support networks across different geographical areas. In short, the data underscores the multifaceted nature of factors influencing ADL and IADL limitations among the elderly in India, emphasizing the need for targeted interventions aimed at enhancing functional independence and improving overall quality of life in later years. The Table also provides a comprehensive examination of mobility restrictions and morbidities among individuals aged 60 and above in India, delineated by various key demographic and socio-economic factors. Age group emerges as a significant determinant, revealing an increase in the prevalence of mobility restrictions and morbidities with advancing age. Notably, individuals aged 75 and above exhibit the highest rates with a staggering 86.0 per cent of them experiencing mobility restrictions and 57.3 per cent coping with morbidities, highlighting the profound impact of aging on physical health. Living arrangement plays a pivotal role, with those living alone or solely with children displaying elevated rates of mobility restrictions and morbidities. For instance, individuals living alone face mobility restrictions at 80.8 per cent, while those living with children (without a spouse) experience morbidities at 56.2 per cent, emphasizing the importance of familial support structures in mitigating health challenges. Residential status reveals distinct patterns with urban areas showing higher rates of mobility restrictions and morbidities compared with rural counterparts. This disparity may reflect differences in lifestyle, environmental factors and access to healthcare services between urban and rural settings. Marital status and satisfaction with living arrangements further underscore their impact on health outcomes. Widowed individuals and those expressing dissatisfaction with their living conditions exhibit higher rates of mobility restrictions and morbidities, emphasizing the crucial role of social support networks and living environments in promoting health and well-being. Educational attainment emerges as a critical predictor with individuals completing 10 or more years of education exhibiting lower rates of mobility restrictions and higher rates of morbidities. Notably, the prevalence of mobility restrictions stands at 66.9 per cent, and morbidities at 66.7 per cent among this educated cohort, suggesting a potential link between education and improved physical health outcomes in later life. Work status and regional disparities also contribute to variations in health outcomes. Currently employed individuals and certain regions exhibit lower rates of mobility restrictions and morbidities indicating potential differences in lifestyle factors, occupational hazards and healthcare access across regions.

Table 1: Prevalence of ADL & IADL limitations, mobility restrictions and morbidities among elderly aged 60 and above by their background characteristics, India, LASI wave-1, 2017-18

Background characteristics	Physical health problem								N
	ADL (+1)	ADL (+2)	IADL (+1)	IADL (+2)	M. (+1)	M. (+2)	Mo. (+1)	M-Mo (+2)	
Age group (years)									
60 – 64	15.9	8.1	37.5	25.8	67.8	57.1	48.3	21.3	10238
65 – 69	19.6	10.4	44.4	32.2	71.9	63.7	53.7	24.4	8924
70 – 74	25.0	15.1	52.7	41.8	81.9	74.1	56.3	26.4	5792
75+	38.6	26.3	64.3	55.9	86.0	80.7	57.3	25.3	6856
Living arrangement									
Living alone	27.3	16.5	59.5	48.8	80.8	74.9	55.3	23.5	1625
Living with spouse	21.5	12.7	43.6	31.3	71.3	63.9	53.2	24.3	6219
Living with spouse & children	20.3	10.8	40.3	29.3	70.8	61.1	51.5	22.8	13689
Living with children (without spouse)	28.7	19.0	58.9	49.3	83.8	77.0	56.2	26.5	8538
Living with others	29.0	17.1	60.0	47.8	82.3	72.7	51.4	21.1	1739
Residence									
Rural	24.4	14.7	51.6	40.2	76.2	68.1	47.4	19.1	21041
Urban	22.2	12.9	40.5	30.7	74.5	66.1	68.0	36.0	10769
Marital status									
Currently married	20.8	11.5	41.5	30.1	71.1	62.1	52.2	23.3	20154
Widowed	28.9	18.8	59.8	49.6	83.8	76.9	55.9	25.6	10816
Others	24.0	13.0	52.5	42.1	72.3	62.7	45.3	18.9	840
Religion									
Hindu	23.5	13.8	48.3	37.7	75.3	67.2	52.3	23.3	23230
Muslim	26.2	15.9	49.0	38.4	78.7	70.9	58.4	27.0	3720
Others	23.3	15.4	47.6	32.4	75.9	65.8	58.5	29.3	4860
Caste									
Schedule tribe	25.6	15.5	50.8	38.6	78.0	70.2	49.8	19.6	5144
Schedule caste	19.8	11.2	44.9	35.2	69.3	60.8	34.4	11.2	5319
Other backword classes	23.0	13.2	50.5	40.5	75.6	66.8	54.2	25.2	12101
None of the above	24.9	15.6	44.2	32.3	76.2	68.8	60.1	29.1	9246
Education									
No schooling	26.2	16.0	56.7	45.9	77.8	70.3	47.2	18.4	17155
Less than 5 years	29.3	17.0	49.1	36.4	80.5	73.0	58.5	26.4	3826
5 - 9 years	18.6	11.2	37.8	27.0	72.9	64.3	59.4	30.2	6044
10 or more years	15.9	8.0	27.1	17.1	66.9	55.8	66.7	37.2	4785
Work status									
Currently working	13.6	5.5	35.1	21.9	64.9	52.7	39.9	13.6	9346
Worked in past but currently not working	30.0	18.8	54.2	44.1	80.3	73.7	58.8	27.3	13428
Never worked	25.7	16.7	54.3	44.8	81.0	74.9	60.4	31.0	9036
Satisfied with living arrangement									
Strongly satisfied	16.3	8.2	34.3	24.2	68.7	60.3	50.8	20.9	6590
Satisfied	23.1	13.3	47.5	35.6	75.7	66.7	53.3	23.6	17656
Neither satisfied nor dissatisfied	26.4	16.2	57.3	47.2	80.0	73.3	53.0	26.0	5293
Dissatisfied	33.2	22.2	64.7	54.2	84.2	77.0	59.5	29.5	1212
Strongly dissatisfied	34.5	21.9	70.3	56.7	87.6	80.8	58.1	27.6	228
Region									
North	14.0	8.8	41.5	30.0	67.1	59.2	57.4	24.4	5799
Central	20.6	11.7	44.0	34.8	71.0	63.5	37.6	13.5	4259
East	28.8	17.6	51.2	40.3	81.4	73.2	50.0	22.9	5749
Northeast	17.0	8.9	40.7	33.0	75.1	67.3	46.7	16.2	4176
West	32.4	19.4	45.5	31.0	78.9	70.7	60.4	27.8	4282
South	21.2	12.6	56.5	46.5	76.7	67.6	65.1	33.1	7545
India	24.0	14.2	48.0	37.4	75.7	67.5	52.4	24.1	31810

Note: ADL-Activities of Daily Living, IADL- Instrumental Activities of Daily Living, M.- Mobility, Mo.-Morbidity, and M-Mo-Multi-morbidity.

Table 2 provides insights into the adjusted odds ratios for ADL, IADL, mobility restrictions and morbidities by their various socio-economic factors influence the functional independence and daily living capabilities among elderly individuals aged 60 and above in India based on data from the LASI wave-1 in 2017-18. Living arrangement emerges as a significant factor influencing ADL and IADL limitations. Elderly individuals living with children (without a spouse) demonstrate higher odds of experiencing ADL and IADL limitations compared with those living alone with odds ratios ranging from 1.19 to 1.4. Satisfaction with living arrangement is found to be strongly associated with ADL/IADL limitations. Those expressing dissatisfaction, particularly those strongly dissatisfied, exhibit substantially higher odds of experiencing ADL and IADL limitations compared with those who are strongly satisfied. The odds ratios for dissatisfaction range from 2.41 to 3.56, indicating a significant impact on functional independence. Advancing age is predictably associated with increased odds of ADL and IADL limitations. Individuals aged 75+ demonstrate the highest odds of functional limitations compared with those aged 60-64 serving as the reference category. Additionally, residing in urban areas is associated with lower odds of ADL and IADL limitations compared with rural areas. Gender differences are evident with females consistently demonstrating higher odds of ADL and IADL limitations compared with males across all categories. However, there are no significant differences in the odds of ADL or IADL limitations between currently married individuals and those who are widowed or have other marital statuses. Various other demographic and socio-economic factors such as religion, caste, education, work status, MPCE quintile, number of living children, age at first marriage and region also exhibit association with ADL and IADL limitations. These findings underscore the complex interplay of multiple determinants in shaping the functional independence of older adults emphasizing the need for targeted interventions to enhance the quality of life and well-being. In short, the study highlights the importance of considering diverse background characteristics in understanding and addressing the functional limitations experienced by the elderly population, providing valuable insights for policymakers and healthcare professionals aiming to improve the lives of older adults in India. The findings also reveal that the living arrangement significantly impacts mobility restrictions and morbidities among the elderly. Living alone serves as the reference category with individuals living with children demonstrating higher odds of experiencing mobility limitations and morbidities, particularly those living with children without spouses. For instance, individuals living with children (without spouses) exhibit adjusted odds ratios ranging from 1.31 to 1.28 across different categories, indicating a higher likelihood of both mobility restrictions and morbidities compared with those living alone. Moreover, satisfaction with living arrangements emerges as a crucial factor affecting mobility and morbidity outcomes. The analysis indicates that dissatisfaction, especially strong dissatisfaction, is associated with higher odds of mobility restrictions and morbidities, highlighting the importance of subjective well-being in maintaining functional independence. For example, individuals who are strongly dissatisfied with their living arrangements demonstrate significantly higher odds ratios ranging from 2.93 to 1.97 across different categories, emphasizing the profound impact of dissatisfaction on mobility and morbidity outcomes. Age is another critical determinant, with advancing age correlating with increased odds of mobility restrictions and morbidities. Individuals aged 75 and above exhibit the highest odds of both mobility limitations and morbidities compared with those aged 60-64. For instance, individuals in the 75+ age group demonstrate adjusted odds ratios ranging from 2.46 to 1.19 across different categories, indicating a substantially higher likelihood of experiencing mobility restrictions and morbidities with increasing age. Gender disparities are evident with females consistently demonstrating higher odds of both mobility restrictions and morbidities compared with males across all categories. For instance, females exhibit adjusted odds ratios ranging from 1.59 to 1.13 across different categories indicating a higher likelihood of experiencing mobility restrictions and morbidities compared with males. Marital status, religion, caste, education, work status, economic status, number of living children, age at first marriage and region also exhibit significant associations with mobility restrictions and morbidities among the elderly population. These findings underscore the complex interplay of demographic, socio-economic and cultural factors in shaping mobility and morbidity outcomes among the older adults. Such insights are crucial for informing targeted interventions aimed at promoting healthy aging and enhancing the quality of life for the older adults.

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Table 2: Adjusted odds ratio for ADL & IADL, mobility restrictions and morbidities among older adults aged 60 and above by their background characteristics, India, LASI wave-1, 2017-18

Background characteristics	Physical health problem							
	ADL (+1)	ADL (+2)	IADL (+1)	IADL (+2)	M. (+1)	M. (+2)	Mo. (+1)	M-Mo (+2)
Age group (years)								
60 – 64®	1	1	1	1	1	1	1	1
65 – 69	1.2(1.1-1.3)a	1.2(1.1-1.3)a	1.2 (1.2-1.3)a	1.2 (1.6-1.3)a	1.2 (1.2-1.3)a	1.2 (1.2-1.3)a	1.2 (1.1-1.3)a	1.2 (1.1-1.2)a
70 – 74	1.6(1.4-1.7)a	1.6(1.4-1.8)a	1.6 (1.5-1.7)a	1.6 (1.5-1.8)a	1.7 (1.6-1.9)a	1.7 (1.6-1.8)a	1.3 (1.2-1.4)a	1.3 (1.2-1.4)a
75+	2.4(2.2-2.6)a	2.8(2.5-3.1)a	2.5(2.3-2.6)a	2.8(2.6-3.0)a	2.5(2.3-2.7)a	2.6(2.4-2.8)a	1.3(1.16-1.4)a	1.2(1.1-1.3)a
Living arrangement								
Living alone®	1	1	1	1	1	1	1	1
Living with spouse	1.0 (0.7-1.4)	1.2 (0.7-1.8)	1.3 (1.0-1.8)c	1.1 (0.8-1.4)	1.3 (0.9-1.8)	1.2 (0.9-1.6)	1.4 (1.1-1.9)b	1.2(0.9-1.7)
Living with spouse & children	1.0 (0.7-1.4)	1.2 (0.8-1.9)	1.5 (1.1-2.0)b	1.2 (0.9-1.7)	1.4 (1.0-1.9)b	1.2 (0.9-1.7)	1.5 (1.1-2.0)a	1.4 (1.0-1.9)c
Living with children (without spouse)	1.2(1.0-1.4)b	1.3(1.1-1.5)a	1.3 (1.1-1.5)a	1.4 (1.2-1.6)a	1.3 (1.1-1.5)a	1.2 (1.1-1.4)a	1.2 (1.1-1.4)a	1.3(1.1-1.5)a
Living with others	1.2 (1.0-1.4)	1.1 (0.9-1.4)	1.3 (1.1-1.6)a	1.3 (1.1-1.6)a	1.4 (1.1-1.7)a	1.2 (1.0-1.4)b	1.3 (1.1-1.5)a	1.4 (1.2-1.7)a
Residence								
Rural®	1	1	1	1	1	1	1	1
Urban	1.0 (0.9-1.0)	1.0 (0.9-1.1)	0.8 (0.7-0.8)a	0.7 (0.7-0.8)a	0.9 (0.8-0.9)a	0.9 (0.8-0.9)a	1.6 (1.5-1.7)a	1.7 (1.6-1.8)a
Marital status								
Currently married®	1	1	1	1	1	1	1	1
Widowed	1.0 (0.7-1.3)	1.1 (0.7-1.6)	1.3 (1.0-1.8)c	1.0 (0.8-1.4)	1.3 (1.0-1.8)c	1.2 (0.9-1.7)	1.2 (0.9-1.6)	1 (0.7-1.4)
Others	0.9 (0.6-1.4)	1.2 (0.7-2.1)	1.3 (0.9-1.8)	1.1 (0.8-1.6)	1.1 (0.8-1.6)	1.2 (0.8-1.7)	1.0 (0.7-1.4)	0.8 (0.5-1.2)
Religion								
Hindu®	1	1	1	1	1	1	1	1
Muslim	1.1 (1.0-1.2)	1.1(1.0-1.2)	1.2 (1.0-1.2)	1.1(1.0-1.2)b	1.2 (1.1-1.3)a	1.2 (1.1-1.4)a	1.3 (1.2-1.4)a	1.4 (1.3-1.5)a
Others	0.9 (0.8-1.0)	1.0 (0.9-1.1)	0.9 (0.9-1.0)c	0.8 (0.7-0.9)a	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.2 (1.1-1.3)a	1.3 (1.2-1.4)a
Caste								
Schedule tribe®	1	1	1	1	1	1	1	1
Schedule caste	0.9(0.8-1.0)b	0.9(0.7-1.0)b	0.9 (0.8-1.0)a	1.0 (0.9-1.1)	0.7 (0.6-0.8)a	0.8 (0.7-0.9)a	0.6 (0.6-0.7)a	0.7 (0.6-0.8)a
Other backword classes	1.0 (0.9-1.1)	0.9(0.8-1.0)c	1.0 (1.0-1.1)	1.1(1.0-1.2)b	0.9 (0.9-1.0)c	1.0 (0.9-1.0)	1.0 (1.0-1.1)	1.1 (1.0-1.1)
None of the above	1.1 (1.0-1.2)	1.1(1.0-1.2)	1.1(1.0-1.2)b	1.1(1.0-1.2)a	1.1(1.0-1.2)c	1.2(1.1-1.3)a	1.1(1.0-1.2)b	1.2(1.1-1.3)a
Education								
No schooling®	1	1	1	1	1	1	1	1
Less than 5 years	1.1(1.0-1.2)c	1.0(0.9-1.1)	0.9(0.7-0.9)a	0.7(0.7-0.8)a	1.2(1.1-1.3)a	1.2(1.1-1.3)a	1.4(1.3-1.5)a	1.4(1.3-1.6)a
5 - 9 years	0.9(0.9-1.0)c	0.9(0.8-1.0)b	0.6(0.6-0.6)a	0.6(0.5-0.6)a	1.0(0.94-1.1)	1.0(0.91-1.1)	1.4(1.3-1.5)a	1.5(1.4-1.7)a
10 or more years	0.7(0.7-0.8)a	0.6(0.6-0.8)a	0.4(0.4-0.4)a	0.4(0.3-0.4)a	0.8(0.7-0.8)a	0.7(0.7-0.8)a	1.7(1.6-1.9)a	1.8(1.6-2.0)a
Work status								
Currently working®	1	1	1	1	1	1	1	1
Worked in past but currently not working	2.2(2.0-2.4)a	2.9(2.5-3.2)a	1.7(1.6-1.8)a	2.1(1.9-2.2)a	1.8(1.7-1.9)a	2.0 (1.9-2.2)a	1.8 (1.7-1.9)a	2.0 (1.9-2.2)a
Never worked	2.0(1.8-2.2)a	2.7(2.4-3.1)a	1.3(1.2-1.4)a	1.6(1.5-1.7)a	1.5(1.4-1.6)a	1.6(1.5-1.8)a	1.8(1.7-1.9)a	2.1(1.9-2.3)a
Satisfied with living arrangement								
Strongly satisfied®	1	1	1	1	1	1	1	1
Satisfied	1.3(1.2-1.4)a	1.5(1.4-1.7)a	1.4 (1.3-1.5)a	1.4 (1.3-1.6)a	1.2 (1.1-1.3)a	1.3 (1.2-1.4)a	1.1 (1.0-1.1)b	1.1(1.0-1.2)b
Neither satisfied nor dissatisfied	1.9(1.7-2.1)a	2.4(2.1-2.7)a	1.9 (1.7-2.1)a	2.0 (1.8-2.2)a	1.6 (1.4-1.7)	1.7 (1.5-1.8)a	1.2 (1.1-1.3)a	1.3 (1.2-1.4)a
Dissatisfied	2.4(2.1-2.8)a	3.2(2.7-3.9)a	2.6 (2.3-3.0)a	2.9 (2.5-3.3)a	2.3 (2.0-2.8)a	2.3 (2.0-2.7)a	1.6 (1.4-1.8)a	1.7 (1.5-2.0)a
Strongly dissatisfied	2.8(2.1-3.8)a	4.4(3.2-6.2)a	3.1 (2.3-4.2)a	3.6 (2.7-4.8)a	2.9 (1.9-4.4)a	2.7 (1.9-3.8)a	1.6 (1.2-2.1)a	2.0 (1.4-2.7)a
Region								
North®	1	1	1	1	1	1	1	1
Central	1.2(1.1-1.4)a	1.2(1.0-1.4)b	0.9 (0.8-1.0)c	1.0 (0.9-1.1)	1.1 (1.0-1.2)b	1.2 (1.1-1.3)a	0.6 (0.5-0.6)a	0.6 (0.6-0.7)a
East	1.9(1.7-2.1)a	1.7(1.5-1.9)a	1.2 (1.1-1.3)a	1.3 (1.2-1.4)a	2.0 (1.8-2.2)a	1.9 (1.8-2.1)a	0.9 (0.8-0.9)a	1.1 (1.0-1.2)
Northeast	0.9 (0.8-1.0)b	0.8(0.7-1.0)b	0.8 (0.7-0.9)a	1.0 (0.9-1.1)	1.1 (1.0-1.3)b	1.1 (1.0-1.2)b	0.7 (0.7-0.8)a	0.7 (0.6-0.8)a
West	2.7 (2.5-3.0)a	2.5(2.2-2.8)a	1.1 (1.0-1.2)b	1.0 (0.9-1.2)	1.8 (1.7-2.0)a	1.6 (1.5-1.8)a	1.2 (1.1-1.3)a	1.3 (1.2-1.4)a
South	1.3 (1.2-1.4)a	1.3(1.2-1.5)a	1.4 (1.3-1.5)a	1.5 (1.4-1.6)a	1.4 (1.3-1.6)a	1.3 (1.2-1.4)a	1.5 (1.4-1.6)a	1.8 (1.6-1.9)a

Note: ADL-Activities of Daily Living, IADL- Instrumental Activities of Daily Living, M.- Mobility, Mo.-Morbidity, and M-Mo-Multi-morbidity. ®: Reference category; a= P<0.01; b= P<0.05; c = P<0.1

Table 3 provides an examination of the prevalence of ADL, IADL, mobility restrictions and morbidities among individuals aged 60 and above in India categorized by various socio-economic positioning indicators. ADL encompasses essential self-care tasks crucial for independent living such as bathing, dressing, eating, toileting, transferring and continence, while IADL pertains to more complex activities facilitating autonomous community living including managing finances, transportation, shopping, meal preparation, housework and communication device usage. Higher prevalence rates of ADL and IADL limitations indicate increased difficulty in performing these tasks without assistance which may impact individuals' autonomy and societal participation. For instance, individuals categorized as "very low" in terms of economic well-being exhibit notably higher prevalence rates of ADL and IADL limitations compared with those classified as "very high." Specifically, within the "very low" category, the prevalence of ADL (+1) is recorded at 34.3 per cent, ADL (+2) at 23.2 per cent, IADL (+1) at 63.6 per cent, and IADL (+2) at 23.2 per cent, indicating significant functional impairments in both basic and instrumental daily activities. Moreover, disparities in ADL and IADL limitations are evident across other socio-economic indicators. Individuals with poor decision-making abilities characterized by scores falling within the "01 - 10 (poor)" range, demonstrate significantly higher prevalence rates of ADL and IADL limitations compared with those categorized in the "31 and above (best)" range. Similarly, individuals with low social support, measured by the absence of support or having only one source of support, exhibit higher prevalence rates of ADL and IADL limitations compared with those with two or more sources of support. These findings underscore the complex interplay between socio-economic factors and functional autonomy among the elderly population. By understanding the nuanced relationship between socio-economic positioning indicators and ADL/IADL limitations, policymakers and healthcare practitioners can develop targeted interventions to mitigate functional impairments and enhance the overall well-being of the older adults. Mobility restrictions, denoting limitations in physical movement and morbidities encompassing the presence of diseases or health conditions are pivotal factors influencing the well-being of the elderly population. Analysing their prevalence across diverse socio-economic groups facilitates the identification of disparities and informs targeted interventions to enhance the health outcomes of older adults. Significant disparities emerge across socio-economic indicators revealing distinct patterns in the prevalence of mobility restrictions and morbidities. Individuals classified under the "very low" socio-economic category exhibit markedly higher prevalence rates of mobility restrictions and morbidities compared with those categorized under the "very high" bracket. Specifically, within the "very low" category, the prevalence of mobility restrictions (+1) stands at 85.3 per cent, mobility restrictions (+2) at 80.4 per cent, morbidity (+1) at 54.9 per cent and multi-morbidity (+2) at 26.9 per cent.

Furthermore, variations are evident across additional socio-economic indicators such as social support, decision-making ability, social activity, economic well-being and work environment. Individuals experiencing poor social support, decision-making ability or economic well-being tend to exhibit higher prevalence rates of mobility restrictions and morbidities compared with those with better socio-economic positioning. For instance, among those with poor decision-making ability (scores falling within the "01 - 10 (poor)" range), substantially elevated prevalence rates of mobility restrictions and morbidities are observed compared with individuals categorized in the "31 and above (best)" range. Similarly, individuals with inadequate social support or limited social activity demonstrate heightened prevalence rates of mobility restrictions and morbidities emphasizing the impact of social determinants on health outcomes in older adults. Moreover, disparities in mobility restrictions and morbidities are apparent across various dimensions of economic well-being and work environment. Individuals with poor economic well-being or unfavourable work environment exhibit elevated prevalence rates of mobility restrictions and morbidities compared with those with higher economic standing or better work conditions. These findings underscore the imperative of addressing socio-economic inequalities in health outcomes among the elderly populace. Tailoring interventions to mitigate disparities and enhance access to healthcare services among vulnerable socio-economic groups is paramount for promoting healthy aging and fostering improved quality of life for the older adults in India.

Table 3. Prevalence of ADL & IADL limitations, mobility restrictions and morbidities among elderly aged 60 and above by their socio-economic positioning indicators, India, LASI wave-1, 2017-18

Socio-economic positioning (SEP)	Physical health problem								
	ADL (+1)	ADL (+2)	IADL (+1)	IADL (+2)	M. (+1)	M. (+2)	Mo. (+1)	M-Mo (+2)	N
SEP combined score									
Very low (poor)	34.3	23.2	63.6	23.2	85.3	80.4	54.9	26.9	7597
Low	21.9	13.4	52.5	13.4	78.0	71.1	53.7	24.3	6749
Middle	18.5	9.2	43.1	9.2	73.6	64.0	52.1	22.4	5822
High	16.6	8.1	35.7	8.1	68.4	57.9	51.5	20.4	5398
Very high (best)	13.4	5.0	26.6	5.0	62.7	49.7	50.7	23.1	4831
Social support									
No support (poor)	23.0	14.0	47.4	14.0	74.9	66.6	52.5	23.6	24698
One support	27.6	14.9	53.1	14.9	79.8	72.3	55.0	25.0	4112
Two & more support (best)	22.6	13.6	49.5	13.6	77.8	69.3	57.7	27.4	2534
Decision making ability									
01-10 (poor)	39.4	28.5	65.0	28.5	84.9	80.0	59.3	29.1	7706
11–20	20.2	11.2	51.0	11.2	78.6	70.9	54.2	25.0	9445
21–31	18.3	8.7	38.5	8.7	71.2	60.4	50.6	20.8	9411
31 & above (best)	13.7	5.9	31.7	5.9	62.0	51.6	45.9	19.2	4831
Social activity									
00–05 (poor)	30.0	19.8	57.8	19.8	78.8	72.3	45.0	18.3	9016
06–10	23.6	14.1	51.1	14.1	77.3	68.8	52.8	22.7	8910
11–15	21.1	11.7	43.4	11.7	76.3	66.9	56.9	24.8	6117
16 & above (best)	15.9	7.3	34.2	7.3	68.8	59.2	63.9	34.3	7349
Social network									
Less than 10 (poor)	26.6	17.2	54.3	17.2	78.3	71.3	52.5	24.0	16284
10–19	20.5	10.5	43.1	10.5	74.3	64.9	53.4	23.7	9614
20–29	20.9	10.7	39.1	10.7	72.4	61.0	55.8	23.5	3208
30 & above (best)	14.5	7.1	31.7	7.1	64.1	55.0	56.4	26.5	2196
Psychological measure									
0 score (best)	20.1	11.4	41.0	11.4	72.2	62.6	52.6	23.3	8,803
1-2	21.8	12.4	46.3	12.4	74.7	66.1	51.8	22.6	14,509
3-6	26.4	16.8	54.6	16.8	80.2	73.5	53.7	26.4	4,323
7-15	29.2	17.9	61.4	17.9	82.9	76.3	57.3	26.4	2,279
16 & above (poor)	22.2	12.4	46.7	12.4	71.5	66.6	56.9	28.0	838
Self-containment									
00-20 (poor)	34.7	23.9	62.9	23.9	85.0	77.7	57.2	24.4	1,000
21-30	29.4	19.0	57.8	19.0	80.6	72.0	54.1	25.4	3,559
31-40	22.8	13.5	47.0	13.5	74.5	67.2	50.3	21.6	10,547
41-50	21.1	11.3	47.5	11.3	74.9	66.6	52.8	24.4	10,848
51 & above (best)	16.4	8.7	35.2	8.7	71.9	61.2	57.1	26.0	4,745
Economic wellbeing									
0 score (poor)	25.7	16.7	54.3	16.7	81.0	74.9	60.4	30.9	8,998
1-2	29.0	17.9	52.9	17.9	79.7	72.9	57.8	26.7	13,663
3-5	13.0	5.7	34.4	5.7	63.8	51.8	41.5	15.2	6,518
6 & above (best)	17.6	7.9	41.2	7.9	68.6	56.3	38.8	11.6	2,548
Work environment									
00 score (poor)	27.4	18.3	56.0	18.3	81.4	75.4	60.7	31.1	9,398
09-17	25.7	16.5	50.1	16.5	72.3	66.4	49.2	18.2	1,899
18-24	23.1	12.7	45.4	12.7	74.3	65.4	49.0	20.3	11,968
26-31	17.5	9.1	41.2	9.1	71.4	60.0	49.8	21.4	6,404
31 & above (best)	30.2	18.9	54.3	18.9	77.0	70.7	64.8	31.3	2,058
Economic & work wellbeing									
00 score (poor)	25.7	16.7	54.3	16.7	81.0	74.9	60.4	30.9	8998
01-20	32.3	22.5	59.1	22.5	81.2	75.6	55.7	23.3	3517
21-39	21.8	11.7	43.7	11.7	73.1	64.1	49.5	20.9	13671
31-49	15.9	7.6	38.7	7.6	67.3	54.4	45.9	18.4	4357
41 & above (best)	34.5	22.1	61.8	22.1	83.2	77.4	69.7	35.8	1184
Food security									
Less than 3 (poor)	35.5	22.0	60.9	22.0	82.8	77.1	52.6	22.8	2010
4	23.4	15.1	46.9	15.1	75.5	67.0	53.8	25.2	12593
5 (best)	22.2	12.4	47.5	12.4	74.8	66.5	53.1	23.3	16878
India	23.8	14.2	48.4	14.2	75.7	67.5	53.4	24.1	

Note: ADL-Activities of Daily Living, IADL- Instrumental Activities of Daily Living, M.- Mobility, Mo.-Morbidity, and M-Mo-Multi-morbidity.

Table 4 presents a comprehensive overview of depression prevalence measured using CES-D and CIDI-SF scales alongside cognition status among individuals aged 60 and above in India stratified by various demographic and socio-economic factors. Age group emerges as a salient factor revealing a progressive increase in depression prevalence with advancing age. Notably, individuals aged 75 and above exhibit the highest rates with depression prevalence reaching 34.2 per cent (CES-D) and

9.5 per cent (CIDI-SF), indicating an impact of age on mental health. Additionally, cognition prevalence shows an increasing trend with age with individuals aged 75 and above having a cognition prevalence of 26.6 per cent. Living arrangement plays a pivotal role with those living alone or solely with children demonstrating elevated depression prevalence. For instance, individuals living alone experience depression prevalence of 46.0 per cent (CES-D) and 12.9 per cent (CIDI-SF) highlighting the importance of social support structures in mental well-being. Similarly, cognition prevalence is lower among those living alone (22.7%), indicating potential correlations between living arrangements and cognitive health. Residential status reveals disparities with urban areas exhibiting slightly lower depression prevalence compared with rural areas. This difference may reflect variations in lifestyle, access to mental health services and social support networks between urban and rural settings. Interestingly, cognition prevalence is higher in rural areas (17.9%) compared with urban areas (8.1%), suggesting potential environmental or lifestyle influences on cognitive health. Marital status and satisfaction with living arrangements further highlight their association with depression prevalence. Widowed individuals and those expressing dissatisfaction with their living conditions exhibit higher depression rates, underlining the importance of social connectedness and environmental factors in mental health outcomes. Similarly, cognition prevalence tends to be lower among those dissatisfied with their living arrangements, indicating a potential link between satisfaction with living conditions and cognitive health. Educational attainment emerges as a critical predictor with higher education levels associated with lower depression prevalence. Individuals with 10 or more years of education exhibit lower depression rates suggesting a potential protective effect of education on mental well-being. However, the relationship between education and cognition is less straightforward with individuals completing fewer than five years of education exhibiting the lowest cognition prevalence (7.7%). In brief, the findings underscore the multifaceted nature of factors influencing depression prevalence and cognition among the elderly in India. Targeted interventions aimed at promoting mental health and cognitive well-being must consider these diverse demographic and socio-economic dynamics to effectively address the unique needs of aging population.

Table 5 presents a comprehensive analysis of the prevalence of depression (assessed using CES-D and CIDI-SF) and cognition among individuals aged 60 and above in India, stratified by various background characteristics. Depression and cognitive health are critical components of mental well-being in the elderly population, and understanding their prevalence across different socio-economic positioning variables is essential for tailored interventions and policy formulation aimed at improving mental health outcomes. Across socio-economic positioning variables, notable disparities in depression prevalence are observed. Individuals categorized under the "very low" socio-economic stratum exhibit the highest prevalence rates of depression with a CES-D prevalence of 41.7 per cent and a CIDI-SF prevalence of 11.7 per cent. Conversely, those classified under the "very high" category demonstrate the lowest prevalence rates of depression with CES-D and CIDI-SF prevalence of 18.6 per cent and 5.1 per cent respectively.

Moreover, variations in depression prevalence are evident across other background characteristics such as social support, decision-making ability, social activity, social network, psychological measures, self-containment, economic well-being, work environment, economic and work well-being, and food security. For instance, individuals with poor psychological measures, characterized by higher scores indicative of poorer mental health, exhibit elevated prevalence rates of depression compared with those with better psychological measures. Similarly, individuals with limited social support networks and lower decision-making ability tend to experience higher rates of depression. Furthermore, disparities in cognition prevalence are notable across socio-economic positioning variables. Individuals classified under the "very low" socio-economic stratum demonstrate the highest prevalence of cognitive impairment with a prevalence of 30.2 per cent. Conversely, those categorized under the "very high" category exhibit the lowest prevalence of cognitive impairment at 2.0 per cent.

Table 4. Prevalence of depression (CESD and CIDI-SF) and cognition among elderly aged 60 and above by their background characteristics, India, LASI wave-1, 2017-18

Background characteristics	Mental health condition				
	Depression			Cognition	
	CES-D	CIDI-SF	N	Percent	N
Age group (years)					
60-64	28.8	8.3	10111	9.4	8997
65-69	28.9	7.9	8787	12.0	7794
70-74	29.9	7.7	5661	16.2	4970
75+	34.2	9.5	6505	26.6	5459
Living arrangement					
Living alone	46.0	12.9	1599	22.7	1361
Living with spouse	29.5	8.2	6031	11.4	5346
Living with spouse and children	26.2	7.2	13535	9.2	12020
Living with children (without spouse)	31.6	8.6	8287	23.4	7132
Living with others only	39.8	11.2	1612	25.8	1361
Residence					
Rural	31.4	9.3	20555	17.9	17880
Urban	27.4	6.0	10509	8.1	9340
Marital status					
Currently married	27.3	7.5	19801	9.9	17573
Widowed	34.8	9.8	10455	24.0	8975
Others	36.7	6.7	808	17.9	672
Religion					
Hindu	30.5	8.3	22706	14.7	19733
Muslim	31.3	9.3	3622	16.1	3268
Others	25.1	7.3	4736	17.9	4219
Caste					
Schedule tribe	34.9	9.8	5022	18.9	4390
Schedule caste	27.5	4.8	5184	31.0	4609
Other backword classes	30.0	8.8	11836	12.9	10134
None of the above	28.1	7.7	9022	11.3	8087
Education					
No schooling	34.1	9.3	16680	24.7	14330
Less than 5 years completed	29.1	9.4	3751	7.7	3360
5 - 9 years completed	25.9	7.1	5929	1.6	5306
10 or more years completed	20.9	5.3	4704	0.5	4224
Work status					
Currently working	27.0	7.6	9254	9.9	8276
Ever worked	32.4	9.6	13008	16.7	11375
Never worked	30.5	7.2	8802	18.7	7569
Satisfied with living arrangement					
Strongly satisfied	20.1	6.1	6591	9.8	5908
Satisfied	26.9	6.8	17649	14.2	15603
Neither satisfied nor dissatisfied	42.5	10.5	5295	19.3	4447
Dissatisfied	56.0	21.9	1212	27.5	979
Region					
North	27.5	6.6	5701	16.0	4959
Central	35.9	14.3	4133	12.4	3447
East	31.7	8.2	5619	17.9	5073
Northeast	18.6	5.4	4067	19.2	3659
West	20.7	7.3	4178	15.8	3695
South	33.8	5.1	7366	12.2	6387
India	30.2	8.3		15.0	

These findings underscore the significant impact of socio-economic factors on cognitive health outcomes among the elderly population. Moreover, disparities in depression and cognition prevalence are evident across dimensions of social activity, social network, psychological measures, self-containment, economic well-being, work environment, economic and work well-being, and food security. Older adults with limited social engagement, weaker social networks and lower economic well-being tend to experience higher rates of depression and cognitive impairment. Addressing these disparities through targeted interventions aimed at improving socio-economic conditions and enhancing access to mental health services is crucial for promoting mental well-being and cognitive health among older adults in India.

Table 5. Prevalence of depression (CESD and CIDI-SF) and cognition among elderly aged 60 and above by their socio-economic positioning, India, LASI wave-1, 2017-18

Socio-economic positioning (SEP)	Mental health condition				
	Depression			Cognition	
SEP combined score	CES-D	CIDI-SF	N	Percent	N
Very low (poor)	41.7	11.7	7592	30.2	6290
Low	30.6	8.0	6748	16.2	5863
Middle	27.3	7.0	5823	9.8	5153
High	22.2	7.0	5402	6.0	4888
Very high (best)	18.6	5.1	4825	2.0	4459
Social support					
No support (poor)	29.7	7.7	24198	15.3	21167
One support	31.6	9.6	4057	15.2	3600
Two & more support (best)	33.2	12.8	2462	9.5	2195
Decision making ability					
01-10 (poor)	38.3	10.0	7218	30.1	5909
11–20	29.4	7.7	9365	14.9	8276
21–31	27.1	7.3	9371	7.8	8437
31 & above (best)	24.4	8.8	4811	4.9	4384
Social activity					
00–05 (poor)	35.0	11.1	8599	26.9	7210
06–10	31.6	8.4	8806	15.7	7750
11–15	28.0	7.2	6058	7.3	5415
16 & above (best)	23.0	5.1	7305	3.0	6629
Social network					
Less than 10 (poor)	32.6	8.6	15803	19.3	13565
10–19	27.8	8.1	9518	11.6	8450
20–29	27.2	9.3	3188	7.4	2930
30 & above (best)	23.7	5.0	2178	3.3	1996
Psychological measure					
0 score (best)	24.3	6.8	8793	11.7	7926
1-2	26.5	6.4	14510	14.0	12799
3-6	32.4	9.8	4316	20.4	3714
7-15	50.1	15.3	2278	20.9	1847
16 & above (poor)	64.3	22.5	837	17.0	665
Self-containment					
00-20 (poor)	53.7	19.4	999	33.7	808
21-30	48.6	13.4	3559	22.4	3044
31-40	35.1	8.9	10550	15.8	9139
41-50	23.0	6.2	10843	12.0	9622
51 & above (best)	11.9	3.9	4737	7.9	4296
Economic wellbeing					
0 score (poor)	30.5	7.3	8722	18.7	7553
1-2	32.1	9.4	13153	16.4	11618
3-5	26.6	7.8	6438	9.3	5813
6 & above (best)	28.6	7.8	2497	11.9	2232
Work environment					
00 score (poor)	30.5	7.2	8747	18.7	7567
09-17	30.7	9.9	1876	16.4	1708
18-24	29.9	8.6	11844	14.5	10713
26-31	29.5	8.3	6316	10.9	5514
31 & above (best)	32.6	10.1	2027	14.4	1714
Economic & work wellbeing					
00 score (poor)	30.5	7.3	8722	18.7	7553
01-20	31.5	10.1	3111	17.6	2786
21-39	29.6	8.5	13524	13.8	12171
31-49	28.8	7.4	4285	10.1	3728
41 & above (best)	35.8	12.6	1168	15.1	978
Food security					
Less than 3 (poor)	55.7	22.4	1956	22.5	1566
4	33.0	7.9	12222	16.6	10522
5 (best)	24.1	6.5	16527	12.8	14991
India	30.2	8.3		15.0	

Table 6 provides an insight into the distribution of various physical and mental health problems among elderly individuals in India categorized by age groups. Understanding the prevalence of these health issues across different age categories is crucial for formulating targeted interventions and healthcare policies tailored to the needs of older adults. In terms of physical health problems, the data reveals a significant increase in the prevalence of Activities of Daily Living (ADL) limitations and Instrumental Activities of Daily Living (IADL) limitations among individuals aged 60 and above compared with those under 60. ADL limitations refer to difficulties in performing basic self-care tasks such as bathing or dressing, while IADL limitations refer to challenges in performing more complex tasks necessary for independent living such as managing finances or using transportation. For instance, the prevalence of ADL limitations increases from 9.9 per cent among individuals below 60 to 23.8 per cent among those aged 60 and above. Similarly, the prevalence of IADL limitations shows a substantial increase with advancing age.

Furthermore, the data highlights the prevalence of multi-morbidity which indicates the co-occurrence of two or more chronic health conditions among older adults. Consistent with other physical health indicators, the prevalence of multi-morbidity also shows a significant increase with advancing age. For instance, the prevalence of multi-morbidity (+2), indicating the presence of two chronic health conditions, increases from 14.3 per cent among individuals under 60 to 24.1 per cent among those aged 60 and above. Turning to mental health, the data indicates a considerable burden of depressive symptoms among both age groups, although the prevalence tends to be slightly higher among individuals aged 60 and above. Depression is assessed using the Centre for Epidemiologic Studies Depression Scale (CESD) and Composite International Diagnostic Interview Short Form (CIDI-SF). Among individuals aged 60 and above, the prevalence of depression is 30.2 per cent according to CESD and 8.3 per cent according to CIDI-SF. These measures capture various aspects of depressive symptoms including feelings of sadness, hopelessness and loss of interest or pleasure in activities. Similarly, while cognitive impairment is observed across all age categories, its prevalence is notably higher among older adults. Cognitive impairment refers to difficulties in memory, thinking, and reasoning, which are assessed using validated cognitive screening tools. Among individuals aged 60 and above, the prevalence of cognitive impairment is 15.0 per cent.

Table 6. Distribution of physical and mental health problems among elderly by their age categories in India, LASI wave-1, 2017-18

	Age <60	Age 60 and above	Total	N
Physical health				
ADL (+1)	9.9	23.8	16.9	66323
ADL (+2)	4.8	14.2	9.5	66,323
ADL (+3)	2.2	8.5	5.4	66,323
IADL (+1)	26.5	48.4	37.4	66264
IADL (+2)	16.7	37.4	27.1	66264
IADL (+3)	10.6	29.6	20.1	66264
Mobility (+1)	52	75.7	63.9	66326
Mobility (+2)	40.5	67.5	54.1	66326
Mobility (+3)	30.5	58.8	44.7	66326
Multi-morbidity (+1)	39.8	53.4	46.6	66408
Multi-morbidity (+2)	14.3	24.1	19.2	66408
Multi-morbidity (+3)	3.6	8.3	6	66408
Mental health				
CESD	26.3	30.2	28.2	64822
CIDI-SF	7.4	8.3	7.9	65311
Cognition	5.9	15	10.3	58160

Table 7 presents the results of a Propensity Score Matching (PSM) analysis examining the impact of physical health on depression (CIDI-SF) among elderly individuals aged 60 and above in India based on data from LASI Wave-1 conducted in 2017-18. The treatment variables, which include Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), Mobility, and Multi-morbidity, are categorized based on their severity. The analysis compares unmatched and matched groups where the matched groups are derived using nearest neighbourhood matching techniques: Average Treatment Effect on the Treated (ATT) and Average Treatment Effect on the

Untreated (ATU). Differences in depression prevalence between the treated and control groups are reported for each treatment variable.

Table 7. Propensity score matching (PSM) analysis of depression (CIDI-SF) after taking physical health variable as treatment variable among elderly aged 60 and above, India, LASI wave-1, 2017-18

Treatment variables	Treated	Controls	Difference	S.E.	T stat
ADL (+1)					
Unmatched	12.6	5.2	7.4	0.00	20.97
ATT	12.6	5.9	6.6	0.01	11.32
ATU	5.2	12.1	6.9	.	.
ATE			6.8	.	.
IADL (+)					
Unmatched	9.9	4.2	5.7	0.00	19.77
ATT	9.9	4.4	5.5	0.00	12.89
ATU	4.2	10.1	5.9	.	.
ATE			5.7	.	.
Mobility (+1)					
Unmatched	7.9	3.4	4.5	0.00	13.81
ATT	7.8	4.2	3.7	0.00	8.89
ATU	3.4	7.4	4.0	.	.
ATE			3.7	.	.
Multi-morbidity (+2)					
Unmatched	9.1	5.9	3.2	0.00	9.59
ATT	9.1	4.7	4.4	0.00	9.17
ATU	5.9	9.8	3.9	.	.
ATE			4.0	.	.
ADL(+2)					
Unmatched	15.2	5.6	9.7	0.00	21.97
ATT	15.2	5.1	10.2	0.01	13.62
ATU	5.6	13.7	8.1	.	.
ATE			8.4	.	.
IADL (+2)					
Unmatched	10.7	4.8	5.9	0.00	19.55
ATT	10.7	5.0	5.7	0.00	11.46
ATU	4.8	10.6	5.8	.	.
ATE			5.8	.	.
Mobility (+2)					
Unmatched	8.4	3.6	4.7	0.00	15.88
ATT	8.3	4.1	4.2	0.00	10.82
ATU	3.6	8.0	4.4	.	.
ATE			4.3	.	.
Multi-morbidity (+3)					
Unmatched	10.8	6.3	4.4	0.01	8.55
ATT	10.8	5.6	5.1	0.01	6.30
ATU	6.3	13.4	7.0	.	.
ATE			6.9	.	.

We conducted a propensity score matching analysis (PSM) to investigate the impact of physical health on mental health, specifically depression, while controlling for various background variables (refer to Table 7). Our aim was to mitigate potential selection bias in the reporting of health indicators which could lead to spurious associations between physical and mental health. It's crucial to recognize that elderly individuals reporting mental health issues may exhibit selectivity based on factors such as education level, wealth index, residence type, parity, religion and caste/tribe affiliation, among others. By employing PSM, we addressed this potential bias. Our analysis revealed that among the elderly population, those experiencing Activities of Daily Living (ADL) difficulties were more likely to report depression compared with those without such challenges. The estimated Average Treatment Effect on the Treated (ATT) values for the treated and control groups were 12.6 per cent and 5.9 per cent respectively, suggesting that the prevalence of depression increased by approximately 6.6 per cent due to ADL difficulties.

Similarly, for Instrumental Activities of Daily Living (IADL), the propensity score for depression was 9.9 per cent among the treated group (with IADL) and 4.2 per cent among the control group (without IADL). The difference in ATT values (5.5%) indicates that if the elderly did not have IADL, the prevalence of depression would have decreased from 9.9 per cent to 4.4 per cent. Conversely, the Average Treatment Effect on the Untreated (ATU) was 4.2 per cent for the treatment group and 10.1 per cent for the control group, implying that if individuals without IADL had IADL, depression prevalence would have increased by 5.9 per cent. Regarding mobility, the estimated ATT value suggests that the prevalence of depression increased by 3.7 percentage points due to mobility issues. Conversely, if the treatment group had become the control, the depression prevalence would have been 7.8 per cent instead of 4.2 per cent, as indicated by the ATT value for the control group. Furthermore, our analysis indicates that the presence of multi-morbidity among the elderly increases the prevalence of depression by approximately 4.0 per cent. This underscores the importance of considering various aspects of physical health in understanding and addressing mental health issues among older adults.

Table 8. Propensity score matching (PSM) analysis of cognition after taking physical health variable as treatment variable among elderly aged 60 and above, India, LASI wave-1, 2017-18

Treatment variables	Treated	Controls	Difference	S.E.	T stat
ADL (+1)					
Unmatched	23.36	13.31	10.05	0.01	18.22
ATT	23.36	18.09	5.26	0.01	5.92
ATU	13.32	18.21	4.89	.	.
ATE			4.96	.	.
IADL (+)					
Unmatched	21.90	10.33	11.57	0.00	26.36
ATT	21.84	17.39	4.45	0.01	6.28
ATU	10.32	13.24	2.91	.	.
ATE			3.57	.	.
Mobility (+1)					
Unmatched	16.81	11.09	5.72	0.00	11.56
ATT	16.74	14.59	2.15	0.01	3.05
ATU	11.08	12.04	0.96	.	.
ATE			1.83	.	.
Multi-morbidity (+2)					
Unmatched	12.27	16.24	-3.97	0.01	-7.79
ATT	12.27	13.12	-0.85	0.01	-1.19
ATU	16.22	16.03	-0.19	.	.
ATE			-0.36	.	.
ADL(+2)					
Unmatched	28.52	13.63	14.89	0.01	21.40
ATT	28.50	20.74	7.76	0.01	6.49
ATU	13.66	21.00	7.34	.	.
ATE			7.39	.	.
IADL (+2)					
Unmatched	25.23	10.71	14.52	0.00	31.15
ATT	25.18	17.86	7.32	0.01	9.04
ATU	10.71	14.54	3.83	.	.
ATE			4.92	.	.
Mobility (+2)					
Unmatched	17.77	10.73	7.04	0.00	15.39
ATT	17.74	14.28	3.46	0.01	5.30
ATU	10.73	12.38	1.65	.	.
ATE			2.82	.	.
Multi-morbidity (+3)					
Unmatched	11.70	15.58	-3.87	0.01	-4.84
ATT	11.70	10.88	0.82	0.01	0.79
ATU	15.55	19.45	3.90	.	.
ATE			3.65	.	.

The propensity score matching analysis conducted for cognition, as outlined in Table 8, yields results akin to those observed for depression concerning variables such as ADL, IADL, mobility and morbidity. For instance, considering the unmatched cases for multi-morbidity, we find that the prevalence of cognition was 12.3 per cent among the treated group (those with multi-morbidity) and 16.2 per cent among the control group (those without multi-morbidity). Specifically, the Average Treatment Effect on the Treated (ATT) value for the control group indicates that if the treatment group had transitioned to the control group, the prevalence of cognition would have been 12.3 per cent, down from the observed 13.1 per cent. This highlights the significant impact of multi-morbidity on cognitive function among the elderly population.

Discussion and Conclusion

As societies worldwide experience demographic shifts towards aging population, understanding the intricate relationship between various factors influencing the physical and mental well-being of older adults becomes increasingly vital. The study delves into this complex web of influences, exploring how factors such as living arrangements, social positioning and economic circumstances intersect to shape the health outcomes of older adults. Living arrangements play a significant role in determining the health status of older adults with studies highlighting the impact of social isolation associated with living alone on exacerbating physical and mental health issues. Social and psychological implications further impact the aging experience in India. Loneliness, migration to old age homes and loss of social support contribute to the psychological distress experienced by older adults (Jacob et al., 2007; Joshi et al., 2003; Ross and Mirowsky, 1992). Conversely, strong social support networks within familial or community settings can act as protective factors against health decline. In addressing these challenges and leveraging the strengths of familial and social networks, India can pave the way for a more inclusive and supportive environment for its ageing population (Arokiasamy et al., 2012; Husain & Ghosh, 2011). Similarly, social positioning, encompassing education, occupation and social class, emerges as a crucial determinant of health outcomes in old age. Higher socioeconomic status correlates with better access to healthcare, healthier lifestyle choices and greater resilience against stressors, while individuals in lower social positions may face increased health risks due to limited resources and adverse living conditions. Economic factors also wield substantial influence over the health of the elderly with financial strain restricting access to essential healthcare services, medications and nutritious food, thereby exacerbating health issues. However, contemporary socio-economic transformation, such as rapid urbanization and changing migration patterns, have led to shifts in family structures towards nuclear living arrangements (Alam, 2010; Bongaarts & Zimmer, 2002). Economic insecurity in retirement further contributes to stress and anxiety, negatively impacting both physical and mental well-being. Robust social safety nets, including pension programmes and affordable healthcare, emerge as critical mitigating factors against the health risks associated with economic hardship among older adults.

The linkages between living arrangements, social positioning, economic conditions and health outcomes are complex and multifaceted. For example, individuals from disadvantaged socioeconomic backgrounds may be more likely to reside in substandard living conditions, leading to poorer health outcomes. Similarly, older adults facing economic difficulties may experience social exclusion, further exacerbating their health risks. Understanding these interconnected pathways is essential for developing targeted interventions to promote the health and well-being of the elderly population.

Moving on to the empirical findings presented in the Tables, the analysis reveals significant associations between demographic, socioeconomic and health-related factors and mental health outcomes among older adults in India. For instance, lower education levels and wealth indices are identified as predictors of adverse mental health outcomes, highlighting the importance of socio-economic status in mental health disparities among the elderly. Additionally, functional limitations, mobility restrictions and multi-morbidity emerge as strong correlates of depression and cognitive impairment among older adults, underscoring the critical role of physical health in shaping mental well-being. Adjusted Odds Ratios (AOR) further elucidate the association between socio-economic positioning indicators and mental health outcomes, providing insights into specific risk factors contributing to depression and cognitive impairment among older adults.

The results of Propensity Score Matching (PSM) analysis for depression underscore the significance of physical health in shaping mental health outcomes among the elderly population in India. These findings emphasize the need for comprehensive intervention strategies that address both physical and mental health needs to promote healthy aging and improve the overall well-being of older adults in India. Similarly, PSM analysis sheds light on the causal relationship between physical health conditions such as activities of daily living (ADL), instrumental activities of daily living (IADL), mobility and morbidities, and the prevalence of depression and cognitive impairment among older adults, emphasizing the importance of addressing physical health conditions to improve mental health outcomes in this population.

In conclusion, the findings of this study highlight the complex interplay between demographic, socioeconomic and health-related factors in shaping mental health outcomes among older adults in India. By addressing disparities in living arrangements, social positioning and economic conditions, societies can foster supportive environments that promote the health and well-being of their aging population. Through targeted interventions and policy initiatives aimed at alleviating socioeconomic inequalities and improving access to healthcare, policymakers, healthcare providers and other stakeholders can work towards ensuring equitable health outcomes for older adults, thereby enhancing their quality of life and promoting healthy aging across the lifespan.

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