

## **The Linkage between Living Arrangements, Social positioning (security), and Economic Condition with Physical and the Mental Health of the Elderly in India**

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### **Introduction**

India, now home to 1.3 billion people, is projected to overtake China in about a decade to become the world's most populous country. The share of India's population aged 50 and older is relatively small at 16 percent, but India will experience rapid growth among this age group shortly (Bloom *et.al*, 2010). Most of the elderly reside in rural areas (71%) and 29 percent of elderly reside in urban areas. The 2011 census also revealed that 15 million elderly people live alone and three-fourths of them are women. Demographically, the proportion of India's elderly population has increased from 5.6 percent in 1961 to 8.6 percent in 2011 according to the Ministry of Statistics and Program Implementation. The United Nations Population Division projects that India's population aged 50 and older will reach 34 percent by 2050. Between 2010 and 2050, the share elderly aged 65 years and older is expected to increase from 5 percent to 14 percent. The median age in India has increased from 19.7 in 1975 to 23.0 in 2000; it is expected to rise to 29.9 by 2025 and 36.6 by 2050 (UN Pop Div., 2012). Within the next two decades, older adults (defined as those 50 years of age or older) are expected to bear nearly half of the total disease burden in India, mostly due to non-communicable diseases (NCDs) (Chatterji *et.al*, 2008).

The health implications of community social networks, although having long been a research focus has witnessed renewed interest over the recent years (Leighton, 1959). This come back can be credited to the concept of "social capital" as a linchpin within public and population health (Moore *et.al*, 2005; Moore *et.al*, 2006). Putnam defines social capital as "features of social organization, such as trust norms, and networks, that can improve the efficiency of society by facilitating coordinated actions" (Putnam, 1993). He analysed two major aspects of social capital: structural (e.g. contacts, social participation) and cognitive (e.g. trust and safety). The cognitive components consist of norms, attitudes, values and beliefs while the structural components of social capital consist of the patterns of civic engagement or a density of social networks (Islam *et.al*, 2006). Structural social capital can also be defined in levels i.e. bonding, bridging, and linking. While bonding social capital refers to intra-group ties between individuals sharing common characteristics such as age, gender or ethnicity, bridging social capital refers to the building of ties between heterogeneous groups (Putnam, 2000).

It was found that elderly females showed a higher chance of living alone and having a change in the living arrangements probably (Bolina, & Tavares, 2016), due to their greater longevity (Camargos, *et. al*, 2011), which increases their chances of becoming widows, lacking financial security (Husain, & Ghosh, 2017). Economic status and education are strongly related to the living arrangement in old age (Panigrahi, 2009). Age, gender, and marital status and health have significant influence in determining the living arrangement of elderly (Velkoff, 2001). Children very often have no options but to leave their parents behind in the place of origin due to a

shortage of living space along with high cost of living in urban areas (Sathyanarayana *et. al.*, 2014). Theoretically, social capital will not vary significantly by living arrangements because social capital is accumulated over the lifespan and living arrangement is an incident occurring at a particular point in life. One such study by (Quingen Xu *et. al.*, 2015) shows that the relationship between living alone and health did not differ based on the level of social capital possession. Another study by (Norstrand & Glicksman, 2015) shows the relationship between indicators of social capital and health outcomes (ADL, IADL, depressive symptoms, stress) by living arrangements.

## Methodology

**Data** - The LASI sample is a nationally representative sample of the population aged 45 years and older, living in private households in India. The sample is also representative of India's 29 states and 6 union territories and four selected metropolitan cities (Delhi, Kolkata, Mumbai, and Chennai). The initial sample was recruited in 2017/19 using a stratified, multistage cluster sampling of all households in India. In accordance with the conventional practice for other population-based surveys, the LASI sampling frame included only household population. Persons living in collective living arrangements, such as nursing homes, long-term dependent or care facilities, boarding houses, messes, hotels, residential hotels, rescue homes, jails, prisons, army camps, boarding schools, ashrams, etc. we're not considered as household population, and therefore, not included in the survey. The LASI is designed to provide reliable estimates of all health outcomes and social and economic wellbeing indicators for older adults. Wave 1 of the LASI covered a panel sample of 72,250 individuals age 45 and above and their spouses, including 31,464 elderly age 60 and above and 6,749 oldest-old persons age 75 and above from 35 states and union territories of India (excluding Sikkim).

## Statistical Methods

The paper considers both descriptive statistics and multivariate logistics regression to assess the objectives of the paper. In the multivariate logistic regression, the form of logistic function will be,

The logistic regression equation is –

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

The logit transformation defined as the logged odds:

$$\text{Odds} = (p / 1-p); \text{ and } \text{Logit (p)} = \text{Ln (p/1-p)}$$

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

1-p: the probability of non-occurrence of the characteristic of interest.

X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>,.....X<sub>k</sub> are predictor variables

b<sub>0</sub>: intercept when there is no effect of any predictor variable on the dependent variable.

b<sub>1</sub>, b<sub>2</sub>, b<sub>3</sub>,.....b<sub>k</sub> are co-efficient of predictor variables.

## **Results and discussion**

In our preliminary analysis we analyse the association between physical and mental health outcomes and its potential factors. We have found that, age is positively related with for activities of daily living (ADL) and instrumental activities of daily living (IADL). The total prevalence of ADL and IADL in India were 15.92% and 36.13% respectively. The prevalence of ADL among men and women were (14.75%) and (16.76%) respectively. However, the prevalence of IADL among men and women were (28.35%) and (41.73%) respectively. The total prevalence of depression in India was 27.64% as measured according to CES-D score. However, the total prevalence of depression in India was 7.71 as measure according to CIDI-SF score. The people who are living alone they had higher chances of ADL, IADL and depression. The female population in India showing higher percentage of depression as compared to male population irrespective of their socio-economic conditions. In the case of composite cognitive impairment, the total prevalence of cognitive impairment was 9.82%. In the analysis, we have found the age is positively associated with cognitive impairment, as age increases chances of cognitive impairments also increases. Cognitive impairment were higher in female population as compared to male population.

In the given table represents adjusted odds ratio for activities of daily living (ADL), Instrumental activities of daily living (IADL), major depression (CIDI-SF scale) and Composite Cognition Impairment among older adults aged 45 and above by their background characteristics. This table shows that elder age (75 and above) are more likely to have ADL and IADL. Elderly who are living with others are more likely to have activities of daily living as well instrumental activities of daily living in spite of that they also are more likely to have cognitive impairment, similar result shows for elderly who are living in urban areas. Female elderly are more likely to have activities of daily living as well as instrumental activities of daily living but are also more likely to have depression as well. Widowed are also more likely to have depression. This table depicts that Muslims are more likely to have depression with respect to Hindus similarly schedule cast are more likely to have cognitive impairment with respect to schedule tribe, elderly who have 10 or more year of schooling are less likely to have cognitive impairment, similarly elderly who worked in the past or not working together are more likely to have ADL and IADL, richest are less likely to have cognitive impairment.

Table-1 Adjusted odds ratio (AOR) for Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL), major Depression (CIDI-SF scale) and Composite Cognition Impairment among older adults aged 45 and above by their background characteristics, India, LASI wave-1, 2017-18.

Background Characteristics	ADL AOR (LL - UL)	IADL AOR (LL - UL)	Depression (CIDI-SF) AOR (LL - UL)	Cognitive Impairment AOR (LL - UL)
<b>Age</b>				
45 - 49 <sup>®</sup>				
50 - 54	1.49***(1.36 -1.63)	1.32***(1.24 -1.4)	0.96 (0.87 -1.06)	1.29***(1.15 -1.46)
55 - 59	1.88***(1.72 -2.05)	1.59***(1.5 -1.69)	0.98 (0.88 -1.09)	1.5***(1.34 -1.69)
60 - 64	2.27***(2.08 -2.47)	1.93***(1.82 -2.04)	0.94 (0.84 -1.04)	1.86***(1.66 -2.08)
65 - 69	2.77***(2.53 -3.02)	2.41***(2.26 -2.56)	0.85***(0.76 -0.96)	2.4***(2.14 -2.69)
70 - 74	3.67***(3.34 -4.03)	3.13***(2.91 -3.36)	0.77***(0.67 -0.88)	3.39***(3 -3.83)
75+	5.48***(5 -6.01)	4.95***(4.6 -5.33)	0.78***(0.68 -0.89)	6.14***(5.45 -6.91)
<b>Living Arrangements</b>				
Living Alone <sup>®</sup>				
Living with spouse	0.79**(0.63 -1)	1.18*(0.98 -1.42)	1.52**(1.02 -2.25)	1 (0.72 -1.4)
Living with spouse and Children	0.77**(0.61 -0.96)	1.17*(0.98 -1.41)	1.43*(0.97 -2.11)	0.94 (0.68 -1.31)
Living with Children (without Spouse)	1.06 (0.95 -1.19)	1.13**(1.03 -1.25)	0.83**(0.71 -0.97)	0.95 (0.83 -1.09)
Living with others only	1.17**(1.01 -1.35)	1.22***(1.08 -1.38)	0.93 (0.76 -1.14)	1.06 (0.89 -1.27)
<b>Residence</b>				
Rural <sup>®</sup>				
Urban	0.99 (0.94 -1.04)	0.75*** (0.72 -0.78)	0.69*** (0.64 -0.74)	0.57*** (0.53 -0.62)
<b>Sex</b>				
Male <sup>®</sup>				
Female	1.24*** (1.17 -1.31)	1.76*** (1.68 -1.83)	1.09** (1.01 -1.18)	1.89*** (1.75 -2.04)
<b>Marital Status</b>				
currently Married <sup>®</sup>				
Widowed	0.87 (0.71 -1.07)	1.26*** (1.06 -1.49)	2.71*** (1.87 -3.94)	1.36* (1 -1.85)
Other	0.88 (0.69 -1.11)	1.39*** (1.15 -1.68)	1.89*** (1.25 -2.84)	1.52** (1.07 -2.14)
<b>Religion</b>				
Hindu <sup>®</sup>				
Muslim	1.05 (0.98 -1.12)	1.15*** (1.09 -1.22)	1.04 (0.94 -1.15)	0.98 (0.89 -1.08)
Others	0.7*** (0.64 -0.75)	0.79*** (0.75 -0.83)	0.8*** (0.71 -0.89)	0.89** (0.82 -0.98)
<b>Caste</b>				
Schedule Tribe <sup>®</sup>				
Schedule cast	0.82*** (0.75 -0.89)	0.72*** (0.68 -0.77)	0.42*** (0.37 -0.48)	2.1*** (1.91 -2.3)
Other Backword class	0.93** (0.87 -0.99)	0.98 (0.93 -1.03)	0.99 (0.91 -1.07)	0.8*** (0.73 -0.87)
None of the above	1.12*** (1.05 -1.21)	0.98 (0.93 -1.03)	0.95 (0.86 -1.04)	0.93 (0.85 -1.03)
<b>Education</b>				
No Schooling <sup>®</sup>				
Less than 5 years complete	1.14*** (1.06 -1.22)	0.74*** (0.7 -0.78)	1.04 (0.94 -1.15)	0.35*** (0.31 -0.39)
5 - 9 years complete	0.95* (0.89 -1.01)	0.54*** (0.52 -0.57)	0.85*** (0.78 -0.92)	0.11*** (0.09 -0.12)
10 or more years complete	0.68*** (0.63 -0.73)	0.34*** (0.32 -0.36)	0.66*** (0.59 -0.73)	0.03*** (0.02 -0.04)
<b>Work Status</b>				
Currently working <sup>®</sup>				
Worked in past but currently not working	2.15*** (2.03 -2.28)	1.69*** (1.62 -1.77)	1.46*** (1.35 -1.59)	1.32*** (1.22 -1.43)
Never worked	1.6*** (1.5 -1.71)	1.16*** (1.1 -1.21)	1.03 (0.94 -1.12)	1.35*** (1.24 -1.46)
<b>MPCE Quintile</b>				
Poorest <sup>®</sup>				
Poorer	0.94* (0.87 -1)	1.03 (0.97 -1.08)	0.99 (0.89 -1.09)	0.82*** (0.76 -0.89)
Middle	1.01 (0.94 -1.08)	0.94** (0.89 -0.99)	0.95 (0.86 -1.05)	0.73*** (0.67 -0.79)
Richer	1.01 (0.94 -1.09)	1 (0.95 -1.06)	1.11** (1 -1.23)	0.64*** (0.58 -0.7)
Richest	1.08** (1 -1.16)	1.03 (0.98 -1.1)	1.34*** (1.21 -1.48)	0.6*** (0.54 -0.66)