Self-reported Morbidity among Elderly in India:
A Correlates of Living arrangement, Socio-economic & Demographic Analysis

Abstract

The study investigate the association between morbidity pattern of elderly population with different living arrangements across various demographic and socioeconomic variables in India using the India Human Development Survey-II 2011-12 data. Descriptive Statistics and binary logistic regression have been used and results depicted that as age increases, morbidity and the likelihood of elderly living with their children increases. Living arrangement, age, religion, education, social groups and place of residence are significant predictors among elderly for any morbidity. Elderly living alone, oldest old, residing in urban areas and from high income groups are reported to be suffering more from any morbidity. There is little variation in multiple morbidities among males and females.

Key words: *Elderly, Aging, Living Arrangement, Morbidity*

Background:

Population aging is a multidimensional change involving the physical, psychological as well as social aspects of an individual which has now become a worldwide phenomenon. The twenty-first century will witness even more rapid population ageing than ever experienced in the past century. The phenomenon of ageing is progressively affecting the developed and developing countries as well; by 2050 one third of the total population in developed countries and one-fifth of the entire population in developing countries will be in sixty plus years. At the global level, the number of elderly persons is projected to increase from 606 million in 2000 to 1.9 billion in 2050. The increase is expected to be dramatic in less developed regions where the number of older people will increase from 375 million in 2000 to 1.6 billion in 2050 (United Nations, 2002).

Over the time, changes have been taking place in socio-economic and demographic dimensions. Changes such as a decline in fertility, higher life expectancy, increase in employment away from home, physical separation of parents and adult children due to migration, the spread of western culture and lifestyle and growing individualism are the prominent factors that have an impact on the traditional family system. As a result, Indian family system which was predominantly joint is

moving towards the nuclear family system. Thus, the gradual and inevitable erosion of traditional safeguards of the family has profound implication for the support and care of the elderly.

The changing aspects of health in older age are very complicated. How these play out is ultimately expressed in the more older adult's physical and mental capacities and functioning. With increasing age, several underlying physiological changes occur, and the risk of chronic disease rises. By the age 60, the significant burdens of disability and death arise from age-related losses in the hearing, seeing and moving, and non-communicable diseases, including heart disease, blood pressure, diabetes, stroke, chronic respiratory disorders, cancer, and dementia. These are not just problems for higher-income countries. In fact, the burden associated with these conditions in older people is far higher in low- and middle-income countries like India. Moreover, since ageing is also associated with an increased risk of experiencing more than one disease (known as multimorbidity) at the same time, it is simplistic to consider the burden from each of these conditions independently.

Eldelry and Health

A Community Based Cross-Sectional Study shows that 38 percent of female elderly were obese or overweight in comparison with 20 percent of the males. Among 180 elderly participants, two-fifths had morbidities associated with a musculoskeletal system that was a predominant health problem. Other health problems detected were (one third) anemic followed by hypertensive, visually impaired, diabetic and had bronchial asthma (Kulkarni, 2014). A cross-sectional study base on urban Agra shows that morbidity load increased with increasing age. Around 89 percent population of elderly had morbidities in urban areas. Most common cause of morbidity observed was anemia followed by cataract, hypertension, and arthritis both as 22 percent. Systemwise musculoskeletal problems were most common, and issues of the nervous system were least (Srivastava et al., 2010).

Samanta et al., (2014) study Living Arrangements and Health of Older Adults in India. They found that older adults living in multigenerational households have the lowest levels of short-term illness. Among them, those who live with their spouse, adult children, and young grandchildren experience the highest health gains. Health advantage diminishes when older adults live only with a spouse and adult children, and further decreases when they live only with their spouse. The solitary living

is associated with the highest likelihood of short-term morbidity. Good health is also shown to be associated with household wealth, gender, household size, and urban residence. Another study Based on Eastern Uttar Pradesh found that Gender, age, caste and wealth index were significantly related with the living arrangement in urban area while in a rural area only variable caste and wealth index were related considerably with living arrangement. Moreover, gender, age, and caste were significantly related with economic dependence in both urban and rural areas. The study also showed that proportion of those elderly who are economically dependent on self or spouse is higher in living alone or with spouse only in comparison to those who are financially reliant on son/others (Singh et al., 2014).

Srivastava and Mishra (2005) study Living Arrangement and Morbidity Pattern among Elderly in Rural India. They found that among the three states Orissa showed the highest percentage of elderly persons having a visual problem and the hearing problem followed by West Bengal and Bihar. The majority of the old people suffering from senility was found in the state of Bihar while lowest in case of Orissa. The study also found that joint problems have a significant effect on locomotor disability and urinary difficulties showed a significant impact on diabetes. Another study Effect of Living Arrangement on The Health Status of Elderly in India based on NFHS second-round survey indicate that elderly who are living alone are likely to suffer more from both chronic illnesses, such as asthma and tuberculosis, and acute illnesses, such as malaria and jaundice, than those elderly who are living with their family, even after controlling for the effects of a number of socioeconomic, demographic, environmental and behavioural confounders (Agrawal, 2012).

Elderly persons who live alone have higher levels of depressive symptomatology. The depressive influence of living alone is more significant in men than women. Undesirable health events have a stronger impact on those who live alone, particularly women. Marital status influences depression indirectly through its influence on living alone (Dean et al., 1992). Bongaarts and Zimmer (2001) found in his study based on developing the world. Women are more likely live alone than men and are less likely to live with a spouse or head of a household. Head of the family and living in a large household and with young children is more prevalent in Africa than elsewhere. The study also shows that Co-residence with adult children is most common in Asia and least in Africa and it is more frequent with sons than with daughters in both Asia and Africa, but not in

Latin America. As a country's level of schooling rises, most living arrangement indicators change with families becoming nuclear.

A study Health among the oldest-old in China found that baseline living arrangements are significantly associated with mortality. Moreover, the association between living arrangements and death vary by gender. Among the different living arrangements, having a partner in the household provides the best health protection for elderly. Living alone and living with children was associated with both health advantages and disadvantages. Institutional living lowers mortality risk for men but not women. Living with others provides the least health benefits (Li et al., 2009). Mini (2009) study shows that significant socio-demographic differentials in health status. Women reported less morbidity, perceived well-being, and physical mobility were better for men. This anomaly can be elucidated by variations in the components of socio-demographic factors. Economic and emotional support from relative would improve outcomes. The presence of specific kin rather than the number of each type of family member was important. Men and women in this sample have largely similar associations between widowhood and self-reported health (Sudha et al., 2006).

Morbidity prevalence was higher among older widows than older widowers. The prevalence of communicable and non-communicable diseases was found 74 and 192 per 1000 older widows respectively. At the same time, the likelihood of seeking health care services for reported morbidities was substantially lower among older widows (Agrawal and Keshri, 2014).

Sahoo and Mishra (2011) study result shows that widows/widowers are having worst relative state of health as compared to currently married elderly. Monthly Per capita Consumer Expenditure (MPCE) is positively related to the state of health. Dependency during old age also has a significant negative impact on the state of health. Male elderly used to take more treatment as compared to their female counterparts. Educational level, occupation, and MPCE are found to be a significant determinant of treatment-seeking behavior.

The proportion of the sick and the bedridden among the elderly is found to be increasing with advancing age; the major physical disabilities being blindness and deafness (Darshan, Sharma and Singh, 1987). The Nandal, Khatri and Kadian (1987) study found a majority of the elderly suffering from diseases like a cough, poor eyesight, anemia and dental problems. The 52nd round of National Sample Survey indicated the prevalence of chronic illness among the aged, which was in general seen to be very high and it was higher in the urban areas (55 percent) than in rural areas (52

percent). Dandekar (1996) in her study stated that there is a lack of medical care facilities for the old irrespective of the place of residence.

Need for the Study:

Vast majority of the studies on elderly in India and other developing countries are confine towards their health deterioration and disabilities among older population. Among other factors, socio-economic, demographics and living arrangement of elderly have an impact on their health status but few or no studies have been done to access this relationship. This studies is conceived with the purpose of filling this gap. The present study throws light on the inter-linkage between living arrangements among elderly with the socio-demographic differential.

Objective:

- ❖ To examine the living arrangement and morbidity with the socio-economic and demographic differential among the elderly in India.

Data and method-:

The present study is based on the India human development survey (IHDS) jointly conducted by The National Council of Applied Economic Research (NCAER), New Delhi and the University of Maryland throughout India in 2011-12.The India Human Development Survey (IHDS) is a nationally representative multi-topic panel survey of 42152 households in 1503 villages and 971 urban neighborhoods across India. The survey not only collected a detailed roster, household income, education, and consumption information, but also asked about the incidence of short-term morbidity, long-term morbidity, and the ability to perform activities of daily living of all household members, including information on whether they sought treatment and the expenditures incurred because of it. The three short-term illnesses on which data are available are fever, cough and diarrhea. For major morbidity information, Respondents were asked about whether any family member was diagnosed with diabetes, hypertension, cancer, asthma, polio, cataract, tuberculosis or other long-term illness. Of the total household 27579 are from rural areas and 14573 from urban areas. Data on a total of 204568 individuals are collected from these households, out of which 102062 are male, and 102506 are female. The present study is restricted only to the population 60 years and above, the sample of aged persons are 21925 (with 10523 men and 11402 women).

Dependent Variable-:

The dependent variable of interest is living arrangement, disease (like Tuberculosis, Blood Pressure, Diabetes, Cataract, Asthma and Heart disease). For the living arrangement problem the elderly people (≥60) were asked whether, they are living alone: as an inmate of old age home or not as an inmate of old age home, living with spouse only, living with spouse and other members, living without spouse but with: children or others relations or non-relations. For living arrangement, we make three categories: living alone which includes living as an inmate of old age home and not as an inmate of old age home, living with spouse only and others which includes living with spouse and other members, living without spouse but with: children and others relations and non-relations. For the disease the question asked to the individual with the most knowledge of household, *has a doctor ever diagnosed any member in the household as* having: *Cataracts, Tuberculosis, Hypertension, Heart Disease, Diabetes,* All variables are dichotomous in nature (*1 as Yes, 2 as No).* Here yes means elderly has suffered from any one of disease.

Independent Variable-:

The study includes a set of independent variables to understand the extent and differentials in living arrangement of elderly. The predictor variables include socioeconomic characteristics of elderly people: Age group, sex, place of residence, religion, social group, marital status, educational level, Income.

Bivariate, as well as multivariate techniques, has been used for data analysis. From the bivariate analysis, cross-tabulation was done, and a Chi-Square test was used to test for significance. In order to estimate the prevalence of Single disease, and multiple diseases by socioeconomic, demographic differentials a logistic regression analysis was carried out with the help of Stata 13. The dependent variable was categorical and dichotomous with two categories; no (disease) =0 and yes (disease) =1. Results are presented in the form of odds ratios (ORs) with 95 per cent confidence intervals.

Findings:

The Prevalence of blood pressure is highest (13 percent) among elderly followed by cataract (8 percent), diabetes (7 percent), heart disease (3 percent) and asthma (4 percent). Elderly suffering from tuberculosis was very low (1 percent) (fig.5.1).

Fig. 1 prevalence of selected diseases
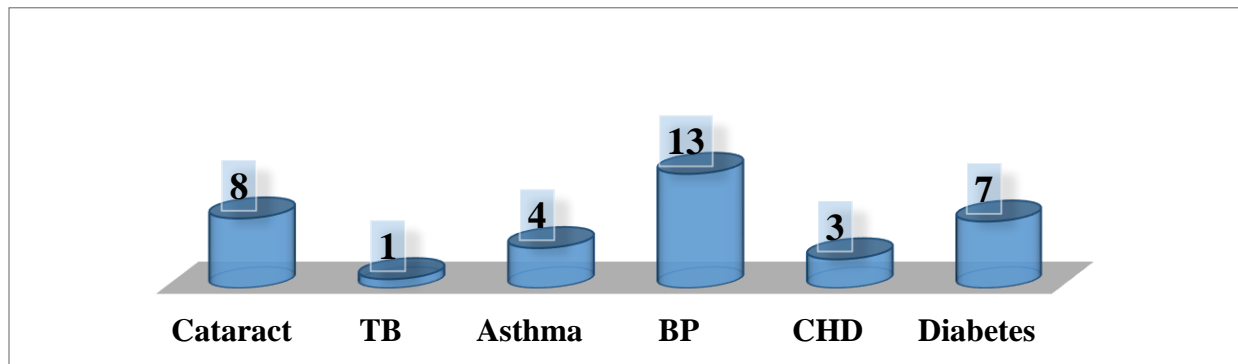
1: Prevalence of single disease (Tuberculosis, Cataract, Blood Pressure, Heart disease, Diabetes, and Asthma)

The distribution of elderly by selected diseases and their background characteristics has been presented in Table 1. Prevalence of cataract (137 per 1000) and blood pressure (140 per 1000) is higher among elderly living alone, and those living with a spouse more suffer from heart disease (33), diabetes (77) and asthma (64). Every 13 per thousand older adults is suffering from tuberculosis. The disease prevalence is less among the elderly living with their children or living with others. Prevalence of tuberculosis (13), heart disease (33), diabetes (72) and asthma (53) is higher among elderly men, and older women have the higher prevalence of cataract (91) and blood pressure (128). Younger old are suffering from tuberculosis and diabetes. Prevalence of hypertension, heart disease, and asthma is higher in older old. The oldest old suffer from cataract. An elderly widowed/separated/divorced and never married are more likely to suffer from all disease except heart disease and diabetes. The inverse relation is seen in the prevalence of tuberculosis and asthma by education of the elderly. The prevalence of cataract, diabetes, blood pressure and heart disease are found to be a positive relationship with the education. The prevalence of diabetes, heart disease, and blood pressure is higher among elderly living in urban areas. In rural areas aged people are more likely to suffer from tuberculosis (12), cataract (81) and asthma (55). Prevalence of all disease is high among Muslim and others elderly compared to Hindu. General caste elderly are more suffering from heart disease, blood pressure, and diabetes except for tuberculosis and asthma. Higher the income of elderly is found to have the greater prevalence of diabetes, heart disease, and blood pressure. However, tuberculosis and asthma are more prevalent among low-income elderly.

2: Prevalence of multiple (TB & Asthma), (Diabetes & BP), (BP & CHD), and (Diabetes, CHD & BP) diseases among elderly

Mostly elderly have multiple concurrent health problems. Prevalence of various diseases by living arrangement and background characteristics is shown in (Table 2). Every 2 per 1000 elderly are suffering from TB and asthma in any living arrangement except alone, and prevalence of multiple diseases is almost equal about living arrangement except elderly living with the spouse are more suffering from diabetes and blood pressure. There is no gender differential has seen among elderly for multimorbidity. Prevalence of diabetes and BP is higher among older old age group while BP and heart disease problem is greater among oldest-old age group.

Table: 1 Prevalence (per 1000) of some selected diseases among the elderly (≥60 years old) by living arrangement and background characteristics, India (2011-12)

Background characteristics	TB	Cataract	BP	CHD	Diabetes	Asthma	Number
Living arrangement							
Living alone	10	137	140	31	41	56	728
Living with spouse	10	96	121	33	77	64	3083
Living with children	9	91	108	21	56	47	5601
Living with others[1]	13	64	115	31	72	44	12513
Sex							
Male	13	66	103	33	72	53	10523
Female	9	91	128	25	62	44	11402
Age group							
Younger old (60-69)	13	60	111	26	70	40	12927
Older old (70-79)	10	97	127	32	67	60	6415
Oldest old (80 +)	7	130	111	32	52	59	2580
Marital status							
Never married	17	71	106	23	55	56	211
Currently married	13	67	111	33	74	47	13317
Widowed/Separated/Divorced	9	97	122	23	57	50	8396
Educational level							
Illiterate	14	80	83	18	35	55	12632
Primary	9	90	143	35	94	49	3910
Secondary	8	70	172	46	121	30	3997
Higher sec. & above	5	61	195	63	150	23	1386
Residence							
Rural	12	81	85	21	44	55	14882
Urban	9	73	189	47	123	32	7043
Religion							
Hindu	11	78	109	25	63	48	18113
Muslim	18	94	137	53	81	53	2207
Other religions[2]	5	67	163	40	105	43	1605

Caste

Other Backward Class	10	73	113	28	72	50	9057
Scheduled caste	15	76	87	20	44	55	4019
Scheduled tribes	8	38	35	4	16	20	1468
Others	12	97	153	41	86	47	7381
Income							
low	15	89	88	20	39	59	7309
Medium	9	68	103	27	61	46	7308
High	8	77	168	43	114	35	7308
Total	**217**	**1686**	**2765**	**698**	**1611**	**970**	**21925**

Source: IHDS-II, 2011-12

Others[1]-Child in law, Grandchild, Brother/Sister, Parent-in-Law, Nephew/Niece, Sib-in-Law, Other Relation, Servant/Others, Total may not match for each characteristic because of missing cases.

Other religion[2]-Christian, Sikh, Buddhist, Jain, Tribal, Others and None, *Prevalence is per 1000

There is a positive relationship between multimorbidity (diabetes & BP), (BP &heart disease) and education level. As increase, the level of education multimorbidity also increase. This may be because educated people are more aware of health. Urban areas elderly are more likely to suffer from multimorbidity except (TB & asthma) and (BP, diabetes and heart disease). Hindu elderly are less likely to suffer from multiple diseases compared to Muslim and others. The prevalence of multimorbidity is higher among general caste elderly followed by OBC, SC, and ST. Elderly those are in the medium or high-income group more likely to suffer from (diabetes & BP) (34, 69) and (BP & heart disease) (10, 20).

3: Association of Tuberculosis, Cataract, Blood Pressure, Heart Disease, Diabetes and Asthma with Living arrangement and socioeconomic and demographic characteristics

The result of Logistic Regression Analysis of Tuberculosis, Cataract, Blood Pressure, Heart Disease, Diabetes, and Asthma have been presented in Table 3 & 4. Living arrangement has a significant effect on the prevalence of cataract, blood pressure, and heart disease but not on Tuberculosis and asthma. Elderly living alone has 52 percent more likely to suffer from cataract, 35 percent more likely to suffer from blood pressure and 61 percent more likely to suffer from heart disease compared to those are living with others. Among elderly those are living with spouse 37 percent more chances of having the cataract, 28 percent more chances of blood pressure, 43 percent more likely to have heart disease and 31 percent more likely to suffer from diabetes compared to elderly living with others. Women have the significantly lower prevalence of Tuberculosis (OR, 0.58) and asthma (OR, 0.68) compared to male and 38 percent more likely to have the cataract, 72 percent more likely to suffer from blood pressure and 29 percent more likely

to suffer from diabetes compared to male. Age of the elderly has a significant positive effect on the prevalence of cataract (OR, 1.60 & 2.04), blood pressure (OR, 1.19 & 1.17), heart disease (OR, 1.30 & 1.50) and asthma (OR, 1.31 & 1.43) but not on tuberculosis and diabetes. Elderly with primary, secondary and above have a significantly higher prevalence of cataract, blood pressure, heart disease, diabetes and asthma than those are illiterate. The prevalence of hypertension, heart disease, and diabetes are more likely among elderly those are living in urban areas than elderly living in rural areas, and prevalence of asthma have significantly lower among elderly those are living in urban areas compared to rural areas. With respect to the religion of the aged persons, Muslim and others religion elderly are significantly more likely suffering from tuberculosis (OR, 1.86), cataract (OR, 1.32), blood pressure (OR, 1.33 & 1.74), heart disease (OR, 2.03 & 1.76) and diabetes (OR, 1.38 & 1.97) compared to Hindu religion. OBC, SC and ST caste elderly have a significantly lower prevalence of blood pressure, heart disease, and diabetes compared to general caste aged people. Controlling the effect the other variables, the high-income group has significantly more prevalence of blood pressure (OR, 1.42), heart disease (OR, 1.32), and diabetes (OR, 1.79) than the low-income group and prevalence of tuberculosis (OR, 0.70) and asthma (OR, 0.80 & 0.80) is significantly lower among elderly those are middle and high-income group compared to the low-income group.

5: Association of any one disease with Living arrangement and socioeconomic and demographic characteristics

Variations in disease across different predictor variables controlling the effect of other variables have been presented in Table. Living arrangement, sex, age, educational level, place of residence, religion, caste, and income group are the significant predictors among the elderly of any one disease. It has been seen that elderly living alone are 33 percent and living with spouse 32 percent more likely to suffer from any one disease compared to living with others, and interesting is that those are living with their children less likely to suffer from any one disease than those are living with others. Senior women have more likely to suffer from any one disease compared to counterpart male. It is evident from the age group of elderly that, with the increase of age there is the substantial increase in the health hazards. Older old (OR, 1.27) and oldest old (OR, 1.37) group suffer more from any one disease compared to younger old age group. Similarly, aged persons who are literate and higher level of education are more likely to have problems compared to those

who are illiterate. Elderly living in urban areas, 38 percent more likely to suffer from any one disease compared to those are living in rural areas. Elderly those are Muslim and others more likely (34 percent & 39 percent) to have any disease compared to Hindu religion. After controlling the effect of other variables, the reporting of any one disease is to be less among elderly belonging to scheduled caste and scheduled tribes compared to general categories. Elderly with the high-income group are 16 percent more likely to have anyone disease than the low-income group.

Table: 2 Prevalence* (per 1000) of multiple disease by living arrangement and background characteristics, India-(2011-12)

Background characteristics	TB & Asthma	Diabetes & BP	BP & CHD	Diabetes, BP & CHD
Living arrangement				
Living alone	0	33	13	6
Living with spouse	2	43	14	4
Living with children	2	34	10	6
Living with others[1]	2	38	12	4
Sex				
Male	2	38	12	5
Female	2	38	12	5
Age group				
Younger old (60-69)	3	37	11	5
Older old (70-79)	1	40	14	4
Oldest old (80 +)	1	36	15	6
Marital status				
Never married	7	40	9	4
Currently married	2	39	13	5
Widowed/Separated/Divorced	2	35	11	5
Educational level				
Illiterate	3	18	7	2
Primary	1	60	19	10
Secondary	1	74	20	8
Higher sec. & above	1	88	28	13
Residence				
Rural	3	22	8	3
Urban	1	79	23	9
Religion				
Hindu	2	34	9	3
Muslim	3	51	28	12
Other religions[2]	2	69	24	15

Caste				
Other Backward Class	2	40	10	5
Scheduled Caste	2	21	7	2
Scheduled Tribes	3	7	1	0
Others	2	53	20	7
Income				
low	3	20	8	3
Medium	2	34	10	4
High	1	69	20	9

Source: IHDS-II, 2011-12

Others[1]-Child in law, Grandchild, Brother/Sister, Parent-in-Law, Nephew/Niece, Sib-in-Law, Other Relation, Servant/Others

Other religion[2]-Christian, Sikh, Buddhist, Jain, Tribal, Others and None, *Prevalence is per 1000

Table 3: Result of Logistic Regression Analysis of Tuberculosis, Cataract and Blood Pressure, India-2011-2012

Background characteristics	Tuberculosis		Cataract		Blood pressure	
	Exp(β)	P values	Exp(β)	P values	Exp(β)	P values
Living arrangement Living with others®						
Living alone	0.779	0.578	1.520***	0.002	1.358**	0.011
Living with spouse	0.841	0.416	1.371***	0.000	1.287***	0.000
Living with children	0.936	0.741	1.107	0.141	0.860**	0.011
Sex Male®						
Female	0.581***	0.001	1.385***	0.000	1.720***	0.000
Age group Younger old (60-69)®						
Older old (70-79)	0.94	0.698	1.606***	0.000	1.192***	0.000
Oldest old (80 +)	0.897	0.653	2.047***	0.000	1.177**	0.022
Marital status Never married®						
Currently married	1.125	0.870	0.835	0.484	1.209	0.398
Widowed/Separated/Divorced	1.018	0.980	0.959	0.871	1.397	0.139
Educational level Illiterate®						
Primary	0.9	0.577	1.456***	0.000	1.780***	0.000
Secondary	0.732	0.152	1.270***	0.003	1.939***	0.000
Higher sec. & above	0.433	0.046	1.059	0.676	2.108***	0.000
Residence Rural®						
Urban	1.024	0.886	0.912	0.124	1.651***	0.000
Religion Hindu®						
Muslim	1.863***	0.001	1.327***	0.001	1.337***	0.000
Other religions[1]	0.465**	0.050	1.009	0.935	1.743***	0.000
Caste Others®						
Other Backward Caste	0.835	0.287	0.973	0.642	0.901**	0.030

Scheduled Caste	1.346	0.139	0.931	0.369	0.776***	0.000
Scheduled Tribes	1.067	0.830	0.424***	0.000	0.246***	0.000
Income						
low®						
Medium	0.700**	0.037	0.887	0.070	1.097	0.117
High	0.712	0.073	0.87	0.052	1.415***	0.000

Source: IHDS-II, 2011-12

Note: ® refers Reference Category, p<0.05 **, p< 0.01 ***

Table 4: Result of Logistic Regression Analysis of Heart disease, Diabetes and Asthma, India-2011-2012

Background characteristics	Heart disease		Diabetes		Asthma	
	Exp(β)	P values	Exp(β)	P values	Exp(β)	P values
Living arrangement						
Living with others®						
Living alone	1.618**	0.038	1.204	0.313	0.817	0.324
Living with spouse	1.432***	0.001	1.318***	0.001	1.125	0.231
Living with children	0.838	0.132	1.026	0.744	0.949	0.571
Sex						
Male®						
Female	1.042	0.657	1.293***	0.000	0.683***	0.000
Age group						
Younger old (60-69)®						
Older old (70-79)	1.304***	0.003	1.064	0.314	1.314***	0.000
Oldest old (80 +)	1.509***	0.001	0.89	0.236	1.437***	0.001
Marital status						
Never married®						
Currently married	1.619	0.293	1.381	0.272	0.481***	0.004
Widowed/Separated/Divorced	1.47	0.405	1.295	0.384	0.516**	0.011
Educational level						
Illiterate®						
Primary	1.615***	0.000	2.199***	0.000	0.942	0.511
Secondary	1.931***	0.000	2.588***	0.000	0.735***	0.004
Higher sec. & above	2.001***	0.000	2.827***	0.000	0.469***	0.000
Residence						
Rural®						
Urban	1.655***	0.000	1.751***	0.000	0.775***	0.002
Religion						
Hindu®						
Muslim	2.039***	0.000	1.385***	0.000	1.131	0.256
Other religions[1]	1.764***	0.000	1.976***	0.000	0.847	0.258
Caste						
Others®						
Other Backward Caste	0.897	0.216	1.148**	0.022	1.015	0.851
Scheduled Caste	0.795	0.078	0.881	0.156	1.076	0.462
Scheduled Tribes	0.138***	0.000	0.269***	0.000	0.449***	0.000
Income						
low®						

	1.125	0.290	1.459***	0.000	0.800***	0.007
Medium	1.125	0.290	1.459***	0.000	0.800***	0.007
High	1.319**	0.015	1.789***	0.000	0.801**	0.015

Source: IHDS-II, 2011-12

Note: ® refers Reference Category, p<0.05 **, p< 0.01 ***

Table 5: Result of Logistic Regression Analysis of any one disease, India-2011-12

Background characteristics	Any one disease		
	Exp(β)	P values	95% confidence Interval
Living arrangement			
Living with others®			
Living alone	1.330***	0.002	1.1103	1.5935
Living with spouse	1.320***	0.000	1.2020	1.4497
Living with children	0.891***	0.009	0.8173	0.9723
Sex			
Male®			
Female	1.292***	0.000	1.2005	1.3910
Age group			
Younger old (60-69)®			
Older old (70-79)	1.272***	0.000	1.1848	1.3655
Oldest old (80 +)	1.369***	0.000	1.2353	1.5170
Marital status			
Never married®			
Currently married	1.19	0.293	0.8602	1.6465
Widowed/Separated/Divorced	1.295	0.123	0.9326	1.7973
Educational level			
Illiterate®			
Primary	1.452***	0.000	1.3326	1.5830
Secondary	1.601***	0.000	1.4596	1.7568
Higher sec. & above	1.666***	0.000	1.4498	1.9145
Residence			
Rural®			
Urban	1.388***	0.000	1.2954	1.4880
Religion			
Hindu®			
Muslim	1.341***	0.000	1.2130	1.4820
Other religions[1]	1.390***	0.000	1.2369	1.5621
Caste			
Others®			
Other Backward Caste	0.982	0.621	0.9142	1.0550
Scheduled Caste	0.881***	0.009	0.8004	0.9688
Scheduled Tribes	0.326***	0.000	0.2717	0.3914
Income			
low®			
Medium	0.987	0.749	0.9093	1.0708
High	1.166***	0.000	1.0696	1.2709

Source: IHDS-II, 2011-12

Note: ® refers Reference Category, p<0.05 **, p< 0.01 ***

Discussion:

Elderly persons living alone are significantly more likely to suffer from diseases than elderly living with others. These findings are consistent with similar earlier studies from the developing world, which have found positive associations between socio-economic status, living arrangement and the health of elderly (Albert & Cattell 1994; Ross & Wu 1996; Knodel & Debavalya 1997; Zimmer & Amornsirisomboon 2001; Mba 2005; Gu et al. 1997; Chen & Short 2008; Song et al. 2008; Wu & Schimmele 2008; Zimmer 2008; Li et al. 2009). Some recent research at a micro level on population ageing in India have also found living arrangements, and care and support for elderly to be a major determinant of their health status (Bongaarts & Zimmer 2001; Gupta & Sankar 2002; Chaudhuri & Roy 2007; Sheela & Jayamala 2008; Lena et al. 2009).

The prevalence of tuberculosis and asthma is higher among elderly living alone than among elderly who are living with their family and prevalence is also higher among aged men than women (Mutharayappa and Dhak, 2009), and higher in the rural areas than in the urban areas. These findings are consistent with the study of Effect of Living Arrangement on the Health Status of Elderly in India (Agrawal 2012). Eight percent elderly are suffering from cataract, 12.61 percent from hypertension, and seven percent are suffering from diabetes. A study conducted by Purty, et al. (2005) found almost similar results (14% hypertension, 8% diabetes, and 6% asthma) in his study. Gurav et al. (2002) study showed that 32.18% suffered from cataract, 16.34% from hypertension and 9.41% from diabetes and Sehgal et al. (2016) also found similar results in his study. Thakur et al. (2013) findings are similar to our study, which is the prevalence of diabetes and heart disease are more among male elderly compare to female, and the prevalence of blood pressure is more among female than male (Bharati et al. 2011, Chinnakal, et al. 2012, Bhatia, et al. 2007, Shah et al. 2011 and Thakur et al. 2013). Diabetes is significantly higher among urban elderly (Bharati et al. 2011).

Urban elderly is more to suffer from the disease compared to rural, and the majority of general caste and the high-income group have two and more diseases. The life style of urban elderly and high-income group are different from rural and low-income group elderly. This may be the reason

that urban and high income elderly are more suffer from this disease compared to rural and low-income group elderly. Elderly suffer from huge health problems. Also, as they suffer from multiple health problems (Kaphle et al. 2014, Kamble et al. 2012), the diagnosis and treatment are more difficult, prolonged and costly as well (Yerpude et al. 2014). Some of the major health problems like blood pressure, heart diseases, diabetes, and cataract are common among elderly (Paltasingh 2012, Kamble et al. 2012). The chance of getting the disease is higher among elderly those are living alone compared to those are living with others (Bhatia et al. 2007). Age and Income of the household are positively related to the state of health. Female elderly used to take more treatment as compared to their male counterparts. This is due to female elderly are more suffer from any disease. Educational level and Income are found to be the critical determinant of treatment-seeking behavior, and it is consistent with the study based on NSS data (Sahoo and Mishra, 2011). It is observed in our study that health problems have the significant relationship with age. As age increases the number of health problems also increases. This association of age and morbidity are statistically significant. 80 plus elderly are more likely to suffer from the disease. Srivastava et al. (2010) and Goel (2003) also observed the higher prevalence of morbidity in this age group.

Conclusion

The results of this study show that the significant proportion of the elderly population is suffering from hypertension followed by cataract, diabetes, heart disease and asthma. The burden of diseases is high among the elderly those are living alone. The study reveals the prevalence of the disease is more likely among elderly those are living in urban areas and belong to top income group. It is observed that the number of morbid elderly substantially increases with the increase of their age. Education of the elderly has a positive relationship with the morbidity and also for treatment-seeking behavior. The multiple diseases do not much vary with respect to the sex of the elderly. However, with respect to the marital status, it is clear that those who have never married or widowed/divorced/separated have multiple diseases and more likely to suffer than those who are currently married. Urban and rich elderly are more likely seek treatment for any one disease. There is need to develop geriatric health care services, regular health check-up, social support by people and proper implementation of geriatric-related legislation by government. More number of IEC activities should be conducted to increase the awareness for more utilization of geriatric services. Utilization and affordability of health services call for the need of public interventions in providing better health facilities at concessional rate particularly to poor elderly.

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