

## **Social Networks and Health of the Older Population in India**

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**U S C E N S U S B U R E A U**

An individual's capacity to seek support, information, and to command resources through a network of friends, acquaintances, and families can be beneficial in times of need, especially in countries where the institutionalized systems of support are weak. This concept often termed 'social networks' is not new. Classical theorists such as Durkheim, Marx and Weber all theorized the importance of social ties, albeit in different ways (Portes, 1988). While Durkheim wrote of the centrality of social solidarity in keeping an individual from feeling alienated or committing suicide, Marx proposed that class consciousness was essential for any class struggle. For Weber, an understanding of status groups required an analysis of people's interactions with others. More recently, scholars in fields as diverse as economics and sociology to medicine and nursing have focused on the tangible impacts of social ties and networks (Granovetter, 1973; Pescosolido, 1996; Johnson, 1996; Cornman et al., 2003).

As people age and their physical and cognitive functions decline, there is conflicting evidence in the literature as to whether their support networks of friends and families begin to shrink (Bradley, et al., 2002; Bowling, et al., 1995). However, there is rich and growing evidence in the West that social networks and relationships in the older years matter for physical and mental wellbeing (Berkman, 1984; Callaghan and Morrissey, 1993; Johnson, 1996; Sugisawa, Liang and Liu, 1994; Wenger, 1997). Unfortunately, data paucity has hindered research in developing countries. A handful of studies that have examined such issues in India have been limited to small case studies, mainly in urban areas (van Willigen and Chadha, 2003; Chadha and Arora, 1995; Chadha and Mangla, 1991).

This paper analyzes whether social networks are associated with the health outcomes of older people in India. While the measures used both for social networks and health outcomes have varied in the literature, much of the evidence indicates that the more effective social networks an older person has, the better their health outcomes seem to be (Berkman, 1984; Callaghan and Morrissey, 1993; Johnson, 1996; Sugisawa, Liang and Liu, 1994; Wenger, 1997).

Of course the issues of causality are serious here and can only be addressed with longitudinal data. However, in the case of India, even the association between the two parameters has yet to be established. This paper addresses that lacuna to a degree, using a construct of social networks that measures a households contact with three major institutions- medical, educational and the government.

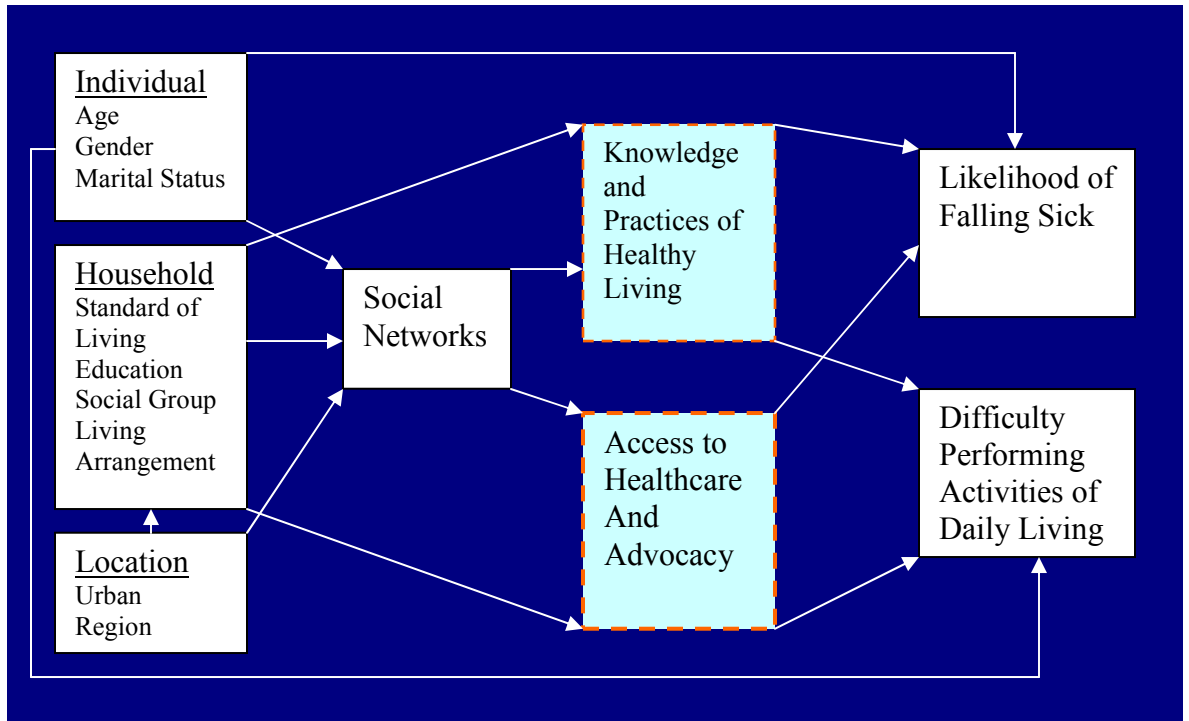
We hypothesize that households that have access to people in such institutions may be better equipped to protect their member's health, including seniors from falling ill. These networks may be advantageous in providing access to better knowledge and practices for healthy living as well as the importance of preventative care. In addition, access to medical care may be easier for people who have contacts in such institutions because of the advantage of insider knowledge and advocacy in health care.

Thus, in our hypothetical model, social networks should have an indirect impact on health outcomes through the mediation of knowledge about healthy living like the importance of nutrition, sanitary living and exercise. In addition, it is mediated through access to medical and other educated professionals. In this paper, the mediating variables between social networks and health outcomes are not measured or included as the data do not allow us to do so, but they are implied. See Diagram 1.

The correlation matrix reveals a positive correlation between both standard of living (.36) and education (.33) with extent of social networks. Thus, more educated households and households with a higher standard of living seem to be associated with larger social networks related to contacts with the three institutions of medical, education and government.

Diagram 1. Proposed Hypothesized Relationship between Social Networks and Health

Outcomes

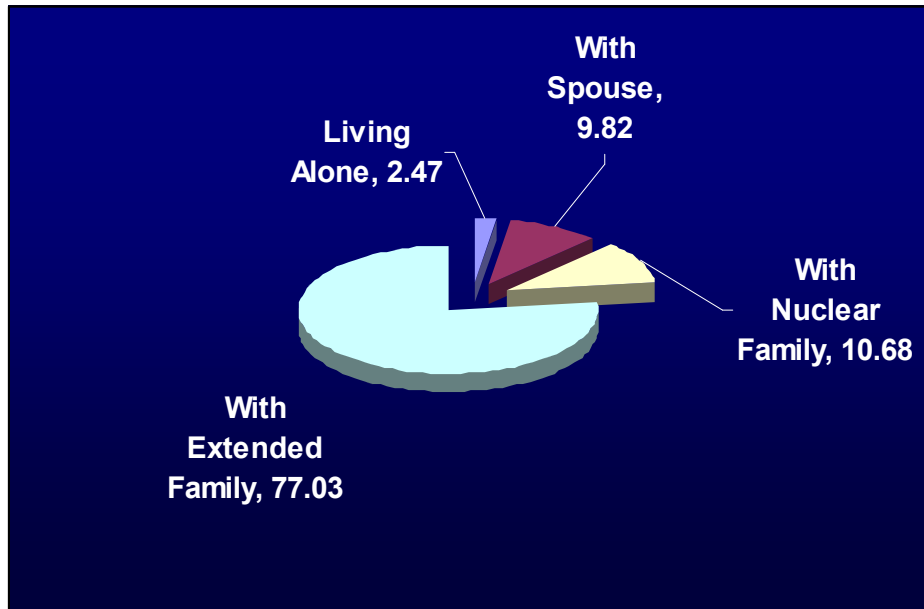


**Data:**

The recent publicly released India Human Development Survey 2005 (IHDS) for the first time in India allows researchers the opportunity to study the impact of social networks on various issues, including aging and health on a national scale. Designed and fielded by the University of Maryland and the National Council of Applied Economic Research, the IHDS is a nationally representative, multi-topic survey of 41,554 households in 1,503 villages and 971 urban neighborhoods across India. Two one-hour interviews in each household covered topics concerning health, education, employment, economic status, marriage, fertility, gender relations, and social networks. This data collection was funded by grants from the National Institute of Health to the University of Maryland.

Over 17,900 people aged 60 and above resided in the households interviewed. A large majority (77 percent), reside in households with extended family (Figure 1). However, 2 percent of older people live alone and about 9 percent live only with their spouse; and for them social networks may be of particular importance. Apart from demographic details, the data has information on caste affiliation, education, work, morbidity, activities of daily living, pension, and program participation.

Figure 1. Percent of People Aged 60 and Over in Various Living Arrangements



Source: Weighted IHDS 2005

The social networks component of the survey collected information from respondents regarding the type of ties the household has to major institutions. Respondents are asked about network ties to medical care, the educational system, and the government.<sup>1</sup> Among households with residents aged 60 and over, 34 percent have ties to the medical institution, 41 percent have ties to schools, and 34 percent have ties to the government (Figure 2). A four-category scale of the extent of network ties is constructed by counting how many of the three possible ties are reported by the household. Even with just three items, the scale has a good estimate of reliability (Cronbach's alpha= 0.72). Only 18 percent of the sample of households in which the older population reside has all three types of network ties; 17 percent of such household have two, 20 percent have one and 46 percent of the households report no such ties (Figure 3).

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<sup>1</sup> The exact wording was:

Among your acquaintances and relatives, are there any who ...

15.1 ... are doctors or nurses or who work in hospitals and clinics?

15.2 ... are teachers, school officials, or anybody who works in a school?

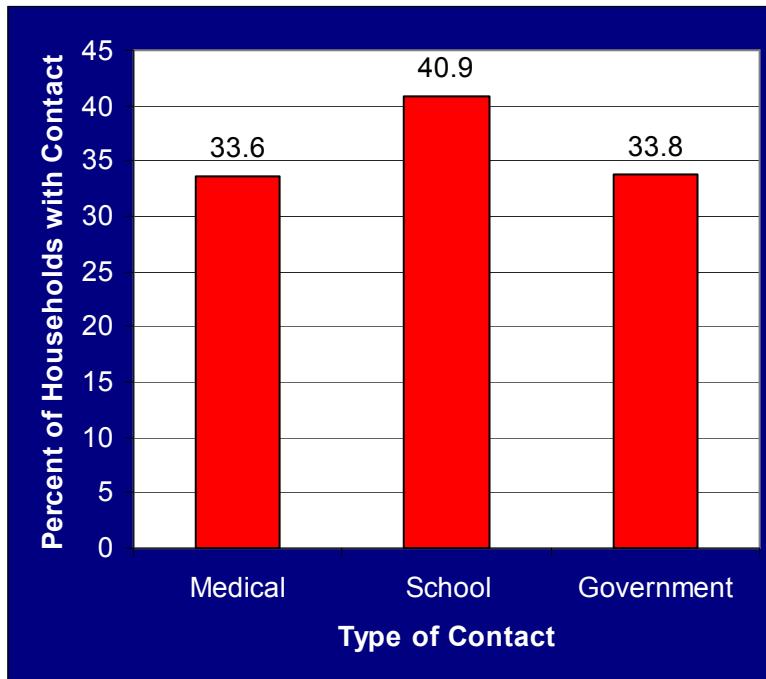
15.3 ... are in government service? [other than doctors, teachers, above]

Table 1. Descriptives of population age 60 and over

	Mean	Std. Dev.	Min	Max
<b><i>Dependent Variables</i></b>				
Whether Sick	0.11	0.32	0	1
ADL scale	0.22	0.84	0	7
<b><i>Independent Variables</i></b>				
Age	67.65	7.38	60	100
Married	0.62	0.49	0	1
Female	0.49	0.50	0	1
Asset Index	8.30	4.42	0	23
Highest Adult Education	2.37	1.70	0	5
<b><i>Living Arrangement</i></b>				
Living Alone	0.02	0.16	0	1
Living with Spouse	0.10	0.30	0	1
Living in Nuclear Family	0.11	0.31	0	1
Living in Joint Family (comparison group)	0.77	0.42	0	1
<b><i>Social Groups</i></b>				
High Caste (comparison group)	0.24	0.43	0	1
OBC	0.37	0.48	0	1
Dalit	0.19	0.39	0	1
Adivasi	0.06	0.23	0	1
Muslim	0.10	0.30	0	1
Sikh, Christian, Jain	0.04	0.19	0	1
Urban	0.23	0.42	0	1
Social Network	1.07	1.16	0	3

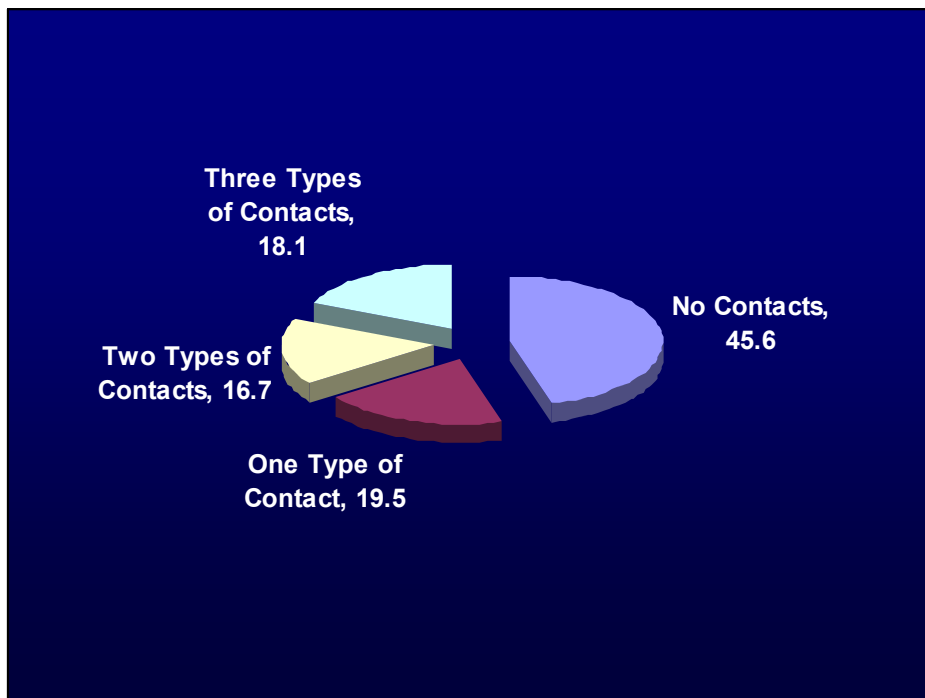
Source: Weighted IHDS 2005

Figure 2. Social Network Contacts with Three Indian Institutions among households with people 60 and over.



Source: Weighted IHDS 2005

Figure 3. Extent of Social Network Contacts



Source: Weighted IHDS 2005 data



### Major Dependent and Independent Variables

Two major dependent variables are used in this paper to examine the association of social networks that the households are embedded in with health outcomes.

The first set of models use a dependent variable based on information collected on short term morbidity, i.e., the incidence of suffering with fever, cough and/or diarrhea in the 30 days prior to the interview. This is a dummy variable where people who suffered from a bout of either one or all of these illnesses are coded 1, and those that did not are coded 0. About 11% of people aged 60 and over suffered from a bout of these illnesses (Figure 4). Logistic regression is used to predict the likelihood of suffering from short term morbidity, controlling for relevant social factors and extent of social networks.

The second set of models use a dependent variable which is a scale based on information from the responses to questions about activities of daily living (ADL). The ADL scale ranges from 0 to 7 and has a Cronbach alpha of .80. A score of 0 represents people who have no difficulty performing basic activities of daily living including walking a kilometer, dressing themselves, going to the toilet independently, or have any problems related to hearing, speech and seeing objects near and far. A score of 7 represent people who have some level of difficulty performing all these activities. About 10% of people aged 60 and above seem to have difficulty performing at least one activity of daily living (Figure 5). Ordinary Least Squares regression is used to model the association between activities of daily living and social networks, controlling for other important social factors.

Figure 4. Percent of People Aged 60 and Over Who Were Sick with Diarrhea, Cough and/or Fever

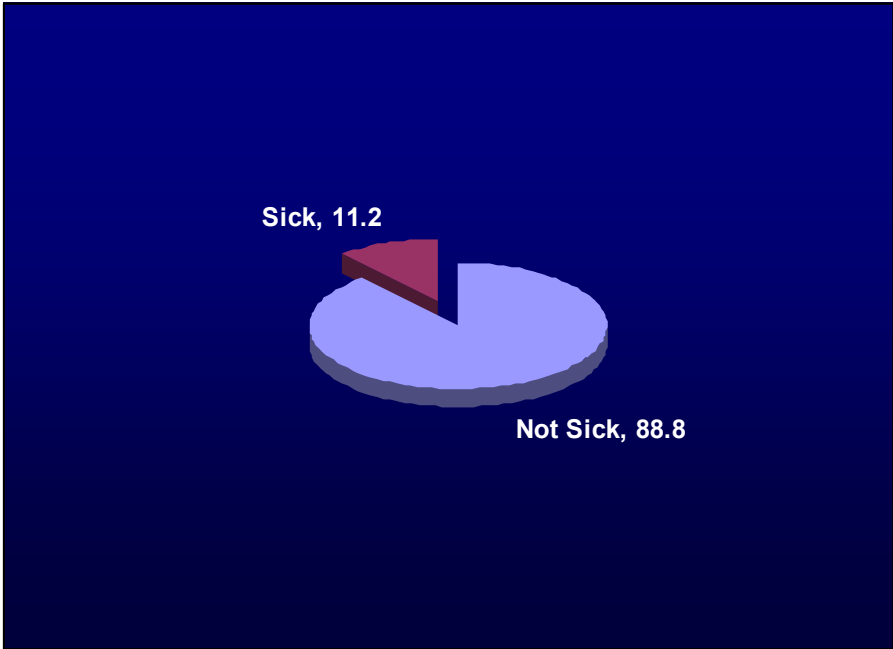
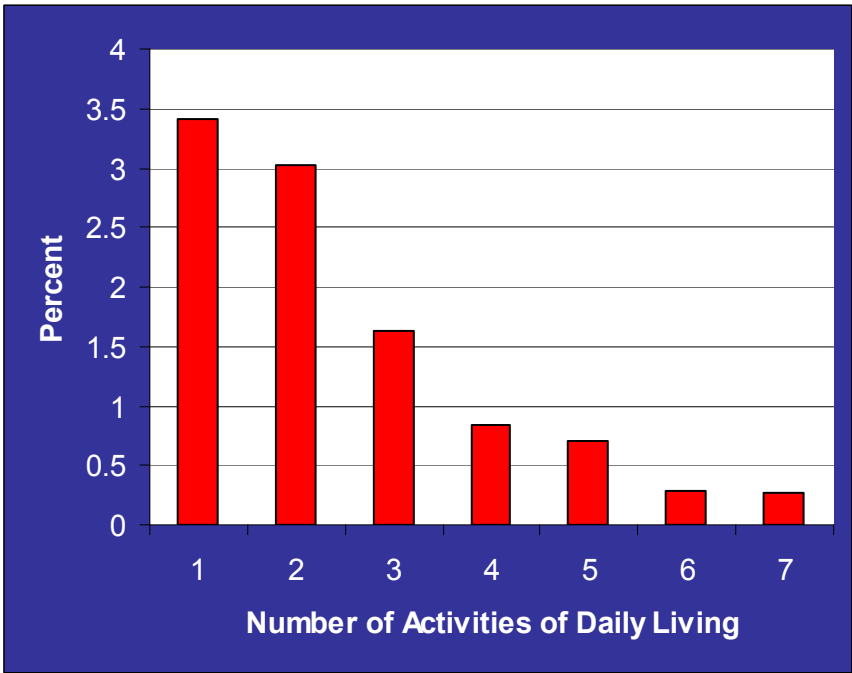


Figure 5. Percent of People Aged 60 and Over Who Have Difficulty Performing One or More Activities of Daily Living (ADL)



Both models control for individual, household and location factors that have been theorized to have an effect on health outcomes in past research. At the individual level, a person's **age**, **gender** and **marital status** are controlled. Past research has found that the likelihood of

falling sick or having difficulty with activities of daily living increases as a person ages and females are more likely to fall sick than males. Furthermore, we expect marital status to lend some protection to health if a person is married.

At the household level, the models control for some common socio-economic variables which have also been found to have impact on health. A scale variable measuring **standard of living** is included in the model to control for household economic status instead of income because of the relative difficulty of estimating income in a predominantly agricultural society. This variable is a sum of 23 household assets and thus ranges from 0 to 23. **Education** captures the highest level of education achieved by the most educated adult in the household in terms of years of schooling. **Social group affiliation** effect is controlled for using a series of dummy variable of the various caste and religious groups. Dalits, Adivasis, Other Backward Castes and Muslims tend to be disadvantaged on many socio-economic fronts compared to High caste Hindu groups. While few studies have looked at the effect of caste and religion on health outcomes, since it is an important discriminating factor on many outcomes in India, we include it in the model to test their effect. Thus, households belong to either of the following- High caste, Other Backward castes (OBCs), Dalits, Adivasis, Muslim, and a combined category of other religions including Christians, Sikhs and Jains. In the models all groups are compared to High caste Hindu households. According to previous research higher levels of income and education are associated with better health. The relationship between social group affiliation will be explored in this paper as there is little evidence in research.

We also control for **living arrangement**, given the lack of senior care infrastructure in India. Household members play an important role in taking care of older people and to the extent that a senior person lives with others, he or she may have better health outcomes than living alone. Living arrangement is included in the model in a series of dummy. The dummy categories are living alone, living with spouse only, living in a nuclear family, i.e. with children, and living in a multi-generational extended family. The last is used as the comparison group in our models. It is quite a common living arrangement in India with 77% of older persons living in such households (Figure 1). In a previous paper based on this data, seniors living with extended family fared the best while older people living alone were the most likely to fall sick with fever, cough and diarrhea (Sen and Noon, 2006).

Location effects are controlled for using dummies for **urban** and a series of dummies for each **state**. Urban areas have access to better health care services as well as better sanitation infrastructure. Thus, we expect urban location to be associated with better health. Urban is coded as 1 and rural areas are coded as 0. About 23% of households are in urban areas. Regional

controls in the form of states are meant to capture not only generalized weather variation but more importantly, variation in medical infrastructure and programs which differs widely by State. All States are compared to Uttar Pradesh.

## **Results**

### (I) Likelihood of Falling Sick with Diarrhea, Cough or Fever

Step-wise logistic regression is used to examine the effect of social networks on short term health outcomes. The first model, a bi-variate relationship between social networks and health outcomes is in the expected direction wherein larger social networks are significantly associated with a lesser likelihood of falling sick (Table 2). In the second model, we include the individual level variables of age, gender and marital status. While age and marital status have no effect on the likelihood of falling sick, females seem to be significantly more likely to fall sick with diarrhea, cough and fever. Controlling for individual level factors, social networks including contacts with three major institutions remain significantly associated with a lesser likelihood of falling sick.

In the third model we include both individual and household level controls. The significance and magnitude of the individual level controls remain almost the same as in the previous model. At the household level three factors are important. Both education and standard of living seem to significantly lower the likelihood of falling sick. Thus, seniors in educated and wealthier households are slightly less likely to report having suffered from a bout of illnesses. This is in keeping with our expectation. Furthermore, living arrangement seems to play a large and significant role in health outcomes. Seniors who live alone tend to significantly fare the worst, as they are 4 times as likely to report being sick than their counterparts living with extended families. Those who live only with their spouses are twice as likely to fall ill compared to those in extended families and those who live with their unmarried children tend to be 1.7 times as likely as seniors in extended families. Thus, seniors have the best health outcomes if they reside in a multigenerational household.

Social affiliation seems to have less impact on health outcomes for short term morbidity. Unlike the ample evidence of disadvantage of the Dalits, Other Backward Castes and Muslim on outcomes related to education and income, in terms of health seniors in these groups do not seem to be significantly different than High caste Hindu seniors. What is more surprising is that Adivasi's or tribes are actually significantly less likely to fall sick compared to High caste Hindus. The only social group affiliation where seniors seem to be significantly more likely to fall sick than High caste Hindus are those belonging to the other religious groups, including Christian, Sikhs and Jains.

Once these factors at the individual and household are controlled for, we see that the association between social networks and better health actually reverses. People in households with larger social networks seem to be significantly but slightly more likely to fall sick with diarrhea, cough and fever. This is contrary to our hypothesis. The magnitude of the effect however is so small at an odds ratio of 1.09 times as likely as people in households with smaller networks that it would be safe to surmise that having a household embedded in a social network comprising of contacts with three important institutions actually has a negligible effect on health, once household level characteristics are controlled for.

The full model includes location factors of urban and region in addition to all of the above variables. Seniors living in urban areas are significantly less likely (.77) to fall sick compared to their counterparts in rural areas. This is in keeping with past research and in accordance with our hypothesis. Regional or State dummies reflect that seniors in some of the southern states fare better than Uttar Pradesh in the north. The effect of social networks on health remains the same as in the previous model showing seniors in households with larger social networks being more vulnerable. But since the magnitude of the effect is so small, it is more likely that social networks as measured here have little impact on short term health outcomes.

## (II) Difficulty in Performing Activities of Daily Living

Step-wise Ordinary Least Squares regression is used to examine the association, if any, between social networks and activities of daily living. The expectation is that seniors who have contacts with three major institutions-health, education and the government have access to help and knowledge regarding leading a healthy lifestyle and thus have less difficulty performing activities of daily living.

The first model examines the bivariate relationship between social networks and the difficulty of performing activities of daily living. The extent of a social network of a household seems to have a significant negative relationship with the difficulty of performing ADLs. Though the magnitude of the effect is small, it is in the expected direction of the hypothesis.

The next model includes individual level factors of age, gender and marital status as control variables. Age has a significant and positive effect with respect to difficulty in performing activities of daily living. The older the senior is the more the difficulty. Being female also has an independent, significant and positive association with the difficulty of performing activities of daily living. Even after controlling for age, women have more difficulty than men performing ADLs. Marital status has little effect. The significance, direction and magnitude of the association between social networks and difficulty performing ADLs remain the same as in the previous model, which is in keeping with our hypothesis.

The third model introduces controls at the household level. Standard of living and living arrangement are the two factors that have a significant association with difficulty performing ADLs. Seniors in economically wealthier households seem to be significantly better off when it comes to performing ADLs compared to other households. Seniors living alone or those living with only a spouse seem to report more problems performing activities of daily living than those living with extended families. Seniors living with unmarried children seem not to be different than those living with extended family. Social group affiliation is again less important as a variable in trying to understand health outcomes. Seniors in Other Backward Castes, Dalits and

Muslim groups are not significantly different from High caste Hindus as it relates to performing activities of daily living. But like the model predicting the likelihood of falling sick, here again the Adivasi's or the tribals seem to be better off than seniors in High caste Hindu households, by reporting less difficulty performing ADLs. As in the case of short term morbidity, seniors in other religious groups including Christians, Sikhs and Jains have significantly more difficulty performing activities of daily living than their counter parts in High caste Hindu households. Even after controlling for both individual and household level factors, social networks retain the significant, small negative effect on difficulty of performing activities of daily living- such that, the larger the social network, the less difficulty seniors have in performing ADLs.

In the full model, location factors are introduced as controls. Seniors in urban areas fare no different than seniors in rural areas with regard to performing activities of daily living. States seem to have a more significant effect on activities of daily living than urban location. Some states fare better than others, though southern states that are known to have better health infrastructure do not necessarily do so in comparison to Uttar Pradesh in the north. Once location factors are controlled, social networks seem to have no significant effect on the difficulty of performing activities of daily living.

## **Discussion**

In a country where social security systems and affordable health care for the older population is largely lacking, we expected larger social networks to be associated with better scores on health measures, such as incidence of diarrhea, cough and fever or performing activities of daily living. But after controlling for household and location factors, social networks as measured here seems to have little effect on the two health outcomes examined in this paper. While the most immediate and direct factor for falling sick is exposure to germs and viruses, our model is designed to capture only social factors that influence health outcomes. And social networks do not seem to mitigate the exposure to germs.

One of the most important social factors in predicting both outcomes seem to be living arrangements. Family members seem to be the most helpful people for the well being of the older population in India. Having contacts with people in the medical, educational or government institutions does not seem to protect seniors from falling sick or ease their performance of activities of daily living.

Furthermore, controlling for all factors, women seem to suffer more than men, both in terms of being more likely to fall sick with diarrhea, cough and fever and having more difficulty performing activities of daily living. Other studies on India have found that adult females seem to have higher rates of morbidity than males (Sen and Sharma, 2005; Duggal and Amin 1989; Kannan 1991; Sundar 1995). A survey of health care utilization and expenditure conducted by NCAER in 1993 showed that in the 15-59 age range, the reported morbidity rates are higher for the females as compared to their male counterparts, both in the case of rural and urban areas (Sundar 1995). Similarly, a study of morbidity among women in Mumbai city reported not only a large gender gap between male and female morbidity but also that in each age group, including children below five years, female morbidity is higher than male morbidity and that this gap increases with each age group. While female morbidity is 6 percent higher in children below five years, it is 264 percent higher among females above 45 years in age (Madhiwalla and Jesani 1997).

This has been found in most other countries as well. While women enjoy longer life expectancy, this does not seem to translate to being healthier on a day to day basis. There is some discussion in the literature about the reasons for this. Whether women are just more likely to admit being sick compared to men and thus report higher rates of illnesses. But the few studies that have used biomarkers to parse this out have found that women do fall sick more than men.

Among the differences in the factors that affect the two outcomes measured, age, education and urban location stand out. Age has a significant association with the performance of



activities of daily living while having no impact on the likelihood of falling sick with diarrhea, cough or fever. Education on the other hand, is the opposite. It reduces the likelihood of falling sick for seniors but has no effect on the difficulty of performing activities of daily living. Finally, urban location reduces the likelihood of falling sick but has no effect on ADLs.

Future research on the effect of social networks may be more productive if we examined its association with preventative healthcare and quality of treatment. These networks would then perhaps prove to be more useful for understanding senior well being.

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