Gender, Health, Marriage and Mobility Difficulty among Older Adults in India

The population of older persons in India is rising significantly. As men and women live longer, there will be an increase in older persons with mobility difficulties. It is therefore necessary to assess the covariates of mobility difficulty in this population in order to effectively model interventions that will delay the onset of these functional limitations.

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Recent evidence from India suggests a growing prevalence of morbidity and poor health status along with significant increases in longevity in the elderly population (Alam, 2000). Yet, barring a few exceptions, most studies about the health and functional ability of older persons in India are based on impressionistic findings and rarely provide empirical evidence addressing the factors that are associated with morbidity and functional limitations.

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Using a large nationally representative sample, this paper documents the prevalence of mobility difficulty among older persons in India and examines the factors associated with such difficulty. In this research, the authors seek to enhance the understanding of mobility limitations among older persons in Western industrialized countries by addressing how different socio-economic, health and demographic variables are associated with mobility limitations in persons aged 60 years and over in India. With a rise in the size of the population of older persons and an increase in life expectancies at older ages, India is likely to experience a concomitant increase in the number of functionally limited elders. It is therefore necessary to examine the covariates of functional limitations, particularly mobility difficulty among older persons in India. This paper attempts to initiate such a dialogue.

Studies differ in their use of measures that gauge disability and functional limitations among elders, and consequently in their estimates of these difficulties. For instance, some studies have used chronic diseases to measure health and disability among the elderly, while others have focused on difficulty in performing activities of daily living (ADL) and instrumental activities of daily living, and yet others have measured difficulty in performing those activities that require at least some level of mobility. However, these studies clearly demonstrate that difficulty in physical functioning is more frequent with increasing age, among women and unmarried/divorced individuals (Fried, 2000; Leveille and others, 2000; Lillard and Waite, 1995). Furthermore, mobility difficulty is a common problem and lower body limitation is a persistent predictor of limits in capacity for daily life.

In India, there are variations in the gender differences in mortality and physical impairments between the northern and southern parts of the country (Bhatt, 1998; Sengupta and Agree, 2001). In previous research, those differences are largely attributed to differences in the status of women between the northern and the southern parts of the country. Considering the generally low status of women (Basu, 1992) in the northern and north-western states, it is likely that socio-economic marginalization through the life course makes older women in these states more vulnerable to ill-health than women in the southern states. For instance, using data from the National Family Health Survey from the states of Uttar Pradesh and Haryana in northern India and Kerala and Tamil Nadu in southern India, Sengupta and Agree (2001) found that northern women were more likely than northern men to report physical impairments of the eyes and limbs, while in southern India, there were no significant differences between men and women. In another study, Rajan, Mishra and Sarma (1999), using data from the southern states of Tamil Nadu, Kerala and Karnataka, found that women were less likely than men to report vision, hearing and walking difficulties.

There is evidence that in India as well as in other countries in South Asia, marriage and the presence of sons is associated with better survival as well as health outcomes (Rahman, 2000; Sengupta and Agree, 2001). However, the comparatively greater benefits of marriage experienced by women compared with

men may vary between countries and regions within countries, based on kinship and marriage systems. Such regional variations are evident in a recent study in India (Bhat, 1998): the southern states show a pattern of higher mortality disadvantage among widowers whereas the northern states show greater disadvantage for widows. Mari Bhat attributes this regional difference to the variation in the incidence of joint families (see Kolenda, 1987 for an explanation of family systems in India).

In a patriarchal society where gender roles are strictly followed, as in India, and where women do most of the housework and caregiving, coresidence with one's spouse may be more beneficial for men since women do most of the housekeeping and caregiving. Yet, Indian women may benefit more than their husbands from the presence of the spouse and sons in the household, mainly owing to their general dependence on men and the sociocultural security of having a spouse (for more discussion, see Lamb, 1999).

One of the consistent findings from previous studies is the positive association between socio-economic status and health, particularly physical functioning (Ross and Wu, 1996; Zimmer and Amornsirisimboon, 2001). Similarly, the association between chronic diseases such as arthritis, stroke, heart disease, hypertension, diabetes, pulmonary disease and cognitive impairment, and decreased functional capacity at older ages is well-established (Fried and others, 1994; Fried, 2000).

Although most of these studies on elderly persons' health and functional ability are limited to western societies, some consistent observations regarding correlates of disability and functional limitations have emerged. Using research findings from previous studies conducted almost exclusively in western industrialized countries and taking into consideration the sociocultural underpinnings of the Indian subcontinent, the following hypotheses are examined:

H1: Compared with older men, older women in India are more likely to report mobility difficulty.

H2: Marriage has a significant and positive association with mobility status. This association is stronger for older women.

H3: Each measure of health (chronic disease) is associated with mobility difficulty. The association between chronic disease and mobility difficulty varies by sex.

H4: Education is inversely associated with mobility difficulty.

H5: Compared with older persons who do not have sons, those who have sons are less likely to report mobility difficulty.

Data and methods

The data used for this study come from the forty-second Round of the National Sample Survey of India conducted in 1986-1987 by the National Sample Survey Organization (NSSO), Ministry of Planning and Programme Implementation, Government of India. The importance of this nationally-representative sample lies in its being the first survey conducted by NSSO to assess the nature and dimensions of socio-economic and health problems of persons aged 60 years and over. The data include a wide variety of information, including demographic and health status data as well as information on mobility restrictions. In addition to questions about socio-economic and demographic factors, this survey includes questions on disability and chronic diseases.

The dependent variable for this analysis is a three-category variable indicating whether the respondent was (a) physically immobile, (b) had some mobility difficulty, or (c) had no mobility difficulty. The questions that determine the extent of mobility restrictions are different from those used in surveys in the United States of America and are not aligned with the ADL or Nagi questions commonly used in Western surveys. Respondents were first asked if they were physically immobile. Responses were coded as either "yes" or "no". Each respondent who reported being mobile was subsequently asked whether he/she had any mobility restrictions. Respondents who stated that they had some mobility restrictions were asked to select a reason for their mobility difficulty. Response categories included "health", "financial", "loss of contact" and "others". Only those respondents who stated that their mobility restriction was related to health reasons were considered as having "mobility difficulty" for the purpose of this analysis. Respondents who stated that the reason for their mobility difficulty was not health-related were considered as having no mobility difficulty. As respondents were expected to provide one and the most important reason that led to that mobility difficulty, mobility difficulty among those individuals who may suffer some health-related mobility restrictions might have been underestimated for cases in which it was not the most important reason for their restricted mobility.

Another limitation of the data stems from the use of self-perceived measures of mobility difficulty. In addition to reflecting real difficulty, these self-perceived measures could be affected by the perceptions of difficulty. There is evidence from other studies that perceptions about illness and disability are positively associated with education and it is likely that in the present context, large differences in educational status between men and women may lead to differences in illness perceptions (Sengupta and Agree, 2001). Given the generally low levels of education in this population and particularly among women, the use of self-perceived measures of mobility difficulty are likely to cause an underestimation of mobility difficulty in the sample in general, and among women in particular.

Table 1. Characteristics of men and women aged 60 years and over, India National Sample Survey, 1986-1987

	Men (N = 34,864)		Women (N = 23,342)		Total (N=58,206)	
	N	Percentage	N	Percentage	N	Percentage
Mobility difficulty* **						
Immobile	1,683	4.8	1,673	7.2	3,356	5.8
Some difficulty	1,692	4.9	1,271	5.4	2,963	5.1
No difficulty	31,489	90.3	20,398	87.4	51,887	89.1
Age* (Mean)**		66.5		67.2		66.7
Marital status* **						
Currently married	32,516	93.3	7,902	33.9	40,418	69.4
Widowed/divorced/separated	2,348	6.7	15,440	66.1	17,788	30.6
Sons alive						
None	5,224	15.0	2,902	12.4	8,126	14.0
1-2	16,928	48.6	12,581	53.9	29,509	50.7
3 or more	12,712	36.5	7,859	33.7	20,571	35.3
Daughters alive* **						
None	6,721	19.3	4,881	20.9	11,602	19.9
1-2	17,784	51.0	12,092	51.8	29,876	51.3
3 or more	10,359	29.7	6,369	27.3	16,728	28.7
Health conditions						
Cough***	8,027	23.0	4,717	20.2	12,744	21.9
Problem with joints and limbs***	9,779	28.0	7,671	32.9	17,450	30.0
Urinary problems***	1,164	3.3	521	2.2	1,685	2.9
Hypertension*						
Yes	2,499	7.2	1,868	8.0	4,367	7.5
None	26,496	76.0	17,517	75.0	44,013	75.6
Don't know	5,869	16.8	3,957	17.0	9,826	16.9
Heart disease						
Yes	1,179	3.4	735	3.1	1,914	3.3
None	28,031	80.4	18,788	80.5	46,819	80.4
Don't know	5,654	16.2	3,819	16.4	9,473	16.3
Diabetes* **						
Yes	825	2.4	381	1.6	1,206	2.1
None	28,222	80.9	19,035	81.5	47,257	81.2
Don't know	5,817	16.7	3,926	16.8	9,743	16.7
Urban residence* **	15,046	43.2	8,296	35.5	23,342	40.1
Education* **						
Illiterate	22,472	64.5	19,010	81.4	41,482	71.3
Primary school	4,067	11.7	1,588	6.8	5,655	9.7
Middle school	6,176	17.7	2,145	9.2	8,321	14.3
High school	1,637	4.7	474	2.0	2,111	3.6
Graduate or higher	512	1.5	125	0.5	637	1.1

* $p<0.10$ *** $p< 0.01$

Table 1 presents selected characteristics of the respondents separately for men and women. While 5.8 per cent of older men and women reported being immobile, only 5.1 per cent reported having some mobility difficulty. This relatively low percentage of individuals who reported having mobility difficulty owing to health reasons likely indicates an underestimation of individuals who may have some health-related mobility difficulty, which may not have been the primary cause of their mobility restriction and was therefore not recorded in the survey. While 7.2 and 5.4 per cent of older women are immobile and have some mobility difficulty, respectively, fewer men are immobile (4.8 per cent) and have mobility difficulty (4.9 per cent). These gender differences in mobility difficulty are statistically significant.

Based on theoretical considerations and the review of previous research largely in developed countries, the authors selected a set of independent variables indicating health, demographic and socio-economic characteristics of the respondents. Age, sex and marital status were entered into the model to indicate the demographic characteristics of the respondents. The mean age of the sample was about 67 years. Out of the 58,206 respondents, about 60 per cent were men and 40 per cent women. Women were significantly less likely than men to be currently married. Over 65 per cent of older women in the sample were widows compared with only 6 per cent of older men. This higher rate of female widowhood can be largely explained by the age differences between marriage partners where women marry men who are significantly older than themselves (Gulati, 1993), and to a lesser extent to increasingly higher female life expectancies at older ages.

Among the independent variables, a series of diseases was used to indicate the general health of the respondents. These health variables include chronic cough, urinary disease, pain in joints and limbs, diabetes, blood pressure and heart disease. Respondents were asked if they suffered from each of these health problems and the responses were coded as “yes”, “no” and “don’t know”. Based on the responses in each of these categories of the disease variables, the variables indicating chronic cough, urinary disease, and pain in joints and limbs were recoded into dichotomies indicating the presence or absence of the condition. The heart disease, blood pressure and diabetes variables remained as three-category variables.

The disease questions asked in the survey were precisely worded to ascertain whether respondents had specific illnesses. However, the list of health problems included those that could be diagnosed without formal medical diagnosis (chronic cough, pain in joints and limbs and urinary problems) and those that needed formal diagnosis (hypertension, diabetes and heart disease). Considering that other studies in South Asia have found gender differences and a female disadvantage in the use of health facilities and doctor visits, women respondents in this survey were likely to underreport illnesses such as heart disease, diabetes and hypertension that require medical diagnosis.

The most common health problem reported by the particular group was pain in the joints and limbs (about 30 per cent of the sample). Considering that this

health condition is the closest to what may be termed as "arthritis" in surveys in the United States and other developed countries, it is not surprising that women were significantly more likely than men to report this condition. Nearly 22 per cent of the respondents reported suffering from chronic cough and more men than women suffered from this condition. This gender difference in chronic cough likely arises from the higher consumption of tobacco and subsequently from the higher incidence of lung disease, including tuberculosis, among men. Relatively fewer people reported having the other health conditions included in the survey. Interestingly, over 16 per cent of the respondents reported not knowing whether they suffered from diabetes, abnormal blood pressure and heart disease.

Socio-economic status was measured with respondents' level of education. Education was coded as a five-category variable indicating that the respondent was illiterate, had completed primary school, middle school or high school or had a graduate or higher degree. Over 70 per cent of the sample was illiterate and there were significant gender differences in educational attainment.

To assess the level of family support, the authors controlled for the respondents' surviving sons and daughters. Two separate variables were coded to indicate whether the respondent had no sons/daughters, one or two sons/daughters, or three or more sons/daughters. About 80 per cent of the respondents had at least one surviving daughter and over 86 per cent had at least one surviving son. As the availability of health services varies by area of residence, a dichotomous variable indicating rural or urban residence was included. Over 40 per cent of the respondents lived in urban areas.

A multinomial logistic regression was used to model the three-category mobility variable. Although the three-category dependent variable would seem to be a candidate for ordered logistic regression, the model did not meet the distribution necessary for an ordered logistic regression. The chi-square score for testing the proportional odds assumption was 113.1365 with 18 degrees of freedom, significant at 0.001, indicating that a proportional odds model was not appropriate for the data. Therefore, a multinomial logistic regression model was used, in which the order of the outcomes is not imposed on the data and effects are allowed to vary. The authors begin their analysis with a model with all control variables and proceed to show interactions in the following models.

Results

Table 2 shows the odds ratios (ORs) from multinomial logistic regression of mobility difficulty among persons 60 years and over. All the demographic variables have significant association with mobility difficulty. Age significantly enhances the odds of having some mobility difficulty as well as being immobile. Results indicate that older women are 1.19 times more likely than men to report severe mobility difficulty. However, there are no significant gender differences among persons who report some mobility difficulty.

Table 2. Odds ratios from multinomial logistic regression showing the likelihood of mobility difficulties among persons aged 60 years and over

	Severe mobility difficulty	Some mobility difficulty
Female	1.183 ***	1.041
Age	1.086 ***	1.062 ***
Marital status		
Widowed/divorced/separated		
Currently married	0.72 ***	0.882 **
Sons alive		
None		
1-2	0.902 *	0.825 ***
3 or more	0.835 ***	0.813 ***
Daughters alive		
None		
1-2	0.956	0.977
3 or more	0.923	0.978
Health conditions		
Cough	1.598 ***	1.66 ***
Problem with joints/limbs	2.28 ***	2.779 ***
Urinary problems	2.125 ***	2.111 ***
Hypertension		
No		
Yes	1.419 ***	1.494 ***
Don't know	0.871 *	1.208 **
Heart disease		
No		
Yes	1.684 ***	1.689 ***
Don't know	1.251 ***	1.029
Diabetes		
No		
Yes	1.351 ***	1.1
Don't know	1.177 **	0.877 *
Urban residence	0.963	0.869 ***
Education		
Illiterate		
Primary school	0.891 *	0.987
Middle school	0.849 ***	0.946
High school	0.823	0.696 ***
Graduate or higher	0.724	0.57 **
Log likelihood	-21,861.40	
N	**58,206**	

* p<0.10, ** p<0.05, *** p<0.01

According to the second hypothesis, marital status was expected to be significantly and negatively associated with mobility difficulty. The results from this analysis confirm the hypothesis. Being married significantly reduces the likelihood of reporting severe mobility difficulty (OR= 0.72; $p<0.01$) as well as the likelihood of reporting some mobility difficulty (OR= 0.88; $p<0.05$). However, there was no significant interaction between marital status, sex of respondent and mobility difficulty (not shown in table).

Among the disease variables, pain in the joints and limbs has the most significant association with mobility difficulty. Compared with persons who report no pain in the joints and limbs, persons who report such pain are 2.28 times more likely to report severe mobility difficulty and 2.78 times more likely to report some mobility difficulty. The results suggest that having any of these diseases is significantly associated with increased odds of having at least some mobility difficulty, therefore confirming the authors' third hypothesis. An interesting result with respect to heart disease, blood pressure and diabetes is that persons who do not know whether they have these diseases are also significantly more likely than those who do not have these diseases to report mobility difficulty. For instance, compared with persons who do not have heart disease, those who do not know whether they suffer from heart disease are 1.25 times more likely to report severe mobility difficulty. Similarly, compared with persons who do not have diabetes, persons who do not know whether they suffer from diabetes are 1.8 times more likely to report severe difficulty. Several interesting interactions between morbidity, mobility difficulty and gender were also observed. These findings are discussed in the following paragraphs.

There appears to be a positive, though not consistently significant association between educational achievement and mobility status. While education at the middle school level significantly reduces the odds of reporting severe mobility difficulty (OR=0.85; $p<0.01$), high school completion (OR=0.70; $p<0.01$) and a graduate or higher degree (OR=0.57; $p<0.05$) significantly reduces the odds of reporting some mobility difficulty.

Compared with those living in rural areas, older urbanites are significantly less likely to report some mobility difficulty (OR=0.87; $p<0.01$). With respect to the availability of family support, it appears that the number of sons is significantly associated with functional mobility. Confirming the expectations (H5), older persons who have one or two sons are significantly less likely to report some mobility difficulty compared with those who have no sons. However, the positive association between having sons and better mobility status is more pronounced when an individual has three or more sons. For instance, compared with those who have no sons, persons who have three or more sons are less likely to report some mobility difficulty (OR=0.81; $p<0.01$) as well as less likely to report having severe mobility difficulty or being immobile (OR=0.84; $p<0.01$). By contrast, having daughters is not significantly associated with mobility status.

To address possible gender interactions in the association between mobility status and chronic diseases, separate logistic regression models were used for each of the chronic disease variables. Gender interactions are not significant in the association between mobility status and chronic cough, pain in joints /limbs and urinary problems. Given that the association between chronic diseases (diabetes, heart disease and hypertension) and mobility difficulty showed interactions with the sex of the respondent, this statistical interaction term was decomposed to intercode the two independent, interactive variables and the multinomial logistic regression was recomputed (see table 3).

Table 3. Odds ratios from multinomial logistic regression showing the likelihood of mobility difficulties among persons aged 60 years and over

	Severe mobility difficulty	Some mobility difficulty
Men without diabetes	1.000	1.000
Men with diabetes	1.444 ***	1.140
Men who do not know if they have diabetes	1.229 ***	0.799
Women without diabetes	1.212 ***	1.002
Women with diabetes	1.473 **	1.003
Women who do not know if they have diabetes	1.365 ***	0.991
Men without hypertension	1.000	1.000
Men with hypertension	1.610 ***	1.616 ***
Men who do not know if they have hypertension	0.912	1.137
Women without hypertension	1.240 ***	1.030
Women with hypertension	1.540 ***	1.392 ***
Women who do not know if they have hypertension	1.028	1.346 ***
Men without heart disease	1.000	1.000
Men with heart disease	1.854 ***	1.920 ***
Men who do not know if they have heart disease	1.290 ***	0.968
Women without heart disease	1.211 ***	1.033
Women with heart disease	1.797 ***	1.414 ***
Women who do not know if they have heart disease	1.472 ***	1.150

** $p < 0.05$, *** $p < 0.01$
(controled for sociodemographic factors, not shown)

Table 3 shows the odds ratios from separate multinomial logistic regression models with gender interactions in the association between mobility status on the one hand and hypertension, diabetes and heart disease on the other. The control variables are not shown in table 3, as they do not vary significantly from the original model in table 2.

The results show that compared with men who do not report hypertension, men and women who report hypertension are 1.6 times and between 1.4 and 1.5 times, respectively, more likely to report either some mobility difficulty or severe mobility difficulty. However, women who do not have hypertension or who do not know whether they have hypertension are also more likely than men who do not have hypertension to report at least some mobility difficulty. For instance, women who do not have hypertension are 1.24 times more likely than the comparison group to report severe mobility difficulty. Similarly, women who do not know if they have hypertension are 1.35 times more likely than the comparison group to report mobility difficulty.

With respect to heart disease, the results show that both men and women who have heart disease are significantly more likely than men who do not have heart disease to report mobility difficulty. Men who have heart disease are almost two times more likely than men who do not have heart disease to report mobility difficulty. Furthermore, both men and women who do not know if they have heart disease are significantly more likely to report severe mobility difficulty. Compared with men who do not have heart disease, men and women who do not know whether they have heart disease are 1.3 and 1.5 times respectively more likely to report severe mobility difficulty. In addition, women who have no heart disease are 1.2 times more likely to report severe mobility difficulty than men without heart disease.

Discussion

The population of older persons in India is rising significantly. As men and women live longer, there will be an increase in older persons with mobility difficulties. It is therefore necessary to assess the covariates of mobility difficulty in this population in order to effectively model interventions that will delay the onset of these functional limitations. In this article, the authors explore the characteristics of individuals who report severe and moderate mobility difficulties. The measure of mobility difficulty, though not without limitations, is unique in its approach to address levels of mobility difficulty. Furthermore, in the absence of better ADL/Nagi measures of disability, the measures provide at least some proxy estimate of disability.

Results from this study confirm that women experience a disadvantage with respect to severe mobility restriction that can lead to immobility. The results also confirm previous research regarding the negative association between marriage and mobility limitation. However, the study finds no significant gender differences in the association between marital status and mobility status among older persons in India. Considering the level of son preference and the overwhelming cultural dependence on sons, especially at older ages, it is not surprising that having more sons is associated with no or fewer mobility restrictions. It is likely that with more sons in the household, older men and women

receive more support and have better access to health care, both of which are associated with higher mobility status.

The analysis suggests that the association between mobility and chronic diseases in the elderly is substantial. The cross-sectional data do not allow the identification of causal linkages, but the present findings suggest that these chronic conditions, including diabetes, arthritis, heart disease, hypertension and chronic cough, can be risk factors associated with mobility difficulty. Furthermore, both men and women who do not know if they have diabetes, heart disease or hypertension also report more mobility-related difficulties compared with those who do not have these diseases. This association is stronger in the case of older women. Although it is possible that mobility difficulty in some men and women may have occurred before the onset of these diseases and are associated with accidents or early impairments, the finding that non-diagnosis of chronic diseases is associated with mobility difficulty more likely reflects the lack of health care utilization among older persons in general and older women in particular.

Furthermore, what is very interesting among the present findings is that older women in the sample consistently reported severe mobility difficulty or being immobile even in the absence of certain chronic conditions such as diabetes and heart disease. This could mean that women are overreporting their mobility difficulties or that they suffer other health conditions (not measured in this survey) that are associated with severe mobility difficulty. It would be interesting in the future to assess a wider variety of chronic conditions and examine their association with mobility difficulty.

This study has important policy implications. First, these results, though not causal, suggest the need for a prevention strategy that will advocate steps to deter and timely treat chronic conditions that are associated with mobility difficulty. These strategies may include lifestyle changes during middle age in order to decrease subsequently the incidence or at least severity of chronic diseases that are associated with ageing on one hand and mobility restrictions on the other. Second, these strategies may underscore the need for timely diagnosis of chronic diseases and identification of risk factors, which may then be treated in order to halt, or at least decrease, their negative impact on functional decline. There are several major difficulties inherent in the immediate adoption of these recommendations, especially in a country where the population is still largely young and the focus of public health administrators is directed to the younger generations. Yet, these findings provide guidelines and outline strategies that will be necessary to deal cost-effectively with health problems among the growing number of elders, many of whom may suffer from mobility limitations.

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