Prevalence of health related disability among community dwelling urban elderly from middle socioeconomic strata in Bangaluru, India

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Background & objectives: Research has shown that health related conditions and socio-economic factors influence disability in the elderly. We examined the prevalence of health related disability in community dwelling elderly (≥65 yr) residents in a suburb of Bangaluru, Karnataka, India, and assessed the association of disability with various socio-economic variables and current health status.

Methods: Using the International Classification of Functioning, Disability and Health (ICF) disability was measured in 356 elderly in the Koramangala suburb of Bangaluru city. Various socio-economic and health related factors associated with disability were documented.

Results: A total of 85 per cent of the respondents reported current medical problems. Based on a total disability score computed from the participation section of the ICF, 27 per cent of the respondents had mild disability while 37 per cent had higher level of disability. Disablement was significantly associated with age > 75 yr and impairment in cognitive and sensory functions especially hearing.

Interpretation & conclusion: In this urban elderly population while majority had current medical conditions, a significant proportion did not experience any difficulties in activities of daily living. Restriction in participation in activities of daily living was more influenced by increasing age and impairment in cognitive functions and not current health status. A multidimensional measure of disability as captured by the ICF needs to be applied to other populations such as urban poor and rural elderly to get a more comprehensive picture of disability among the elderly in India.

Key words Cognitive impairment - disability - elderly people

India is an ageing society[1] with the rate of growth of ageing population exceeding the growth of the general population[2]. In India, it is estimated that the elderly in the age group 60 and above is expected to increase from 71 million in 2001 to 179 million in 2031 and in the case of those 70 yr and older, the projected increase is from 27 million in 2001 to 132 million in 2051[3]. Data available from India suggest that almost 50 per cent of the elderly suffer from chronic diseases with the prevalence of diseases increasing with rising age from 39 per cent in 60-64 yr to 55 per cent in those older than 70 yr[4]. Cardiovascular diseases followed by respiratory diseases are the leading causes of death among the elderly in India[5]. Hearing and visual impairments are two of the common causes of morbidity in the aged population[6,7]. A National survey

noted that 5 per cent of the elderly have difficulty in physical mobility with women (7%) experiencing more difficulty than men (4%)[4]. Varying degrees of neuro-psychiatric morbidity have been reported, the median range of psychiatric disorders being one out of three elders, with depression being the commonest disorder in the elderly[8].

Among the elderly, the focus is not only on reducing disease related morbidity and mortality, but on promoting optimal health and ensuring disability-free years[9]. In a population based study in a rural district from South India, authors using the International Classification of Impairments, Disabilities and Handicaps, noted that visual disability was the single most important cause of preventable disability (56%) among the elderly aged above 60 yr with only one third of them using assistive devices[10]. In another study from northern India, a significant proportion of the elderly surveyed had multiple health-related morbidities (42.5%) and a higher number of morbidities were associated with greater disability and psychological distress[11]. In a clinic based study from a tertiary health care centre in Delhi, of the 1586 subjects aged 60 yr and above, 6.9 per cent had impairment in daily activities[12]. A study from Assam showed that utilization of health services was very low among the rural elderly compared to the urban elderly[13].

The focus in most epidemiological studies in old age has been on the relationship between the level of functional ability with age, gender and disease status[14,15]. Many population and clinic based cross-sectional studies in India have reported an association between female gender and greater health morbidity and functional disability among the elderly[16,17].

Studies, from both the developing countries[18] and developed economies[19] have noted an inverse association between socio-economic status and mortality, morbidity and disability among the elderly. A study from China reported wide disparities in the functional health of older adults especially in relation to instrumental activities of daily living (IADL) and these disparities were attributable in the main to differentials in educational attainment[20]. Studies from India have noted a negative association between socio-economic status and parameters of social morbidity such as widowhood and economic dependence among the elderly[17].

Thus, while majority of the studies on the elderly in India have focussed on the prevalence of health status,

health related disability has been a neglected area of research in Indian gerontology[21]. Most studies on ageing in the country have focussed on single dimensions of well being namely health, nutritional status, social support and economic status. In the International Classification of Functioning, Disability and Health (ICF) developed by the World Health Organization, the social and personal consequences of medical conditions and the influence of the environment are considered an important component of disability[22]. The present study was undertaken to determine the prevalence of health related disability in community dwelling elderly (≥ 65 yr) residents in a suburb of Bangaluru, Karnataka, India, using ICF version 2.1a. Various socio-economic and health related factors associated with disability were also examined.

Material & Methods

This cross-sectional population based study was conducted between August 2004 till August 2005 in Koramangala, a suburb of Bangaluru. Koramangala had a population of 45,573 as per the 2001 census report[23]. The suburb is divided into 7 blocks. The names of all the streets in the suburb were noted and then randomly selected the 'order' of streets in each block. 625 subjects were contacted proportionately across the various blocks in the area and the elderly in each block were visited based on the 'order' of the streets in the block. Consenting patients were interviewed at their homes. The research team was accompanied by volunteers from an NGO that runs community centres for elderly in the city and had members residing in the study area. The institutional ethics review board approved the study.

Elderly subjects of 65 yr and above and of either gender were interviewed in their homes by trained investigators using questionnaires that captured the following details:

(*i*) Socio-demographic details included age, sex, marital status, family type, living arrangements and religious affiliation, number of children, educational qualification and occupation.

(*ii*) Financial status covered issues concerning the current employment status, retirement benefits, pension and other sources of income. Various sources of income were computed together to arrive at a composite figure.

(*iii*) Health status included section information concerning different medical illnesses and current

medication. Medical records if available with the respondents were scrutinized by a trained nurse to confirm medical conditions. Details of current medication use were ascertained from physician prescription available with the subjects. Current tobacco and alcohol use were based on response to a single item question. Pulse rate and blood pressure were recorded by a trained nurse. The respondents were asked to rate their current emotional and physical health (Good vs Bad). The number of health related visits to the physician and incidences of hospitalization during the past 12 months were noted and used as a surrogate marker of current health status.

(*iv*) Measurement of disability: International Classification of Functioning, Disability and Health checklist version 2.1a (ICF) developed by the World Health Organization was used to study the impact of health on daily activities[22].

In all, 625 elderly persons aged 65 yr and above were contacted. Of these, 356 (56.9%) consented to participate in the study, 104 (14.7%) declined consent to participate but agreed to answer questions on the abbreviated non-respondent's questionnaire while the remaining 165 (26.4%) individuals who refused to participate also declined to provide answers to the non-respondent's questionnaire.

Statistical analysis: The data were analyzed using SPSS Version 13 (SPSS Inc, Chicago, Ill). The demographic characteristics of the responders and non responders were examined using χ^2 test. The disability score that was computed from the responses on the participation section of the ICF deviated significantly from normality and hence a log transformed score was used. Multiple linear regression analysis of the log transformed values was performed to identify the significant factors associated with disability.

Results

Of the 356 adults included, slightly more than half were male with an overall mean age of 72.3 ± 6.9 yr. Majority were married with widows constituting about 25 per cent of the sample. Most of the study respondents belonged to the Hindu religion and 60 per cent of the study population had college education (Table I). Almost two third of the study population lived in joint family setting and majority were currently not employed having retired from their primary occupation. However, only 10 per cent of the elderly participants were entirely dependent on others for financial support. Majority lived in a self owned independent house

Table I. Demographic characteristics of urban elderly 65 yr and above (n=460)

Characteristic	Responders (n=356) No. (%)	Non-responders (n=104) No. (%)
Age (yr):		
65	45 (12.6)	19 (18.6)
66-70	127 (35.7)	31 (30.4)
71-75	85 (23.9)	33 (32.4)
75-80	58 (16.3)	10 (9.8)
>81	41 (11.5)	9 (8.8)
Gender:		
Male	196 (55.1)	60 (57.7)
Female	160 (44.9)	44 (42.3)
Marital status:		
Married	253 (71.1)	80 (77)
Widowed	90 (25.3)	23 (22)
Unmarried	9 (2.3)	1 (1)
Separated	4 (1.3)	0
Spouse:		
Alive	256 (72.1)	78 (75)
Deceased	91 (25.6)	25 (24)
Religion		
Hindu	273 (76.7)	66 (64.1)
Christian	56 (15.7)	23 (21.4)
Muslim	16 (4.5)	12 (11.7)
Currently employed:		
Yes	45 (12.6)	21 (20.2)
No	311 (87.4)	83 (79.8)
Education:		
Illiterate	17 (4.8)	8 (8)
Primary school	17 (4.8)	7 (7)
Secondary school	19 (5.3)	4 (4)
High school	86 (24.2)	24 (24)
College	217 (61)	57 (57)

*P <0.05 (chi-square test)

(65%) (Table II). The age distribution was significantly different between the respondents and non participants in the study with a greater proportion of > 80 yr among the respondents.

Majority of the respondents reported current medical problems (85%) (Table III). Among these diabetes and hypertension were equally prevalent in both genders, while arthritis was significantly more common among women. The distribution of health problems was similar in the two major income groups *i.e.*, < Rs.10,000 and > Rs.10,000 per month. Majority were lifelong teetotallers (68%) and minority were current smokers (3.9%). Majority reported using assistive devices (89%); 42 per cent of the widow/widower had a person to assist with household chores.

Table II. Living arrangements of the urban elderly 65 yr and above (n=356)

Characteristics	Frequency No. (%)
Family type:	
Joint	225 (63.2)
Nuclear	131 (36.8)
House:	
Owned by self	231 (64.9)
Belongs to a family member	65 (18.3)
Rented	60 (16.9)
Type of house:	
Independent house	294 (82.6)
Apartment	62 (17.4)
Income:	
<=1000	18 (5.5)
1001-5000	81 (24.5)
5001-10000	82 (24.8)
10001-20000	94 (28.5)
20000-50000	46 (13.9)
>50000	9 (2.7)
Sources of income:	
Salary	5 (1.4)
Pension	20 (5.6)
Financial investments	34 (9.6)
Combination of the above	257 (72.2)
Financially dependent on others	34 (9.6)
Satisfaction with present living arrangements:	
Satisfied	353 (98.4)
Not satisfied	2 (0.6)
Feeling safe in the neighbourhood:	
Yes	348 (98)
No	7 (2)
Currently using assistive devices:	
Yes	315 (88.5)
No	41 (11.5)

About 49 per cent of the respondents made < 3 physician visits and 13 per cent were hospitalized for health related problems during the past one year (Table IV). Majority rated their current emotional and physical health as good and reported spending less than 10 per cent of their monthly income on medication and health related issues. We computed a total disability score for each individual on the basis of their responses to questions in the participation section of the ICF as majority did not report any impairment in activities of daily living (ADL) or any significant barriers in their environment. Individuals were grouped into the different levels of disability based on the level of difficulty reported in each of the items that formed a domain in the participation section of the ICF. The various domains covered under the

Table III. Prevalence of medical illnesses among the urban elderly 65 yr and above (n=356)*

Type of medical illnesses	Frequency No. (%)
Hypertension	176 (49.4)
Diabetes	115 (32.3)
Arthritis	100 (28.1)
Coronary artery disease	99 (27.9)
Genitourinary diseases	99 (27.9)
Gastrointestinal diseases	59 (16.6)
Respiratory diseases	55 (15.4)
Dermatological diseases	48 (13.5)
Injuries	35 (9.8)
Stroke	20 (5.6)
Depression	20 (5.6)
Tuberculosis	14 (3.9)
Kidney diseases	11 (3.1)
Epilepsy	8 (2.2)
Any medical problem	303 (85.0)

*Ascertained through self reports and not objective measurement

Table IV. Current health status in the urban elderly 65 yr and above (n=356)

Characteristics	Frequency No. (%)
Currently having any medical condition	
Yes	303 (85.1)
No	53 (14.9)
Currently on medication	
Yes	313 (87.9)
No	43 (12.1)
Current smokers	
Yes	14 (3.9)
No	342 (96.1)
Currently consume alcohol	
Yes	113 (31.7)
No	243 (68.3)
Number of visits to the physician in the last one year	
None	70 (19.7)
1-3	103 (29)
4-10	99 (27.9)
11-12	58 (16.3)
> 12	25 (7)
Hospitalized during the last one year	
Yes	46 (13)
No	310 (87)
Rating of physical health in the past month	
Good	337 (94.6)
Bad	19 (5.3)
Rating of emotional health in the past month	
Good	
Bad	339 (95.5)
	16 (4.5)
Restriction of daily activities in the past month due to ill health	
Yes	22 (6.2)
No	334 (93.8)

participation section included learning and applying knowledge, general tasks and demands, mobility, self care, domestic life, interpersonal interactions and relationships, and community, social and civic life. If a person reported severe/complete difficulty in any of the component items of a domain, he/she was assigned score 2. If no difficulty was reported in all of the items, the individual was assigned score 0. Individuals who had mild level of disability in any item were assigned a score of 1. A total disability score was obtained by adding the scores obtained in each domain. Overall, 43 per cent of the respondents did not have any disability, 27 per cent had mild disability in any one domain and the remaining 31 per cent had higher level of disability. This disability score did not follow normal distribution and hence was log transformed for the regression analysis. Linear regression analysis was used to examine the association between log transformed total disability score and impairments of bodily functions encompassing various physiological systems, socio-economic variables and current health status. On linear regression analysis, age being greater than 75 yr (β=0.139, P<0.05), severe impairment in cognitive (β=0.563, P<0.001) and sensory functions especially hearing (β=0.225, P<0.05) was significantly associated with disability. Gender, marital status, education, income and current health status did not influence disability.

Discussion

Our results support some of the earlier findings that health problems especially cardiovascular illnesses and diabetes are widely prevalent medical conditions in the elderly. Although no formal sample size calculation was carried out for the current study, but the present sample of 356 respondents with 85 per cent prevalence of health related problems was similar to a study by Bhatia *et al*[24] in a comparable urban setting who also reported 86.1 per cent of the elderly participants having one or more health related problem.

Majority of the respondents rated their current physical and emotional health as good. Earlier research has shown that self-rating of health is linked to functional ability with poor self-rated health being associated with an increased risk of disability[25]. Previous studies from India have reported rural-urban differences in the prevalence of disability with a greater prevalence of severe disability among the rural elderly[11,13]. It has been suggested that residence in urban areas provides better access to health care, availability of logistic support in the form of transportation, less dependence on physical effort to complete certain tasks and better financial support in the form of retirement benefits[20].

Functional disability computed as a sum score of restriction in participation in daily life activities was significantly associated with older age, cognitive and sensory function impairment. Many studies related to disability among the elderly have confirmed that increasing age tend to be associated with increased risk of disability[26,27]. While most studies with a few exceptions have also confirmed that disability tends to be more among women, our inability to find such an association may be linked to a generally lower prevalence of limitations in ADLs in our study population. It has been suggested that while ADLs may reflect pure disability in performing a task by either men or women, limitations in instrumental activities of daily living may be influenced more by gender specific tasks[20]. Thus, use of a composite disability score in the present study as reflective of functional status precluded examination of impairments in gender specific tasks.

Cognitive impairment was shown to be positively associated with disability and was independent of age, gender, and co-morbid medical conditions[28]. A recent study from Italy showed that cognitive impairment is a more powerful predictor of impaired functional activities than disease burden[29]. Impairments in hearing function were significantly predictive of disability. While most participants reported using assistive devices, in majority these were to overcome visual impairments. Earlier population studies from India have reported that impairment in hearing and visual functions as important causes of disablement in the elderly[7] especially with only a minority of the elderly using assistive devices[10].

In the present study, current health status was not predictive of disability. This was in contrast to earlier studies that showed a consistent association between co-morbid medical conditions and disablement among the elderly[30]. In addition, studies have also demonstrated that multiple co-morbid medical conditions incrementally increase the risk for disability[14,18]. Our findings are in agreement with a study from China on functional decline in elderly which also did not report any association between the presence of co-morbid medical conditions and disability and may be related to socio-cultural differences in the impact of disease conditions on disablement[20].

In conclusion, majority of the respondents from an urban elderly community in Bangaluru, South India,

reported current medical conditions. Most subjects were satisfied with their current living conditions. Rates of disablement as measured by responses in the participation section of the ICF were higher in older respondents and in those with impairment in mobility and cognitive functions. The strength of the study was in the use of a comprehensive measure of disability that encompasses the social and personal consequences of medical conditions and the influence of environmental conditions on disability. However, one of the major limitations of the study was that the participants were mainly from an urban locality belonging predominantly to middle socio-economic strata. Another major limitation concerns measurement of health status, which was self reported, although effort was made to obtain relevant medical records to validate medical conditions.

While it is difficult to generalize the findings from the present study to other populations in India, given the wide variations in living conditions and access to health facilities, application of the present methodology to other populations such as the urban poor and rural elderly may provide a more representative picture of disability among the elderly in India.

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