

Prevalence and Determinants of Disability in the Rural Elderly Population in Northern India

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Abstract

Study Objectives: To study the prevalence of impairment in a rural elderly population in India and its association with age, gender and other selected variables.

Design: Cross sectional study

Setting: Intensive field practice area of Comprehensive Rural Health Services Project Ballabgarh in distt. Faridabad, Haryana, a rural field practice area of Centre for Community Medicine, All India Institute of Medical Sciences, New Delhi.

Subjects: All people who had completed 60 years of age at the time of interview.

Methods: The study sample was selected using stratified random cluster sampling. Impairment was assessed by using Lachs scale, except for vision assessment, where instead of Jaeger Card; finger counting at a distance of 3 meters for each eye separately in good day light method was applied.

Results: Out of the 1117 aged a total of 987 (88.4%) could be interviewed. Among these, 490 (49.6%) were males and 497 (50.4%) were females. About four-fifth (81.6%) of them were illiterate. One-fifth of the males and half of the females were widowed. Most (78.2% males & 86.1% females) of the aged were having one or the other health problems. Forty-eight percent of the elderly had at least one impairment. Impairment increased with age and was more common among females. Visual impairment was the most frequently observed. In the functional assessment, 23.6% of the subjects were blind in one eye and 16.4% were blind in both eyes. 11% were observed to have hearing impairment. About 9 % had impairments of arm functions. When tested for leg function, 1.5% of the aged were not able to move, mostly both legs. On logistic regression, impairment was positively associated with age, illiteracy, loss of interest, chronic health problems, cognitive defect, and not gainfully employed.

Conclusion: Impairment is an important health problem among elderly in rural area of northern India. There is a need to provide appropriate and comprehensive service; so as to enable the elders to realize their full potential and lead a healthy and happy life.

Key Words: Aged, Rural, Impairment, Disability.

Introduction

The increase in number of elderly people has been observed as a result of many contributing factors i.e. a significant decline in the number of babies born, increase

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in life expectancy, which is simultaneously attributed to advancement in medical treatment and technology, prevention and eradication of many infectious diseases and improved nutrition, hygiene and sanitation. With the increased life expectancy, the health conditions of the people in their later stage have been observed to be worsening. Illnesses and injuries along with degeneration of body organs also result in hospitalisation or decreased

activity, which may subsequently lead to disability or dependence. Since the consequences of the disability can seriously affect the economic, social, and psychological aspect of life of older persons with disability and also their families and the communities as well, it is found to be a major health concern among older people. In a nation-wide survey¹, prevalence of various types of physical disabilities in rural elderly was found to be quite high (40%). The highest prevalence rate (47%) of disability was observed in Andhra Pradesh and a lowest of 32% in Haryana.

Problems of eyes are one of the most common health problems in the elderly. Visual impairment is found to be most prevalent (27%)¹. In various community based rural studies, visual problems including poor eyesight and cataract have been reported to range from 7% to 91%^{2,3,4,5,6,7,8,9,10}. The prevalence of hearing impairment increases with advancing age and approaches 60% during the ninth decade¹¹. Most hearing loss in the elderly is of the sensorineural type, including presbycusis. Conductive hearing losses are less common. An important treatable cause of hearing loss is cerumen impaction, which is found in up to 30% of elderly people¹¹. At national level, NSSO 52nd round 1995-96¹ had reported hearing disability to be 15%. One of the curses of old age is immobility due to illness or disease. Locomotor disability has been reported in 11% among the elderly, without any gender difference¹.

In this study, as well as in most surveys referred to in this study, conducted elsewhere, the definition of impairment and disability has been used loosely and interchangeably, therefore, it should not be viewed strictly or critically.

Methods

This study was conducted in Intensive Field Practice Area (IFPA) of Comprehensive Rural Health Services Project (CRHSP) Ballabgarh in district Faridabad (Haryana). This is a rural field practice area of Centre for Community Medicine (CCM), All India Institute of Medical Sciences (AIIMS), New Delhi. The period of data collection was between January 1998 to December 1999. Twenty-eight villages with a population of 69,995 are covered by IFPA. Two Primary Health Centres (PHC) Dayalpur and Chhainsa provide health services, covering 8 Sub-Centres (SC) which includes two PHC sub centres. The demographic data of this population is stored electronically in a database, which is updated regularly. The sample was selected using stratified random cluster sampling. To take a representative sample, Sub-centres were stratified on the basis of availability of health facility i.e. PHC Sub-centre (2) & Non PHC sub-centres (6). Sample sub-centres were selected randomly by draw of lots i.e.

- One sub-centre out of the 2 PHC sub-centres
- One sub-centre out of the 6 non-PHC sub-centres.

All the villages in selected two sub-centres were included in study. Each village served as a cluster and all the aged people in these villages were studied. This was a cross-sectional study of people, who had completed 60 years of age and had been resident of area for at least six months. A computerized list of elderly population was obtained from computer database of study area. Additional cases were identified with the help of health workers and by the investigator. If elderly were found to be absent on one visit, another visit was made within 7 days. If they could not be contacted despite two visits, then they were excluded from the study. Personal interviews were conducted in their local language by the researcher in the homes of the respondents. An informed verbal consent from each participant was taken. When necessary, subjects were referred for further examination/investigation and treatment. The approval of the ethics committee was taken for carrying out this study.

The data was collected using semi-structured interview schedule adapted from standardized schedules (Pareek, 1981; Andrews, 1992)^{12,13}. Detailed informations were collected regarding basic demographic-characteristics, current and past health problems, living conditions, health care practices, and use of medication and health care needs. Recall period for self-reported health problems was of one month and of chronic health problems covered the last one-year. Problems were recorded on the basis of self-report or history or examination or available records. Single investigator performed all the interviews and measurements.

The data was analyzed using Epi Info 6.04 d and SPSS version 7.5 software. For comparing of proportions, Chi-square and Fisher Exact test were used. Logistic regression was used to find out the various risk factors for disability.

Measurement of functional status was performed by using procedures prescribed by Lachs et al (1990) (with some modification) for general screening of functional disability in the elderly¹⁴.

Vision was tested by finger counting (vision-with or without spectacles depending on whether the subjects were using spectacles or not) at a distance of 3 metres for each eye separately in good daylight. Person's vision was recorded as 'able to count' or 'unable to count' at this distance (i.e. vision equal to or better than 3/60 or worse than that). This is in consonance with the WHO definition of blindness (WHO 1979).

For assessing hearing, simple questions (e.g. what is your name? or where do you live?) was whispered from behind the head. To check for hearing disability, the investigator

stood 12 to 24 inches behind the patient, covered one ear, and whispered the words in the uncovered ear, which were repeated by the patient. Person's hearing was recorded as 'able to hear' or 'unable to hear'. Those who were unable to hear were referred for ENT consultation.

Arm function: Proximal function was assessed by ability of the participants to touch the back of the head. Asking the respondent to pick up a spoon assessed distal function. A study subject was designated as having abnormal results in case of inability to do the task.

Leg function: The respondent was asked to rise from the cot/chair, walk a distance of 10 feet, return and sit down. Inability to walk or transfer out of cot/chair was designated as abnormal result or disabled.

Results

The present study was conducted in 7 selected villages with a total population of 17,795. There were 1,117 aged (>60 years) in this population, comprising 6.3% of the total population. Out of these 987 (88.4%) could be interviewed. Only 12 (1.1%) people refused to cooperate and rest 118 (10.5%) could not be contacted, the reason being, either they had moved away or had died since inclusion in the database. Of the 987 subjects included in this study, 49.6% were males. Majority of the aged were illiterate (81.6%), living in joint families (82.9%), belonging to lower socio-economic status (48.8%), living with spouse and children (56.0%). In general females were more likely to be illiterate (99.0% vs. 63.9%), widowed (49.7% vs. 20.4%), living alone (4.2% vs. 1.0%), having son as a head of household (51.3% vs. 27.8%), and not working (74.4% vs. 54.5%).

Physical impairments (observed)

Results of observed disabilities on testing are presented in Table 1.

Vision : Visual impairment was the most frequently observed. In the functional assessment when vision was tested using finger counting at 3-meter distance, 23.6% of the subjects were found blind in one eye and 16.4% in both eyes.

Hearing : 11% were observed to have hearing impairment. 4% of the respondents were not able to hear with one of the ears, while 7% could not hear in both ears.

Arm function : Nearly 9 % had impairment of functions of arms. 2.9% subjects were observed to have impairment in proximal functions of one arm only, whereas

2.7% suffered impairment of the function in both arms. The distal arm function impairment was observed in 1.8% of the aged in one arm and 1.4% in both arms.

Leg function: When tested for leg function, 1.5% of the aged were not able to move mostly both legs.

TABLE 1: Physical impairment of the respondents on testing (n = 987)

Impairment	Rt. only No. (%)	Lt. only No. (%)	Both No. (%)	Total No. (%)
Vision	98(9.9)	135(13.7)	162(16.4)	395(40.0)
Hearing	18(1.8)	22(2.2)	69(7.0)	109(11.0)
Arm Function				
Proximal	12(1.2)	17(1.7)	27(2.7)	56(5.7)
Distal	7(0.7)	11(1.1)	14(1.4)	32(3.2)
Leg Function	1(0.1)	0(0.0)	14(1.4)	15(1.5)

Prevalence of impairment in relation to age and gender are presented in Table 2.

TABLE 2 : Distribution of the Respondents by Age, Gender and Type of Impairment

Age Group	N=	Vision No. (%)	Hearing No. (%)	P		Leg Func- tion No. (%)
				No. (%)	D No. (%)	
Males						
60-64	126	26(20.6)	6(4.8)	0 (0.0)	1 (0.8)	0(0.0)
65-69	114	28(24.6)	2(1.8)	5 (4.4)	2 (1.8)	0(0.0)
70-74	117	49(41.9)	11(9.4)	5 (4.3)	6 (5.1)	3(2.6)
75+	133	66(49.6)	20(15.0)	8 (6.0)	7 (5.3)	2(1.5)
Total	490	169(34.5)	39(8.0)	18 (3.7)	16 (3.3)	5(1.0)
Females						
60-64	179	51(28.5)	13(7.3)	10 (5.6)	1 (0.6)	2(1.1)
65-69	133	66(49.6)	15(11.3)	7 (5.3)	6 (4.5)	2(1.5)
70-74	103	56(54.4)	20(19.4)	11 10.7	4 (3.9)	2(1.9)
75+	82	53(64.6)	22(26.8)	10 (12.2)	5 (6.1)	4(4.9)
Total	497	226(45.5)	70(14.1)	38 (7.6)	16 (3.2)	10(2.0)

Amongst study population, visual impairment was observed in 34% of the males and 45% of the females. In all age groups, women had higher prevalence of visual impairment than men. There was an increasing trend with age in both genders. Visual impairment was found to be significantly associated with age ($p < 0.001$) and gender ($p < 0.001$).

The hearing impairment was also higher among women, as was the case in visual impairment. The prevalence was twice as high in females than in males. An increasing significant trend ($p < 0.001$) was observed in all age groups amongst men (except in 65-69 age group) and women.

The proportion of women having proximal arm impairment was twice 38 (7.6%) that of men 18 (3.7%) and was found to be significant ($p = 0.005$). Impairment in arm function did not have increasing prevalence with age.

The distal arm function impairment was similar in both males and females. There is an increasing trend with age in males only.

Leg function impairment had low prevalence but was higher in females than in males (2% in females and 1% in males) and had no trend with age in males but was observed in females. These differences are not significant.

Impairment determinants: The determinants of impairment were analyzed by multivariate analysis (logistic regression). For this, impairment was converted into a binary variable, impaired and not impaired. Being impaired meant presence of any one or more of visual, auditory or locomotor impairment. No impairment means having none of the three impairments. Wherever necessary, dummy variables were created. The results of this analysis in the form of crude odds ratios are shown in Table 3.

The variables which were found to be significantly associated after preliminary bivariate analysis with impairment were: Age, female sex, illiteracy, married, widowed, dependency, smoking, tobacco chewing, alcoholic intake, satisfaction with life, sleep problems, lost interest, sad or depressed, worried, depressed, dependent in ADL, chronic problems, poor perceived health status, cognitive defect, not employed gainfully. However widowed, family type, socio-economic status, other addictions, living alone and BMI < 18.5 & BMI > 25.0 were not found to have significant effect on impairment in the bivariate analysis.

For multivariate analysis (logistic regression) only those variables found significant in bivariate analysis were included. The variables in the model correctly classified 67% of the cases. The adjusted odds ratios are shown in Table 4.

TABLE 3. Determinants of impairment among Aged, (Bivariate Analysis)

Variables	Crude Odds Ratio	CI	P
Age: >75 years			
<75 years*	2.67	1.92-3.73	<0.001
Sex: Females			
Males*	1.75	1.35-2.28	<0.001
Literacy: Illiterate			
Literate*	2.73	1.89-3.95	<0.001
Marital status: Widowed			
Married*	0.61	0.47-0.80	<0.001
Family: Nuclear			
Joint*	0.82	0.58-1.17	0.25
SES: Lower	1.16	0.9-1.67	0.41
Middle	1.05	0.72-1.53	0.82
Upper*			
Dependency: Dependent	2.68	1.84-3.91	<0.001
Non-dependent*			
Smoking: Smoker			
Non-smoker*	0.73	0.56-0.95	0.02
Chewing Tobacco	1.80	0.98-3.34	0.04
No tobacco chewer*			
Alcohol: Alcoholic	0.29	0.16-0.51	<0.001
Non-alcoholic*			
Other Addiction	3.30	0.60-24.70	0.17
No other addiction*			
No Satisfaction with life	1.64	1.19-2.25	0.002
Satisfaction with life*			
Sleep Problem	1.63	1.25-2.12	<0.001
No sleep problem*			
Lost Interest	2.29	1.75-3.01	<0.001
No lost interest*			
Sad or Depressed	1.87	1.39-2.50	<0.001
Not sad or depressed*			
Worried	1.54	1.16-2.05	0.002
Not worried*			
Depression	1.55	1.19-2.01	<0.001
Not depressed*†			
Living Alone	0.68	0.28-1.60	0.33
Living with others*			
ADL Dependency	7.58	3.80-15.49	<0.001
Not dependent on ADL*			
BMI < 18.5	1.15	0.89-1.49	0.29
BMI > 25.0	0.78	0.42-1.49	0.43
BMI Normal 18.5-25.0*			
Chronic Problems	2.18	1.50-3.15	<0.001
No chronic problems*			
Cognitive Defect	2.69	1.87-3.85	<0.001
No cognitive defect*			
Not Working	2.46	1.85-3.27	<0.001
Working*			
Perceived Health Status:			
Not Healthy	1.97	1.48-2.61	<0.001
Healthy*			

* Reference category, † as per scale used

TABLE 4 : Determinants of Impairment by Step Wise logistic regression

<i>Variables</i>	<i>Adjusted Odds ratio</i>	<i>CI</i>	<i>P-value</i>
Age>75 years	2.07	1.46-2.94	<0.001
Illiterate	2.0	1.36-2.94	<0.001
<i>Alcohol</i>	<i>0.40</i>	<i>0.23-0.71</i>	<0.01
Lost interest	1.63	1.23-2.17	<0.01
ADL	3.92	1.99-7.73	<0.001
<i>Chronic problem</i>	<i>1.74</i>	<i>1.19-2.55</i>	<0.01
<i>Cognitive defect</i>	<i>1.72</i>	<i>1.18-2.5</i>	<0.01
<i>Not working</i>	<i>1.46</i>	<i>1.08-1.98</i>	<0.01

The variables which were associated positively with impairment were: Age>75 years, being illiterate, having lost interest, being dependent on ADL, having chronic problem, having cognitive defect and not working.

Significant negative association of impairment was found with alcohol consumption. This may be because some of the alcoholic respondents might have died.

Discussion

The prevalence of various types of impairments was found to be high (47.8%) in the present study. In the Nation-wide survey¹ (NSSO 52nd round 1995-96) also, the prevalence of various types of physical disabilities in rural area was found to be high (40%) amongst elderly, though in Haryana state¹, it was reported to be slightly lower (32%). The possible reason for higher impairment in this study was that the presence of impairment was reported both unilateral and bilateral, where as in NSSO 52nd round, only bilateral disabilities were reported. Physical disabilities were reported in 13.8% of the aged in Rohtak study¹⁶, which may be low due to methodological reasons.

In the present study, impairment was observed more in females compared to males. NSSO 52nd round 1995-96¹ also reported a higher prevalence of disability among females than males for whole country, as well as in Haryana.

In the present study, the prevalence of impairment increased with age and was higher among females. Similar findings were reported by other studies from United Kingdom¹⁷ and Japan¹⁸. A higher impairment amongst females could be probably due to combination of factors like poor nutrition status, poor access to health care, higher incidence of osteoporosis and fractures, postmenopausal status etc.

Visual impairment was the most frequently observed impairment in the present study. When vision was tested using finger counting at 3-meter distance, a little over 40% of the subjects were blind at least in one eye. NSSO

52nd round 1995-96¹ reported a lower figure of 27% of the respondents suffering from visual impairment on clinical examination (a person who can't count fingers of a hand with spectacles if using, from a distance of 3 meters in good daylight with both eyes open). In the present study 16.4% of subjects were bilaterally blind. The prevalence of bilateral blindness was a little higher than that reported (12.8%) on clinical examination (Visual acuity <6/60) by Murthy et al.¹⁰ In a study by Grover³ nearly 69% of the elderly had visual impairment. Cataract was observed to be responsible for the majority of cases on clinical examination.

The prevalence of visual impairment in the present study was found higher among females than males. NSSO 52nd round 1995-96¹ and Grover³ have also reported similar results. The reason was probably due to tendency of early health seeking behaviour in men as compared to women and also exposure to smoke in cooking places to which women are more exposed. In this study visual impairment was found also to increase with age both among males and females.

Hearing impairment was observed in 11% of the study subjects in the present study. A higher prevalence (15%-18%) was reported in some rural community-based studies^{1,16, 19}. Even higher prevalence of hearing impairment (46%) was reported by Vijaya Kumar S (1996)⁸. Hearing impairment in the present study as well as in NSSO 52nd round 1995-96¹ was almost found similar, while the possible reason for higher proportion in Lal, Grover, Sarna et al. and Vijaya Kumar S (96)^{16,3,19,8} studies may be its subjective assessment. As compared to the present study, a higher prevalence of hearing impairment was reported (whisper voice test) among aged in Saudi Arabia²⁰, Malayasia²¹ (evaluated by interview, no audiometry) and USA²².

In the present study hearing impairment was found to be more among females compared to males. Some other community based rural studies^{3,16} including the one at national level, NSSO 52nd round 1995-96¹ have also reported hearing disability to be higher among females as compared to males. In the present study hearing impairment also was found to increase with age both in males and females.

Difficulties in mobility can lead to isolation of the elderly. In the present study, 1.5% of the aged were bed ridden. However, Dandekar²³ reported that 5% of the old persons in rural and urban areas of India (about 4% men and 7% women) were physically immobile. Arm and leg impairment was found to be 10.4% among aged. The proportion was higher in females than males. This may be due to higher proportion of falls reported in females in this study. Similar findings (11.1%) in rural India were reported in the NSSO 52nd round report¹.

Responses to close-ended question about mobility revealed that 51.8% of the elderly had some difficulty in mobility/walking. Lal¹⁶ reported restricted mobility in 33% of the aged. Grover³ reported a prevalence of orthopaedically handicapped to be 40% in rural Delhi. In the present study the higher proportion of women (62.6%) reported difficulty in movement as compared to men (59.0%). Antilla et al.²⁴ also reported higher percentage in women than in men, though the overall prevalence was low.

The factors which were found significant associated on multivariate analysis were elderly greater than 75 years, illiterate, not working, who had lost interest in their life and experiencing cognitive defect and were dependent on ADL due to chronic problems.

Conclusions

Disability is an important health problem among elderly in rural area of northern India. There is a need to provide appropriate awareness, comprehensive and accessible services, so as to enable the elders to realize their full potential and lead a comfortable, healthy and happy life. The mobile health clinics equipped with these facilities may be a solution.

Acknowledgements

The authors are grateful to all the participants who participated in the study. The authors also wish to thank to Dr. P.L. Trakroo, Dr. Kiran Goswami, Dr. K. Anand and Late Dr. Noel D'Souza for their helpful comments, technical assistance and encouragement.

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