FUNCTIONAL DISABILITY AND ASSOCIATED CHRONIC CONDITIONS AMONG GERIATRIC POPULATIONS IN A RURAL COMMUNITY OF INDIA

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SUMMARY

Background: Geriatric population and chronic diseases are increasing throughout the world especially in developing countries like India. Because of social change and urbanization, disability is also a problem in India. As the major reasons for geriatric disabilities are chronic diseases, a study was undertaken.

Objectives: To find out the prevalence of different chronic diseases and disability among the geriatric population in a rural community of India and to determine the association between chronic diseases and disability of the geriatric population.

Method: A cross-sectional, observational community based study was conducted in a rural area of West Bengal, India through house to house visit for Clinical examination, observation and interview with a pre-designed pre-tested proforma

Results: Out of 495 study population, 80 (16.16%) were found to be functionally disabled as per ADL scale and more than half (56.2%) of them had 3 or more chronic conditions. 92.5% of study populations had one or more chronic conditions

Conclusion: Association between different risk factors and disability was found with age, sex, anaemia, Chronic Obstructive Pulmonary Diseases(C.O.P.D), scabies, hypertrophy of prostate, ischaemic heart disease, osteoporosis, osteoarthritis and acid peptic disorder were the risk factors of disability. These data suggest the significant chronic conditions and risk factors associated with disability. Measures to reduce such chronic conditions and impairment would be the useful approach for the prevention of disability.

Keywords: disability, geriatric population, chronic condition, ADL scale, rural area

INTRODUCTION

The World is aging and so is its population. Increasing awareness, better health care, improved living conditions lead to increase life expectancy and geriatric population. By 2025, the number of elderly people is expected to rise more than 1.2 billion with about 840 million of these in low- income countries.[1] In India, according to the Sample Registration System (2005) 7.2 percent of the total populations were above the age of 60 years[2].

Aging is a natural process and with the process of aging most organs decline in function resulting increase in chronic illness and disability. As the numbers of older and disabled persons grew and the prevalence of chronic disease increased, the importance of function in health and illness was recognized.[3] Chronic illness and functional ability have an influence on the quality of life in elderly populations. There is also evidence that older people have the risk of multiple co-morbidities,[4] which may lead to increased disability among them.

Disability could be prevented either by preventing the disease or by preventing the impairment. As the chronic conditions are the major causes of disability, assessment of chronic diseases and its association with disability will help in implementation of different preventive programmes and reduce the burden of the nation. This study was undertaken to determine the prevalence of different chronic diseases and disability; and the association between chronic diseases and disability among the geriatric population in a rural community of India.

METHODS

A community based cross-sectional study was carried out in the Tarakeswar block, at Hooghly district, West Bengal, the rural field practice area of Medical College Kolkata, India in the year 2007. Tarakeswar is situated around 50 Km from Kolkata covering a population of 175,523. Considering the prevalence of chronic diseases among geriatric people as 45%[5] in rural areas, 95% confidence limit and allowable error 10%, the

sample size was calculated using Epi Info version 3.5.1 and it became 454.

Adding 10% non- response, the total number came out to be 500. Aged 60 years or more was considered as geriatric population in India. The list of all persons aged 60 years or more was prepared from the voter list and it was 13,516. By using simple random sampling technique, total number of sample (500) was selected from the voter list with name and address. After taking verbal consent, geriatric people were interviewed by house-to-house visit, using a pre designed semi-structured proforma.

First part of the proforma included socio-demographic and personal characteristics like age, sex, level of education, per capita income, religion and mother tongue. Second part of proforma contained questions about morbidity and disability. Morbidity was assessed by clinical examination and verified by the records, if available. Cured morbidity was excluded from the study.

Diseases were coded according to ICD-10. Later it was grouped under different system related diseases. Disability was ascertained by self reporting in performing ten non-instrumental activities of daily living (ADL)[6]. Based on ADL score the individuals were divided into two groups – (a) score > 10 – Independent/functionally not disabled, (b) score $\leq$ 10 – dependent/functionally disabled. Association between different risk factors and disability were assessed by binary logistic regression model. Data were analysed using Epi Info version 3.5.1 and SPSS version 14.

RESULTS

Due to incompleteness of proforma and non- response, ultimately final sample came to 495. Data of 495 samples were analysed. Table I shows the basic characteristic of sample and disabled population. Mean age and SD of the study population was 66.89 ± 7.38 years; 77.5 % of disabled population was female.

Most of the population were Hindu by religion (96.4%) and Bengali speaking (90.9%). 88.8% of disabled populations were illiterate, 22.4% were living alone and 51.3% belonged to socio-economic class – IV & V. More than half (56.2%) of the disabled population had 3 or more chronic diseases and 7.5% of study population did not have any chronic condition. Prevalence of disability was16.16% as per ADL scale.

Among the disabled population, 67.5% had the involvement of musculoskeletal system, followed by Diseases of circulating system (43.8%), Diseases of eye & adnexae (33.8%), Diseases of blood and blood forming organs (22.5%) and Endocrine, nutritional and metabolic disorder (22.5 %).

Table 1 Basic Characteristic of the Sample

Characteristics	**Total Population (n = 495)**	**Disable Population (n = 80)**
Age in Yrs (Mean ± SD)	66.89 ± 7.38	69.98 ± 7.69
Gender (%)		
- Female	261 (52.7)	62 (77.5)
- Male	234 (47.3)	18 (22.5)
Religion (%)		
- Hindu	477 (96.4)	79 (98.7)
- Muslim	18 (3.6)	1 (1.3)
Mother tongue (%)		
- Bengali	450 (90.9)	71 (88.8)
- Hindi	45 (9.1)	9 (11.2)
Literacy Status (%)		
- Illiterate	315 (63.6)	71 (88.8)
- Primary	117 (23.6)	1 (1.3)
- Above primary	63 (12.7)	8 (9.9)
Marital status (%)		
- Married	342 (69.0)	53 (66.3)
- Widow	153 (31.0)	27 (33.7)
Family composition (%)		
- Alone	18 (3.6)	18 (22.4)
- With spouse	72 (14.4)	9 (11.3)
- With spouse & Children	270 (54.5)	44 (55)
- With children	135 (27.3)	9 (11.3)
Socio-Economic class (%)*		
Class –I (Rs.≥2200)	12 (2.4)	4 (5.0)
Class – II (Rs.1100 – 2199)	18 (3.6)	5 (6.3)
Class – III (Rs.660 – 1099)	90 (18.2)	30 (37.5)
Class – IV (Rs 330 – 659)	189 (38.2)	23 (28.8)
Class – V (Rs. < 330)	186 (37.6)	18 (22.5)
No. of Chronic Conditions		
0	37 (7.5)	0
1	192 (38.8)	9 (11.3)
2	179 (36.3)	26 (32.5)
3	49 (9.8)	18 (22.6)
>3	38 (7.6)	27 (33.6)

* Source – Prasad Scale- Reference[16]

Table 2 Overall Percentage of System wise Chronic Diseases by Level of Disability

System Involved	Not Disabled (n=415) (ADL score >10)	Disabled (n = 80) (ADL score ≤ 10)	p value
Diseases of blood and blood forming organ	10.8	22.5	0.007
Endocrine, nutritional and metabolic disorders	8.7	22.5	0.000
Mental and behavioural disorders	3.1	21.3	0.000
Diseases of nervous systems	11.8	7.5	0.354
Diseases of eye and adnexae	43.4	33.8	0.145
Diseases of ear and mastoid	10.8	11.3	0.923
Diseases of circulating system	21.9	43.8	0.000
Diseases of respiratory system	21.7	11.3	0.047
Diseases of digestive system	71.6	67.5	0.549
Diseases of skin and subcutaneous tissue	12.8	1.3	0.004
Diseases of musculoskeletal system	36.6	66.3	0.000
Diseases of genitourinary system	10.8	5.0	0.162

Diseases of blood and blood forming organs, Endocrine, nutritional and metabolic disorders, Mental and behavioural disorders, Diseases of circulatory system, Diseases of respiratory system, Diseases of skin and subcutaneous tissue, Diseases of musculoskeletal system were significantly higher among the disabled population in comparison to non-disabled population.

Table 3 Associations between the Presence of Chronic Diseases and Functional Disability in activities of Daily Living (n = 495)

Chronic Disease (ICD - 10 Code)	OR* (95% CI)	Rank	OR ** (95% CI)	Rank
Anaemia (D50 D53)	4.00(1.70–9.19)	2	3.42(1.48 – 7.93)	2
Cataract (H25 H26)	1.12 (0.61 – 2.04)	11	0.88 (0.52 – 1.49)	11
Deafness (H90 H91)	1.04 (0.42 – 2.55)	12	0.72 (0.29 – 1.74)	12
C.O.P.D (J44 J45)	0.70 (0.34 – 1.46)	14	0.50 (0.24 – 1.03)	14
Tuberculosis (A15 A18)	1.53 (0.60 – 3.89)	9	2.04 (0.72 – 5.72)	6
Depression (F32 F33 F34)	0.30 (0.11 – 0.79)	15	0.25 (0.09 – 0.63)	15
Dental Carries (K02)	1.18 (0.67 – 2.07)	10	0.98 (0.53 – 1.79)	10
Scabies (B86)	0.14 (0.01 – 1.07)	16	0.09 (0.01 – 0.75)	16
Osteoarthritis (M13)	3.82 (1.97 – 7.41)	3	2.50 (1.26 – 4.93)	4
Prostate (N40)	0.88 (0.25 – 2.99)	13	0.55 (0.19 – 1.56)	13
Diabetes (E11, E12)	3.53 (1.39 – 9.00)	4	2.32 (1.07 – 5.06)	5
Neuropathy (G35, G37)	1.98 (0.55 – 7.12)	8	1.65 (0.45 – 5.96)	7
Hypertension (I10, I11, I15)	2.42 (1.08 – 5.44)	6	1.46 (0.70 – 3.03)	9
I.H.D. (I20, I25, I27)	2.26 (0.93 – 5.52)	7	1.52 (0.67 – 3.48)	8
Acid-Peptic Disorder (K25 K26 K27 K29 K30)	3.15 (1.66 – 5.97)	5	2.99 (1.60 – 5.57)	3
Osteoporosis (M80, M82)	7.97 (3.72 – 17.0)	1	7.81 (3.94 – 15.4)	1

Note: OR = odds ratio; CI = confidence interval.
*OR adjusted for age and gender. **OR additionally adjusted for the remaining chronic conditions.

Table 3 reveals the association between chronic diseases (ICD – 10) and functional disability among study population as estimated by odds ratio (ORs).

Conditions were ranked according to the magnitude of the association. Osteoporosis, Anaemia, Acid peptic disorder, Osteoarthritis and Diabetes were strongly associated with disability. Other diseases, associated with disability were Tuberculosis, Neuropathy, IHD and, Hypertension.

Association between different risk factors and disability by binary logistic regression analysis (Table 4) showed that age, sex, anaemia, C.O.P.D, Scabies, Hypertrophy of prostate, Ischemic Heart Disease, Osteoporosis, Osteoarthritis and Acid peptic disorder were the risk factors of disability. About fifty eight percent (58.2%) of the disabilities were explained by these factors.

Table 4 Association between disability and risk factors by binary logistic regression analysis

Predictor Variable	B	S.E.	Wald	df	p value	Exp (B)
Age	-.079	.026	9.043	1	.003	.924
Sex	-1.575	.499	9.978	1	.002	.207
Anaemia	1.858	.675	7.587	1	.006	6.414
Cataract	-.325	.417	.609	1	.435	.722
Deafness	-.818	.708	1.334	1	.248	.441
C.O.P.D	1.258	.495	6.457	1	.011	3.517
Tuberculosis	1.179	.713	2.735	1	.098	3.253
Depression	-.986	.568	3.013	1	.083	.373
Dental caries	-.933	.527	3.126	1	.077	.394
Scabies	-2.955	1.187	6.192	1	.013	.052
Osteoarthritis	.816	.467	3.051	1	.049	2.262
Prostate hypertrophy	-3.294	.889	13.731	1	.000	.037
Diabetes	-.172	.626	.075	1	.784	.842
Neuropathy	-.947	.736	1.653	1	.199	.388
Hypertension	-.011	.384	.001	1	.978	.989
Ischemic heart disease	1.546	.521	8.811	1	.003	4.692
Acid peptic disorder	1.719	.482	12.711	1	.000	5.579
Osteoporosis	3.876	.537	52.042	1	.000	48.23
Constant	6.913	4.819	2.058	1	.151	1005.12

DISCUSSION

Of the study population 92.5% had one or more chronic conditions, consistent with 89% among Kashmiri people in India[7] and 88.9% in northern India[8] whereas in different studies in the United States the prevalence varied from 82% to 88%.[9,10] But among rural people of Chandigarh-India, the prevalence of morbidity was 77.6%.[11] This wide variation of prevalence of morbidity may be due to the differences in the racial and ethnic origin of the study populations, socioeconomic status, criteria for considering older people and the questionnaires used.

In our study, musculoskeletal system disorder was the most prevalent morbidity among the disabled population, similar to the study conducted at four US clinics, Winston-Salem, NC, Hagerstown, MD, Pittsburgh, PA, and Sacramento, CA.[12] The reason may be that when the people become older, there is deterioration of function of musculoskeletal system leading to restricted mobility, which adversely affects the older people to sustain independently in the society.

The present study observed that Osteoporosis, Anaemia, Acid peptic disorder, Osteoarthritis, Diabetes, Tuberculosis, Neuropathy, IHD and Hypertension were associated with disability. In a cross-sectional survey of the entire population aged 70 and over, living in Ospitaletto Brescia, northern Italy similar association with anaemia, diabetes, hypertension and heart disease was reported.[13]

In another longitudinal study among older Americans, association of heart disease, diabetes and arthritis with disability was observed.[14] Joshi et al, in a cross-sectional study at rural and urban area of Chandigarh (India), found that morbidities like asthma, COPD, hypertension, osteoarthritis, gastrointestinal disorders, anaemia, and eye and neurological problems were significantly associated with disability. [8]

In a study among African Americans association between hypertension and disability was also seen.[15] This may be due to fact that morbidity and disability can differ from country to country and also in different places with in the country due to different ethnic factors, educational status, life style, nature of work & working conditions of the study population and availability and utilization of health care services.

In our study an attempt has been made to find out the association between different risk factors with disability by binary logistic regression analysis. The study revealed that age, sex, osteoarthritis, anaemia, C.O.P.D, scabies, prostate hypertrophy, I.H.D, osteoporosis and acid peptic disorder were significantly associated as risk factors with disability and 58.2% of the disabilities were explained by these factors.

In this regards, studies showing association of chronic conditions with disability by this regression model are scarce in Indian context.

CONCLUSION

As this was a descriptive study, the factors found as associated with disability could be suggestive, not a causal one. A little over half (58.2%) of the risk factors of disability were explained by the present study. There may be other factors for disability, which were not identified in this study. Future analytical study with large sample would be conclusive for causal factors of disability.

However, the study highlighted that the different chronic conditions like osteoporosis, anaemia, C.O.P.D, scabies, prostate hypertrophy, I.H.D, osteoarthritis, acid peptic disorder, age and sex were significantly associated with functional disability of the geriatric population.

These analysis emphasized allocation of society's financial resources for the future programme of the geriatric population focusing preventive measures at the early stage and adequate treatment of such chronic diseases for their betterment and improving quality of life. National programmes and policies on prevention of these chronic conditions and risk factors among the geriatric population should be prioritized.

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