

Assessment of level of cognition and their relation with functional status among geriatric population in Raipur city, Chhattisgarh, India

Md. Alam Naushad¹, Dhiraj Bhawnani², Nirmal Verma³, Laxmikant Umate⁴,

¹ Assistant Professor, Community Medicine, C.C.M. Medical College, Durg, Chhattisgarh, India.

² Associate Professor, Community Medicine, Govt. Medical College, Rajnandgaon, Chhattisgarh, India,

³ Professor & Head, Community Medicine, Pt. JN.M. Medical College, Raipur, Chhattisgarh

⁴ Statistician, Community Medicine, L.B.K.M. Govt. Medical college, Jagdalpur, Chhattisgarh, India

Abstract

Background: Increasing longevity and transition of family from joint to nuclear have made aside to graying population, in context of that study have made to assess the relation between level of cognition and functional status. **Objectives:** Assessment of level of cognition and their relation with functional status. **Methods:** Community based cross-sectional observational study. Structured questionnaire was used for assessment of level of cognition MSQ (Mental status questionnaire) and for functional assessment Katz index was used. **Results and Conclusion:** Dependency was positively associated with advancement of age and female sex. Male had more severe confusion than female. Cognitive impairment was shown to be statistically positively associated with disability.

Introduction

“You do not heal old age, you protect it; you promote it; you extend it”. Sir James Sterlings Ross.^[1] Aging is generally defined as a process of deterioration in the functional capacity of an individual that results from structural changes, with advancement of age. High fertility and declining mortality are the major factors responsible for population increases in most countries of the world, especially the developing ones. Demographers, researchers, and responsible citizens have started to think about the aged population and its problems because of the demographic transition in many countries of the third world now taking place in a much shorter period of time. Aging of the population will be one of the major challenges of the near future. In USA, UK and other western countries the

attainment of the age 65 has been considered for the purpose of classifying aged persons, where as in India it is from 60 years.^[2] The elderly sub-population referred to as the “young old” (60-74), the “old” (75-84), and the “old-old” (85+).^[3] In 2009, the global population of people aged 60 and over was 680 million, representing 11% of the world's population. They have increased by 10.4 million just since 2007-an average increase of 30,000 each day.^[4] Current projections indicate that from 1980 to 2020 about 75% of the additional numbers in the global elderly will be in developing countries.^[2] By 2050, The 60 and older population will increase from 680 million to 2 billion- increasing from 11 to 22 percent of the world's population. From 1950 to 2050, the world population will have increased by a factor of 3.6; those 60 and over will have increased by a factor of 10; and those 80 and over by a factor

Corresponding author:

Dr. Dhiraj Bhawnani

Associate Professor, Department of Community Medicine, Govt. Medical College, Rajnandgaon, Chhattisgarh, India. Email: dhiraj.bhawnani@gmail.com

Received: 21.04.2018

Accepted: 15.06.2018

of 27.^[4] **As Per available data from SRS, the % of elderly population (60+) has gone up from 5.3 to 5.7 percent during 1971 to 1981, and it would be 19.1% in 2050.**^[5] **India ranks 73 on the world aging index. India among health domain ranked 85 lowest among 91 countries. Life expectancy at 60 years is just 17 yrs.**^[6] Chhattisgarh is moving fast towards an 'aged society', with the aged population constituting 7.2 percent (India 8 percent) and moving further.^[5] This pose mounting pressures on various socio economic fronts of state, including pension outlays, health care expenditures, fiscal discipline, savings levels etc. With the above background, the present study was conducted to assess the functional status and their relation with level of cognition **in elderly population residing in Raipur city (C.G.), India.**

Material & Methods:

This Cross-sectional observational study was conducted during July 2013 to June 2014. **Study variables included** Demographic data, Mental status and Functional status using ADL & IADL.

Approval from the institutional ethical committee was obtained and verbal consent was taken from subject and their caregiver before obtaining information.

Sample size were calculated by using statistical formula, $n = Z^2 \cdot 1 - \alpha / 2 \cdot P(1 - P) / d$.^[7] where P = Morbidity Problems (50%), d= Absolute Precision (4%), Confidence level= 95%. Multistage simple random sampling was used to select subject from 32 areas of 8 zone in Raipur city. A total of 600 figures come using statistical formula. For making uniformity 20 subjects from each of 32 areas were selected that comes 640.

Pre-designed pretested Performa was used for the study. Structured questionnaire was used, for assessment of level of cognition using MSQ (Mental status questionnaire). MSQ has 10 questions. Each question is Scored 0 for Incorrect, and 1 for a correct response. Normal Subject Score 9 or 10; Score < 8 imply a degree of Mental Confusion. Score < 3 Severe Confusion.^[8] For functional assessment like Activity of daily living (ADL) Katz index and for Instrumental activity of daily living (IADL) Lawton - Brody index was used.^[9,10] Katz index include five component bathing, dressing, toileting, transferring and feeding. Each component have score 0 for dependent and 1 for independent. Total maximum score are 06 (Patient independent) and lowest score are 0 (Patient very dependent). Lawton Brody index includes eight components. Ability to use telephone, shopping, food Preparation, Housekeeping, laundry, Mode of Transportation and responsibility for own medications. A summary score ranges from 0 (low function, dependent) to 8 (high function,

independent) for women and 0 through 5 for men to avoid potential gender bias.

Inclusion criteria: All elderly persons in the age group of 60 years and above who were residing in the study area for at least one year, and willing to participate in study without compulsion.

Exclusion Criteria: who were not willing to participate in study and remain absent on day of visit to their house.

Data was Analyzed using Microsoft Office Excel 2007 and statistical significance was obtained using Chi square test and p value. $p < 0.05$ was considered as a statistical significant.

Results:

Table-1 showed statistically significant relation between literacy status and sex ($p < 0.0001$). A Significant number of the study population was illiterate (30.93%). Table-2 shown dependency was more in female. Majority of the elderly male were able to perform activities like bathing, dressing, toileting, Transfer in and out of bed and feeding on their own. Statistically the ADL level Showed significant difference between the two sexes. Statistically significant association between age group and activity of daily living was observed $p < 0.001$ (Highly significant). Dependency was more with advancement of age. Table-3 shown Females were more dependent than males. About 29.36% females were independent, 66.44% need assistance, and 57.81% were very dependent. As age advances dependency increases, among very dependent, from 8.22% in young old to 16.66% in old and 66.66% in very old. In present study, In both Activity of daily living (ADL) and Instrumental activity of daily living (IADL) females were more dependent than males, and dependency was increasing with advancement of age. ADL were affected earlier than IADL. Table-4 shown Cognition was normal in 29.37% elderly whereas 65% had some degree of mental confusion, 5.62% had severe confusion. Cognitive impairment was shown to be statistically positively associated with disability $p < 0.001$ (Highly significant). Those who were independent 39.49% had normal cognition, 60.50% had some confusion. None had severe confusion. Among those need assistance 21.70% was normal, 67.25% had some confusion, 11.03% had severe confusion. Among very dependent 2.5% had normal cognition, 85% had some confusion, 12.5% had severe confusion.

Discussion

In the current study, out of total studied elderly, more than two third belongs to young old age group followed by old and very old age group. Females were more than males. There was no any male in very old age group. Similar finding were observed in other study done by Lena a et al. showed that a

Table-1 Distribution of study population according to gender, age, literacy and SES (n=640)

Age group(years)	Male(n=267)	Female(n=373)	Total(n=640)	χ^2 df, p value
60-74	200(74.90)	323(86.59)	523(81.71)	$\chi^2 =14.23$, df=1, p<0.0001
75-84	67(25.09)	47(12.60)	114(17.81)	
=85	0	3(0.80)	3(0.46)	
Total	267(41.71)	373(58.28)	640(100)	
Literacy status				
Illiterate	52(26.26)	146(73.73)	198(30.93)	$\chi^2 =62.23$, df=3, p<0.0001
Up to primary	28(33.33)	56(66.66)	84(13.12)	
Up to higher secondary	112 (43.57)	145(56.42)	257(40.15)	
Graduate & Above	75(74.25)	26(25.74)	101(15.78)	
Total	267(41.71)	373(58.28)	640(100)	
Socio Economic Status(SES)				
Class I	63(23.59)	9(2.41)	72(11.25)	$\chi^2=84.02$, df=4, p<0.0001
Class II	54(20.22)	119(31.90)	173(27.03)	
Class III	50(18.72)	76(20.37)	126(19.68)	
Class IV	96(35.95)	137(36.72)	233(36.40)	
Class V	4(1.49)	32(8.57)	36(5.62)	
Total	267(100)	373(100)	640(100)	

*Figure in parenthesis are in percentage.

major fraction of the population was in the young old age group; while a small fraction (2.8%) were 80 yrs old or older. Males and females formed an almost equal proportion of the study sample.^[11] Sex ratio in present study was 1415.73 women per 1000 men. At present sex ratio for general population in India are 943 as per office of the Registrar General & Census Commissioner, India.^[12] Sex Ratio in Urban regions of Chhattisgarh was 956 females per thousand male.^[12] Trend in the sex ratio (Number of Females per 1000 males) for elderly and the general population, In 1951, 1028 for elderly and 946 for general population, In 1961, 1000 for elderly and 941 for general population, In 1971, 938 for elderly and 930 for general population, In 1981, 960 for elderly and 934 for general population, In 1991, 930 for elderly and 927 for general population, In 2001, 972 for elderly and 933 for general population, In 2011, 940 for general population.^[12] In the current study, significant number of the study population was illiterate (30.93%). The percentage of illiterate women was more (73.73%) than that of males (26.26%). In other study by Shradha K, et al (2012) in urban population of Mysore, Karnataka, India out of 526 subjects about half of the elderly were illiterate.^[13] Lena, et al., (2012) reported illiteracy in 45.1%, more among females (62%) than males (22.8%).^[11] Present study has finding similar to Lena, et al., (2012). Literacy was more than the study of

Shradha K, et al (2012).^[13, 11] In Present study, 36.40% of total population belongs to socioeconomic class IV followed by Class II (27.03%), Class III (19.68%), and Class I (11.25%). There was statistically significant difference between male and female socio-economic status. Except in Class I of all other socio-economic classes female were more than male. In other study similar observation were made, Shradha K, et al (2012) in a study of urban population of Mysore, Karnataka, India observed that Socio-economic status revealed that there were mainly three classes from where elderly belongs to; upper middle, upper lower, lower and lower middle. Most of the elderly (64.8%) belongs to class IV. None of the elderly belongs to upper socioeconomic group. 27.6% of the aged female and 10.6% of aged male belongs to lower socioeconomic class according to Modified Kuppaswami's socio-economic scale.^[13] Present study shows in both Urban and Slum elderly proportion of light activity performer was more than moderate and heavy activity performer. Overall light activity performer was more in Urban than slum area. But in Urban area more were in young old age group, whereas among Slum elderly, maximum were in very old (100%) followed by old (78.12%) and lastly in young old age (54.94%) group. Out of total study population, 49.84% were independent, 43.90% were Partial dependent, and 6.25% were Very dependent. Dependency was more in female.

Table-2 Distribution of Study population according to Functional activity(ADL), age, gender (n=640)

Age Group(in yrs)	ADL			Total (n=640)
	Independent (n=319)	Need assistance (n=281)	Very dependent (n=40)	
60-74	276(52.77)	222(42.44)	25(4.78)	523(81.71)
75-84	43(37.71)	57(50)	14(12.28)	114(17.81)
= 85	0	2(66.66)	1(33.33)	3(0.46)
Total	319(49.84)	281(43.90)	40(6.25)	640(100)
$\chi^2 = 19.292$, d.f. = 4, p = 0.001				
Gender				
Male	176(55.17)	83(29.53)	8(20)	267(41.71)
Female	143(44.82)	198(70.46)	32(80)	373(58.28)
Total	319(49.84)	281(43.90)	40(6.25)	640(100)
$\chi^2 = 48.656$, d.f. = 2, p < 0.0001				

*Figures in parenthesis are in percentages.

Majority of the elderly male were able to perform activities like bathing, dressing, toileting, Transfer in and out of bed and feeding on their own. Statistically the ADL level Showed significant difference between the two sexes. R.S. Sarasa (2001), Thiruvananthapuram, in their study observed that (3%) female were fully dependent followed by 16.8% partially dependent. 80% or more were Independent.^[14] In present study more female dependency could be due to more morbidity among females. Dependency increases with age in this study. Of the total population very dependent were from 4.78% in young old to 12.28% in old and 33.33% in very old. 19.68% elderly were independent in Instrumental activity of daily living, 70.31% were need assistance, and 10% were very dependent. Females were more dependent than males. 29.36% females were independent, 66.44% need assistance, and 57.81% were very dependent. Present study shows statistically significant relation between dependency and advancement of age. As age advances dependency increases, among very dependent, from 8.22% in young old to 16.66% in old and 66.66% in very old. In present study, In both Activity of daily living(ADL) and Instrumental activity of daily living(IADL) females were more dependent than males, and dependency was increasing with advancement of age. ADL were affected earlier than IADL. Sushma Tiwari (2010), Varanasi, observed that 7.2 % elderly population had decreased daily activity scores and 19.8% elderly had decreased instrumental activity of daily living scores.^[15] There are studies to show that impairment of ADL functions occur prior to that of IADL. Cognition was normal in 29.37% elderly whereas 65% had some degree of mental confusion,

5.62% had severe confusion. Severe confusion was more among male (63.88%) than female (36.11%). In another study by Srinivasan Krishnamachari et al.,(2010) reported that cognitive impairment was shown to be positively associated with disability and was independent of age, gender and co-morbid medical condition.^[16] Present study shows sex differentiation among cognitive impairment. More males were severely confused than females. Present study showed that among total studied elderly population 65% had some confusion, 29.37% had normal cognition level, and 5.62% had severe confusion. Cognitive impairment was shown to be statistically positively associated with disability. Lisa c. et al(2006) shows in their study, Cognitive functioning was not predictive of individual ADL tasks but was predictive of the IADL tasks of preparing meals, shopping for groceries, managing money, telephone use, light housework, and medications but not heavy housework.^[17] A recent study from Italy showed that cognitive impairment is a more powerful predictor of impaired functional activities than disease burden.^[18]

Conclusion

Dependency was positively associated with advancement of age. Male had more severe confusion than female. Cognitive impairment was shown to be statistically positively associated with disability. Caregiver had been advice to take care of their elderly and involve them in social work and decision making. It will improve their level of cognition and will ensure their independency.

Conflict of interest: None declared

Source of support: Nil

Table-3 Distribution study population according to Functional activity (IADL), age, gender (n=640)

Age Group(in yrs)	IADL			Total (n=640)
	Independent (n=126)	Need assistance (n=450)	Very dependent (n=64)	
60-74	124(23.70)	356(68.06)	43(8.22)	523(81.71)
75-84	2(1.75)	93(81.57)	19(16.66)	114(17.81)
= 85	0	1(33.33)	2(66.66)	3(0.46)
Total	126(19.68)	450(70.31)	64(10)	640(100)
$\chi^2 = 42.879$, d.f. = 4, p < 0.0001				
Gender				
Male	89(70.63)	151(33.55)	27(42.18)	267(41.71)
Female	37(29.36)	299(66.44)	37(57.81)	373(58.28)
Total	126(19.68)	450(70.31)	64(10)	640(100)
$\chi^2 = 55.669$, d.f. = 2, p < 0.0001				

*Figure in parenthesis are in percentages.

Table-4. Distribution of study population according to cognition with Gender and ADL

Gender	Normal (n=188)	Some confusion (n=416)	Severe Confusion (n=36)	Total (n=640)
Male	89 (47.34)	155 (37.25)	23(63.88)	267(41.71)
Female	99 (52.65)	261 (62.74)	13 (36.11)	373(58.28)
Total	188(29.37)	416(65)	36(5.62)	640(100)
$\chi^2 = 13.123$ d.f. = 2, p < 0.001				
ADL				
Independent	126(39.49)	193(60.50)	0	319(49.84)
Need assistance	61(21.70)	189(67.25)	31(11.03)	281(43.90)
Very dependent	1(2.5)	34(85)	5(12.5)	40(6.25)
Total	188(29.37)	416(65)	36(5.62)	640(100)
$\chi^2 = 66.173$ d.f. = 4, p < 0.001				

*Figure in parenthesis are in percentage.

References:

1. Park K. Text Book of Preventive and Social Medicine. 24th ed. PremNagar (Jabalpur): M/S Banarsidas Bhanot Publishers; 2017.
2. Kumar S, Rajasekhar P, Reddy NB, Sai TSR, Prabhu GR, Swarnalatha N. Socio-demographic Determinants of Mental Health Problems among Rural Elderly Population. Indian Journal of Public Health Research & Development 2013;4(3):33-38.
3. Feather A. Older People. In: Glynn M, Drake WM, editors. Hutchinson's clinical Methods. 24th ed. Poland: Elsevier Company Ltd; 2018. p85.
4. Un.org [Internet]. United Nations: Demographic profile of older population; c2014 [cited 2014 may 10]. available from <http://www.un.org/esa/population/publications/worldageing19502050/pdf/90chapteriv.pdf>
5. Census india.gov.in [Internet]. Chhattisgarh: Annual health survey 2011-12 fact sheet; c2011 [cited 2014 May 13]. Available from http://www.censusindia.gov.in/vital_statistics/AHSBulletins/AHS_Factsheets_2011_12/Chhattisgarh_Factsheet_2011-12.pdf
6. Mohammad AJ. Global age watch index 2015 [Internet]. New York: Amina J. Mohammad. 2015- [cited 2014 May 13]. Available from <http://www.helpage.org/global-agewatch/>

7. Lwanga SK, Lemeshow L. Sample size determination in health studies: A practical manual, Part I, Geneva (Switzerland) world Health organization; 1991, 1(1).
8. Michael S. Hutchinson's clinical Methods. 20th ed. ELBS with W.B. Saunders company ltd. 1995. p67.
9. Sherry A, editor. Katz Index of Independence in activity of daily living (ADL) [Internet]. Greenberg: Try this: Best Practices in nursing care to older adults; 2012 [cited 2014 May 12]. Available from <https://consultgeri.org/try-this/general-assessment/issue-2.pdf>
10. Sherry A, Boltz M editors. The Lawton Instrumental activity of Daily Living (IADL) [Internet]. Greenberg: Try this: Best Practices in nursing care to older adults; 2007 [cited 2014 May 12]. Available from <https://www.alz.org/careplanning/downloads/lawton-iadl.pdf>
11. Lena A, Ashok K, Padma M, Kamnath V, Kamath A. Health and social problems of the elderly: A cross-sectional study in Udipi Taluk, Karnataka. IJCM 2009; 34(2):131-4.
12. Gender composition of the population. [accessed on 2015 May 14] available from http://censusindia.gov.in/2011-prov_results/data_files/india/Final_PPT_2011_chapter5.pdf
13. Shradha K, Prashantha B, Prakash B: Study on Morbidity Pattern among elderly in urban Population of Mysore, Karnataka, India. International Journal of Medicine and Biomedical Research 2012; 1(3):215-223.
14. Sarasa R S. **Socio-economic Conditions, Morbidity Pattern and Social Support among the elderly women in a rural area, Thiruvananthapuram, 2011.**
15. Tiwari S, Sinha AK, Patwardhan K, Gehlot S, Gambhir IS, Mohapatra S.C. Prevalence of Health Problems among elderly: A study in a rural population of Varanasi. Indian J. Prev. Soc. Med 2010; 41(3&4):226-30.
16. Srinivasan K, Vaz M, Thomas T. Prevalence of health related disability among community dwelling urban elderly from middle socioeconomic strata in Bangalore, India. Indian J Med Res 2010; 131: 515-521.
17. Lisa c. Gurie Mc, Ford ES, Ajani U. A. Cognitive functioning as a predictor of functional disability in later life. The American Journal of Geriatric Psychiatry. 2006; 14(1):36-42.
18. Scanlan JM, Binkin N, Michieletto F, Lessig M, Zuhr E, Borson S. Cognitive impairment, chronic disease burden, and functional disability: A population study of older Italians. *American Journal of Geriatric Psychiatry* 2007; 15(8):716-724.

How to cite this article: Naushad MA, Bhawnani D, Verma N, Umate L Assessment of level of cognition and their relation with functional status among geriatric population in Raipur city, Chhattisgarh, India. J Comprehensive Health. 2018; 6(2): 97-102.