Prevalence and determinants of Cognitive impairment and Depression among the Elderly (> 60 years) in a rural community of Koppal, Karnataka

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Abstract

Background: Globally, there has been gradual rise in the proportion of elderly population. This has resulted in the increased burden of neurodegenerative diseases like Cognitive impairment and depression, leading to increased dependency and poor quality of life among them.

Objectives: The objectives of the study were, 1) To estimate the prevalence of Cognitive impairment and Depression among elderly (>60 years) in the study setting, and 2) To determine various factors associated with Cognitive impairment and Depression among them.

Methods: A cross sectional community-based study was conducted in the field practice area of PHC, Irkalagada, Koppal for a duration of 6 months from July 2023 to December 2023. Cluster sampling technique was used for sample selection and a total of 524 elderly (aged ≥60 years) were included. Data collection was done using a predesigned and structured questionnaire after obtaining written informed consent and Statistical analysis was done using WHO Epi info software version 3.5.4.

Results: The prevalence of Cognitive impairment (CI) was 230 (43.89%) and the prevalence of Depression was 323 (61.64%) among elderly in the present study. The study found Cognitive impairment to be significantly associated with Literacy, Survival status of spouse and consumption of Alcohol and Tobacco (Both smoke and smokeless forms); Depression to be significantly associated with Literacy and consumption of Alcohol and Tobacco smoking.

Conclusion: The present study found that the burden of Cognitive impairment and Depression is high among elderly in the study setting and also identified some of its determinants, for effective planning of interventions.

Key words: "Aged", "Cognitive Dysfucntion", "Depresssion", "Life Style"

Introduction

The world is aging rapidly through demographic transition leading to increase in the proportion of elderly population. As per recent estimates (2023), the number of people aged 60 years and older is 1.1 billion globally, which is expected to reach 2 billion in 2050, representing 22% of the total population. India, the second highest contributor of elderly people in the world, will become home for 323 million elderly population (60 years or older) by the year 2050 compared to current 153 million in the year 2023. As people get older, they inevitably become vulnerable to different medical and psychological problems leading to increased dependency and poor quality of life among them[1, 2, 3, 4, 5, 6].

With increase in life expectancy, there is gradual increase in the burden of degenerative diseases especially neurodegenerative diseases, with Cognitive impairment (CI) and Depression being most common among them. CI is a transitional stage between normal aging and dementia and it reflects the clinical situation where a person has memory complaint and objective evidence of CI but no evidence of dementia. Human reasoning and experiences depend on cognition and CI can affect a patient's independent functioning and consequently his quality of life. A large proportion of people with cognitive disability currently live in low- or middle-income countries. In India, the prevalence of CI varies from 3.5% to 11.5% in elderly aged 65 years and above and is more in rural areas. Although CI

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is expected to occur in some of the elderly, existing research, however, finds a strong association of it with several modifiable risk factors including education, occupation and income/ wealth[1,2,7,8,9].

Depression is another serious illness of concern among elderly and is considered both as a disease and risk factor for other diseases. It is associated with increased risk of morbidity, increased risk of suicide, decreased physical, cognitive and social functioning, and greater self-neglect, all of which are in turn associated with increased mortality. The prevalence of depression is 4.4% worldwide and is expected to become the leading cause of disability- adjusted life years (DALYs) by the year 2030. The prevalence of depression among Indian elderly population varies between 13% to 25%. Multiple risk factors have been identified, which include gender, economic disadvantages, social disadvantages and chronic illnesses[1, 2, 6, 10, 11].

Both Cognitive impairment and Depression are not treatable and therefore, identification of risk factors is essential to take preventive measures. Further, early recognition through screening and initiation of appropriate treatment for these conditions in older people can improve quality of life by preventing suffering or premature death and maintaining optimal levels of function and independence[1,2,12]. With this background, the present study was undertaken with the following objectives.

Objectives of the study: 1) To estimate the prevalence of Cognitive impairment and Depression among elderly (>60 years) in the study setting. 2) To determine various factors associated with Cognitive impairment and Depression among elderly in the study setting

Materials and Methods

A Community based cross-sectional study was conducted in the Field practice area of Primary Health Center (PHC) Irkalagada, Koppal Taluk, Koppal District for a duration of 6 months from July 2023 - December 2023. PHC, Irkalagada is approximately 18 - 20 kms from District headquarters catering to a population of 20, 827 residing in 3827 households. The study population consisted of all the elderly (aged ≥60 years) in the field practice area of PHC, Irkalagada. Using the formula $n = z^2pq/ d^2$ (z = 1.96; p = prevalence, q = 1 - p & d = precision), minimum sample size calculated was 409 with an absolute precision of 5%, significance level of 0.05 and design effect of 1.5, taking 23% prevalence of Cognitive impairment among elderly in Karnataka as per recent estimates[13] and we included 524 elderly (aged ≥60 years) in the present study.

Cluster sampling technique was used for sample selection. All 11 villages in the field practice area of

PHC Irkalagada, Koppal were considered as clusters and 6 such clusters were selected by Simple random sampling. In each of the selected cluster, house to house visit was done and minimum of 100 elderly were included in the study. However, owing to disparities/ incomplete data in the questionnaires, only 524 data of elderly could be used for final analysis. The exclusion criteria were 1) Elderly unavailable at the time of house visit (A total of 3 visits were done on different occasions), 2) Temporary visitors/ guests to the house, and 3) Elderly residing in the study area for a period of < 6 months.

Study tools and Data collection: A predesigned and structured questionnaire was used for data collection after obtaining written informed consent from the participants. The questionnaire used for the study purpose comprised of three parts: (a) Sociodemographic details (b) MiniMental State Examination (MMSE)[14] Scale to assess Cognitive impairment and (c) Geriatric Depression Scale (GDS) [15] to assess Depression. Both MMSE and GDS are validated questionnaires used extensively to screen Cognitive impairment and Depression respectively. The study participants who were found to be suffering from Cognitive Impairment and Depression in the present study were referred to PHC Irkalagada, Koppal for definitive diagnosis and management.

Statistical analysis: Statistical analysis was performed using Epi info software version 3.5.4. Cognitive impairment and Depression were detected and graded as per MMSE scale and GDS scales respectively, and their prevalence were estimated in relation to certain selected variables.

Ethical Clearence: Ethical clearance was obtained from the Institutional Ethics committee, KIMS, Koppal.

Results
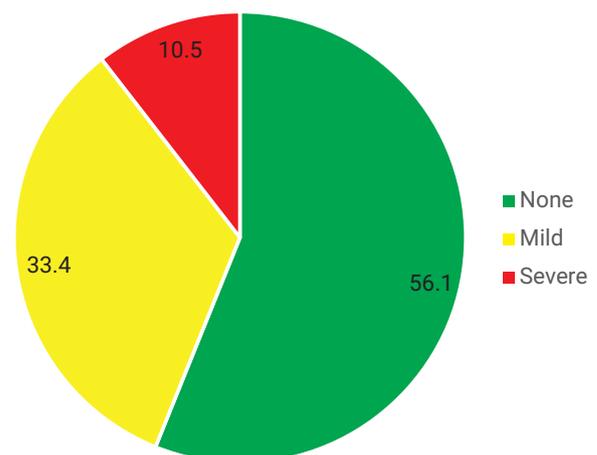
Figure 1: Prevalence of Cognitive impairment among study subjects according to Mini Mental State Examination (MMSE) (N = 524)

Figure 1: shows the prevalence of Cognitive impairment among elderly as assessed by Mini Mental State Examination (MMSE). It is evident that the prevalence of Cognitive impairment was 230 (43.89%) among elderly aged 60 years and above in the present study, which included 175 (33.39%) and 55 (10.49%) of mild and severe levels respectively.
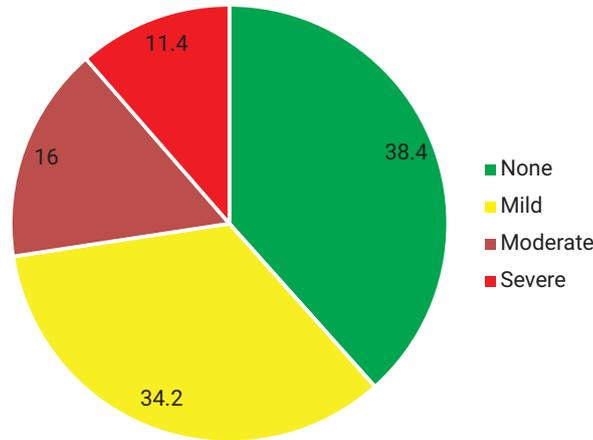
Figure 2: Prevalence of Depression among study subjects according to Geriatric Depression Scale (GDS) (N = 524)

Figure 2: shows the prevalence of Depression among elderly as per Geriatric Depression Scale (GDS). The overall prevalence of Depression was 323 (61.64%) in the present study and it was mild in 179 (34.16%), moderate in 84 (16.03%) and severe in 60 (11.45%) of subjects.

Table 1: Prevalence of Cognitive impairment among study subjects according to certain Socio demographic and Lifestyle factors (N = 524)

Variables	Classification	Cognitive Impairment N (%)		
		Present	**Absent**	
Age (years)				
< 64	229	96 (41.92)	133 (58.08)	
65 to 69	171	72 (42.10)	99 (57.90)	χ2 = 2.461
70 to 74	84	42 (50)	42 (50)	P = 0.482
> 75	40	20 (50)	20 (50)	
Gender				
Male	285	124 (43.50)	161 (56.50)	χ2 = 0.037
Female	239	106 (44.35)	133 (55.65)	P = 0.846
Literacy				
Nil	301	161 (53.48)	140 (46.52)	χ2 = 30.82
Primary	173	60 (34.68)	113 (65.32)	P = 0.000
High school & above	50	9 (18)	41 (82)	
Spouse				
Alive	431	180 (41.76)	251 (58.24)	χ2 = 4.472
Dead	93	50 (53.76)	43 (46.24)	P =0.034
Living with children				
Yes	472	207 (43.85)	265 (56.15)	χ2 = 0.003
No	52	23 (44.23)	29 (55.77)	P = 0.959
Own a Home				
Yes	476	211 (44.32)	265 (55.68)	χ2 = 0.399
No	48	19 (39.58)	29 (60.42)	P = 0.528
Other Immovable property				
Present	275	120 (43.63)	155 (56.37)	χ2 = 0.015
Absent	249	110 (44.17)	139 (55.83)	P = 0.901

Variables	Classification	Cognitive Impairment N (%)		
		Present	Absent	
Alcohol				
Present	103	58 (56.31)	45 (43.69)	χ2 = 8.027
Absent	421	172 (40.85)	249 (59.15)	P = 0.005
Smoking				
Present	115	62 (53.91)	53 (46.09)	χ2 = 6.006
Absent	409	168 (41.07)	241 (58.93)	P = 0.014
Smokeless tobacco				
Present	241	139 (57.67)	102 (42.33)	χ2 = 34.42
Absent	283	91 (32.15)	192 (67.85)	P = 0.000

Table 1: shows prevalence of Cognitive impairment among study subjects according to some Socio demographic and Lifestyle factors. The prevalence of Cognitive impairment among elderly aged 60 years and above, whether mild or severe, was almost equal in both the genders and in almost all the age groups in the present study. However, Cognitive impairment was found to be inversely proportional to the literacy and also, Cognitive impairment was found to be low among those whose spouses were alive compared to their counterparts in the present study and both these factors were found to be statistically significant (P < 0.05). The present study did not find any significant association between the prevalence of Cognitive impairment among elderly and their living status with or without children and their material possessions like whether they own a house or any other immovable property. But it was significantly more (P < 0.05) among consumers of Alcohol and Tobacco (Both smoke and smokeless forms), as seen in the table.

Table 2: Prevalence of Depression among study subjects according to certain Socio demographic and Lifestyle factors (N = 524)

Variables	Classification	Depression N (%)		
		Present	Absent	
Age (years)				
< 64	229	133 (58.07)	96 (41.93)	
65 to 69	171	108 (63.15)	63 (36.85)	χ2 = 3.390
70 to 74	84	58 (69.04)	26 (30.96)	P = 0.335
> 75	40	24 (60)	16 (40)	
Gender				
Male	285	177 (62.10)	108 (37.90)	χ2 = 0.057
Female	239	146 (61.08)	93 (38.92)	P = 0.811
Literacy				
Nil	301	185 (61.46)	116 (38.54)	χ2 = 15.558
Primary	173	119 (68.78)	54 (31.22)	P = 0.000
High school & above	50	19 (38)	31 (62)	
Spouse				
Alive	431	258 (59.86)	173 (40.14)	χ2 = 2.002
Dead	93	63 (67.74)	30 (32.26)	P = 0.157
Living with children				
Yes	472	290 (61.44)	182 (38.54)	χ2 = 0.081
No	52	33 (63.46)	19 (36.54)	P = 0.776
Own a Home				
Yes	476	290 (60.92)	186 (39.08)	χ2 = 1.129
No	48	33 (68.75)	15 (31.25)	P = 0.288
Other Immovable property				
Present	275	164 (59.63)	111 (40.37)	χ2 = 0.984

Variables	Classification	Depression N (%)		
		Present	Absent	
Absent	249	159 (63.85)	90 (36.15)	P = 0.321
Alcohol				
Present	103	74 (71.84)	29 (28.16)	$\chi2$ = 5.645
Absent	421	249 (59.14)	172 (40.86)	P = 0.018
Smoking				
Present	115	82 (71.30)	33 (28.70)	$\chi2$ = 5.818
Absent	409	241 (58.92)	168 (41.08)	P = 0.016
Smokeless tobacco				
Present	241	158 (65.56)	83 (34.44)	$\chi2$ = 2.898
Absent	283	165 (58.30)	118 (41.70)	P = 0.089

Table 2: shows prevalence of Depression among study subjects according to some Socio demographic and Lifestyle factors. The prevalence of Depression among elderly in the present study was found to be significantly associated with neither their age, gender nor even with living status of their spouses. But, Depression among study subjects was found to be significantly (P < 0.05) associated with literacy status, as the case with Cognitive impairment. Further, similar to Cognitive impairment, the prevalence of Depression among elderly was not found to be significantly associated with their status of staying with or without children and their material possessions. The prevalence of Depression was found to be significantly (P < 0.05) associated with consumption of Alcohol and Smoking, but not with consumption of Smokeless tobacco.

Discussion

The present study was conducted in a rural community of Koppal to estimate the prevalence of Cognitive impairment and Depression among elderly aged 60 years or more and to determine various factors associated with them. The prevalence of Cognitive impairment among elderly in the present study was 230 (43.89%) according to MiniMental State Examination (MMSE) Scale, which included 175 (33.39%) of mild and 55 (10.49%) of severe levels. Few studies like Kumari R et.al. in North India involving 425 subjects (2021)[1], Rajesh J et.al. among 77 (2019)[7] and Mohammad KA et.al among 178 elderly (2022)[16] in Chennai, Tamil Nadu and Kathari B et.al in 280 subjects (2019)[17] in Chitradurga, Karnataka have found comparable levels of Cognitive impairment in their studies. However, Konda PR et.al. in Hyderabad, Telangana involving 100 subjects (2016)[5], Khan ZA et.al. in Haryana among 575 study subjects (2017-2018)[18] and Deepti R et.al. in Bangalore, Karnataka which included 222 subjects (2018)[19], have found very low prevalence of CI in their studies, contrary to the present study. This difference

could be due to differences in the study setting, profile of study subjects, sampling techniques and methods of data collection.

The prevalence of cognitive impairment was found to be inversely proportional to the literacy in the present study similar to the findings of many other studies done in different parts of the country.[1,3,5,7,8,9,17,18]

CI was significantly high among elderly who had lost their spouse, in confirmation with the findings of the study done by Jadenur et.al involving 100 subjects in Belagavi, Karnataka (2019-2021)[8]. Further, CI was significantly more among consumers of Alcohol and Tobacco in the present study, in line with the findings of studies by Mohammad KA et.al done among 178 subjects in Chennai, Tamil Nadu (2022)[16] and Khan ZA et.al in Haryana conducted among 575 subjects (2017-2018)[18]. However, a number of studies have found CI to be significantly associated with some other variables like Age, Gender, Socioeconomic status, type of family, unlike the findings of the present study[5,7,8,9,14,17,18].

The overall prevalence of Depression in the present study was high i.e.323 (61.64%), which was comparable to the findings of Manna N et.al. in West Bengal involving 133 elderly (2022)[2], Kathari B et.al. in Chitradurga district of Karnataka involving 280 subjects (2019)[17] and Bincy K et.al. in Tamil Nadu which included 7200 elderly (2016-2018)[20]. Behera P et.al. in North India among 395 subjects (2016)[4] and Chauhan P et.al in South India among 290 subjects (2010-2011)[21], however, have found very low prevalence of Depression in their studies. Depression was found to be significantly associated with literacy status. Kumari R et.al. in North India involving 425 subjects (2021)[1] and Nandini C et.al. in Shimoga, Karnataka among 210 subjects (2018)[13] have found similar results. Similar to CI, Depression among elderly in the present study was also found to be significantly more in consumers of alcohol and smokers.

The present study has used validated questionnaires like MMSE and GDS to screen for Cognitive impairment and Depression respectively among elderly, which is one of the major strengths of the study. The present study is first of its kind in the study setting and has tried to identify a number of factors responsible for the high prevalence of Cognitive impairment and Depression among elderly, unlike earlier studies. However, the study was not without limitations. The cross-sectional nature of the study did not allow to establish temporality of the various factors found to be significantly associated with Cognitive impairment and Depression. Also, the findings are generalizable only to rural areas. Despite this, the present study has provided enough information to take necessary steps to prevent CI and Depression among elderly and also provides a baseline data for future research in identification of risk factors using Analytical study designs.

Conclusion

More than two in five had Cognitive impairment and more than three in five had Depression among elderly in the present study. Cognitive impairment was found to be significantly associated with Literacy, Living status of Spouse and consumption of Alcohol and Tobacco. Similarly, depression among elderly was found to be significantly associated with Literacy and consumption of Alcohol and Tobacco in the present study. Long term goal of improving the literacy along with short term goal of adopting healthy lifestyle can play an important role in Healthy aging.

Acknowledgements

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