Original Article

Comparative analysis of nutritional status among institutionalised and community-dwelling elderly women and its association with mental health status and cognitive function

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ABSTRACT

Introduction: Population pyramids are significantly impacted by the global phenomena of ageing. It has been reported that depression and cognitive function have an impact on the nutritional status of older adults. Depression is the most common psychiatric problem in old age, and cognitive deterioration is frequently observed in this age group. **Objective:** This descriptive and comparative study set out to compare the cognitive abilities, nutritional health and depression status of older adults who lived in community settings and in assisted living facilities. **Materials and Methods:** A total of 250 older women (125 from institutionalised old age home and 125 from community) participated in a cross-sectional study (residing at Rajarhat, Newtown area). The lengthy version of the Mini Nutritional Assessment tool (MNA®) was used to evaluate the participants' nutritional status. The Geriatric Depression Scale (GDS 30) was used to evaluate the severity of the depression. Using the Folstein Mini-Mental State Examination (MMSE), cognitive function was assessed. Using SPSS software, the Chi-square, Kruskal–Wallis test, and Spearman's rho correlation coefficient were computed. **Results:** In the present study, it was observed that only 30.4% of the respondents who are community-dwelling elderly had normal MNA score, whereas 69.6% were at risk of malnutrition or already malnourished. Considering institutionalised elderly it was observed that only 7.2% were normal and 92.8% were malnourished/at risk of malnutrition. Statistically significant association was observed between nutritional status and mental health status ($P = 0.00$) as well as cognitive function ($P = 0.00$) among old age home residing elderly. Among the community-dwelling elderly mental health status has significant association with their nutritional status ($P = 0.00$) and cognitive function ($P = 0.00$) as well. **Conclusions:** Community-dwelling elderly were relatively healthy compared to old age home residents. Maintaining the nutritional, cognitive, and mental health of institutionalised and community-dwelling elderly women requires the implementation of physical and cognitive stimulation activities as well as interventions targeted at improving a healthy diet.

Keywords: Cognitive function, depression, nutritional status, older women

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Introduction

Population pyramids are significantly impacted by the global phenomena of ageing.[1] The main causes of an increase in the proportion of individuals over 65 include an increase in the number of older adults and factors such as decreased fertility, death rates and population growth.[2] The demographic ageing of the population, coupled with new family structures and societal dynamics, is generating an increasing demand for institutions for older adults.[3] Families who turn to institutionalisation often do so due to a lack of family support or suitable housing, a lack of financial resources, or both. Additionally, the rising presence of women in the workforce and limited financial resources are additional justifications.[4] The institutionalisation process is intricate and entails significant adjustments to daily activities.[5] As a result, there is a decline in the nutritional, cognitive and functional condition. Among institutionalised older adults, malnutrition is increasingly concerning and frequently goes undiagnosed. According to the criteria and technique used in each study, this condition has a prevalence rate of between 5-12% in the general population and 52-85% in institutionalised individuals.[6] Malnutrition increases morbidity and death in older people, lowers quality of life and lengthens hospital stays. Additionally, malnutrition is linked to sarcopenia, a weakened immune system, a higher risk of infection, a slower rate of wound healing, and a decline in functional status.[7] Depression is a state of mental discomfort, lack of interest in or enjoyment from life and leisure activities, or mental pain. Changes in appetite, sleepiness or hypersomnia, exhaustion or lack of energy, psychomotor agitation or retardation, excessive guilt feelings, inability to focus, difficulties thinking and suicidal thoughts are a few symptoms.[8,9] The majority of persons with this psychiatric illness are women, who experience it more frequently than men do. Numerous factors, some of which are different from those that contribute to depression in younger people, can lead to depression in later life.[10] In older people who are depressed, malnutrition is more likely to occur, and vice versa. Depression is associated with poor eating habits and weight loss and is a substantial psychological risk factor for developing malnutrition in old life.[9,11] In a country like India, the majority of families appear to disregard the significance of women's health. As a result, when women get older, their nutritional and physical health may suffer. In India, old age houses, which also house elderly women, are a fast-growing housing typology. In our country, elderly people often live with their family and children, but recently, as the family structure has changed to a nuclear one, there has been an increase in the number of elderly people living in old age homes. Therefore, special consideration must be given to the nutritional, psychological and physical health of these elderly women. There was no study conducted to understand the difference in nutritional status, cognitive function, and depression status between institutionalised or community-dwelling elderly. This descriptive and comparative study aims to determine and compare the cognitive functions, nutritional status, and mental status of elderly individuals residing in old-age homes with those living in the community.

Materials and Methods

Study type, study design, and study participants

Sample size was calculated by taking the previous prevalence of malnutrition as 83%[12] and using the formula $n = 4pq/L2$[13-15] (where p = prevalence of malnutrition, q = 100−p, L = 10% of p). It came out to be 173. During the study period, 125 (≥60 years old) community-dwelling participants from Rajarhat-Newtown area of Kolkata could be covered based on their availability, willing to participate and according to exclusion criteria. Again, a total of 125 participants were chosen from three randomly selected old age home (out of a total of 11 such institutions) and represented as institutionalised elderly. Purposive sampling techniques were implemented during selection of the study participants. Participants who were older women (≥60 years) were free of any form of severe cognitive impairment, serious illnesses were included as participants. Before the start of the data collection, the study objectives were thoroughly explained to the participants, who then signed the informed consent form. Illiterate participants were included after providing their thumbprints and consent. The present study was started after getting approval from institutional ethics committee of All India Institute of Hygiene and Public Health, Kolkata, and it is part of a bigger project published elsewhere.[13-15] The study was conducted during the period of March 2021 to April 2022.

Assessment of nutritional status

Mini Nutritional Assessment (MNA®) tool's lengthy version was used to evaluate the participants' nutritional status. The five sections of this tool were anthropometry, functioning, general evaluation, nutritional evaluation and subjective evaluation. The nutritional status of the participants was assessed based on their scores obtained in accordance with the MNA tool's guidelines.[16,17] The MNA scores determine the classification of nutritional status: normal (24–30 points), at risk of malnutrition (17–23.5), and malnourished (less than 17 points).

Assessment of geriatric depression

The participants' potential for depression was evaluated using the Geriatric Depression Scale (GDS-30). Participants were asked to respond to a few questions on their psychological state, and scores were generated based on the responses to assess the severity of depression. A score of 0–4 is regarded as normal; a score of 5-8 denotes mild depression; a score of 9–11 indicates moderate depression; and a score of 12–15 indicates severe depression.[18]

Assessment of cognitive function

A 30-questionnaire Folstein Mini-Mental State Examination (MMSE) scale was used to assess the cognitive function of the elderly participants. The Mini-mental State Examination has a score range of 0 to 30, with a score of 25 or more being considered to represent normal cognitive status. 0–17 show severe cognitive impairment, 18–23 show mild cognitive impairment, and 24–30 show no cognitive impairment.[19]

Statistical analysis

The collected data were initially entered into an Excel worksheet to check for any potential errors, and then SPSS software, version 20.0, was used for the statistical analysis. Chicago, Illinois, USA: Statistical Package for the Social Sciences Inc. Statistics were observed to be significant at $P < 0.05$. Percentages were used to express categorical data. For continuous data, the Kolmogorov-Smirnov test was used to verify the normality of the distribution, and a significant P value showed that the data were skewed. Therefore, the interquartile range (IQR) and the median were used to express continuous data. Pearson's Chi-square test and odds ratio (OR) were used to see whether there is any association between categorical variables. The Spearman's rank correlation coefficient (*rho*) was used to calculate the relationship between two continuous variables. For the three groups of MNA, the Kruskal–Wallis H test was used to compare the median values of the independent variables.

Results

The 125 participants in community-dwelling residents had an average age of 73 (12) (Median (IQR)) years. The majority of them had little formal education (less than four years of formal education or illiterate = 88%), and 44% were widowed, separated or divorced. The median body mass index (BMI) was 24.4 (3.9) kg/m², with values ranging from 16.2 kg/m² to 33.6 kg/m². 65.5% of the individuals were overweight (BMI >22.9 kg/m²), 28.8% were normal weight (BMI 18.5-22.9 kg/m²), and 5.6% were underweight (BMI <18.5 kg/m²), according to WHO classification for Asian Indians.[20] Whereas, among institutionalised respondents the average age was 82.3 (6.1) years. The majority of them had little formal education (less than four years of formal education or illiterate 100%), and 30.4% were widowed, separated or divorced. The median BMI was 25.1 (6.3) kg/m², with values ranging from 16.0 kg/m² to 47.9 kg/m². 64.8% of the individuals were overweight (BMI >22.9 kg/m²), 22.4% were normal weight (BMI 18.5-22.9 kg/m²), and 9.6% were underweight (BMI <18.5 kg/m²).

In present study, it was observed that only 30.4% of the respondents who are community-dwelling elderly had normal MNA score, whereas 69.6% were at risk of malnutrition or already malnourished [Table 1]. Considering institutionalised elderly it was observed that only 7.2% were normal and 92.8% were malnourished/at risk of malnutrition. Age has no significant association with MNA scores in both of the cases [Tables 1 and 2]. The OR for institutionalised was 0.50 (confidence interval (CI) of OR: 0.10-2.33) and for community-dwelling elderly women, it was 0.88 (CI: 0.41-1.87). Among the community-dwelling elderly, 49.6% of respondents belong to 60-69 years of age, 42.4% belong to 70-79 years of age, and 7.5% belong to 80-89 years of age.

Among the institutionalised elderly women, 3.2% of respondents were suffering from severe cognitive impairment (CI), and 76.8% were found to have mild to moderate CI. Whereas among community-dwelling elderly, there were none suffering from severe CI, 56.8% had mild impairment, and 36% had normal or no impairment.

Considering MMSE of institutionalised women, there is a significant association that existed with malnutrition indicator score (MIS) ($P = 0.00$). Again, the OR for MMSE was 11.72 (3.7-36.39). Again, for community-dwelling elderly women, there a significant statistical association existed between MMSE and MIS, the OR for MMSE was 52.50 (16.68-165.15).

Among the elderly women residing at intuitions, 40.8% were severely depressed, 52% were mild, and 7.2% were having no depression. MIS has an insignificant association with depression score according to the Chi-square test, again OR for GDS

Table 1: Distribution of community-dwelling elderly women according to malnutrition indicator score in relation to age, MMSE, GDS (*n*=125)

Parameters	Malnutrition Indicator Score			Total *n* (%)	Chi-square test (*P*)	OR (95% of CI)
	Malnourished *n* (%)	At Risk *n* (%)	Normal *n* (%)			
Age (years)						
60-69	1 (1.59)	41 (65.08)	21 (33.33)	63 (100)	0.119 (0.94)	0.88 (0.41-1.87)
70-79	3 (5.45)	35 (63.64)	17 (30.91)	55 (100)		
80-89	0 (0)	5 (71.43)	2 (28.57)	7 (100)		
MMSE						
Severe	-	-	-	-	67.71 (0.00)	52.5 (16.68-165.1)
Moderate	4 (4.44)	5 (55.55)	0 (0)	9 (100)		
Mild	0 (0)	66 (92.96)	5 (7.04)	71 (100)		
Normal	0 (0)	10 (22.22)	35 (77.77)	45 (100)		
GDS						
Severe	0 (0)	16 (32.65)	33 (67.35)	49 (100)	46.27 (0.00)	0.049 (0.018-0.13)
Mild	0 (0)	55 (88.71)	7 (11.29)	62 (100)		
Normal	4 (28.57)	10 (71.43)	0 (0)	14 (100)		
Marital Status						
Married	4 (7.27)	47 (85.45)	4 (7.27)	55 (100)	30.32 (0.00)	13.5 (4.40-41.39)
Widowed	0 (0.00)	34 (48.57)	36 (51.43)	70 (100)		

MNA=Mini Nutritional Assessment, GDS=Geriatric Depression Scale, MMSE=Mini-Mental State Examination, The Odds Ratio (OR) and Chi-square were analysed using two by two table according to normal and malnourished/at risk group

was 0.804 (0.19-3.4). Considering community-dwelling elderly women, 39.2% were severely depressed, 49.6% were having mild depression, and 11.2% had no depression. Here, the GDS score has a significant association with MIS according to the Chi-square test ($P = 0.00$) [Tables 1 and 2].

Considering median (IQR) value, the MIS had a median value of 23 (2.5) median (IQR), for community-dwelling elderly women, and 19 (5.5) for institutionalised elderly women. Significant statistical associations were observed according to the Mann–Whitney test, where community-dwelling elderly demonstrated better nutritional status than the other one [Tables 3 and 4]. Again, significant median differences were observed from Kruskal–Wallis H test among the median values of MMSE scores and GDS scores ($P < 0.05$) [Table 3]. According to Spearman's correlation data, GDS has a significant negative correlation ship with MIS/MNA [Table 3].

Discussion

It was observed that the severity of cognitive impairment, depression and MIS were higher among institutionalised elderly women. We sought continuous nutritional assessment and counselling to provide adequate health care support. Similar observations were also observed in different parts of the world.[21-24] Staying away from the family and living alone perhaps creates all such conditions among these institutionalised elderly. Again, the prevalence of malnutrition was also higher among institutionalised women than the community-dwelling elderly women. Similar observations were also common in previous reports.[25] Thus institutionalised setup for the elderly yet predisposes risk of cognitive impairment, depression and malnutrition. There was no national study in northern part of India that indicates such a comparison. According to Borowiak *et al.*,[26] institutionalised old persons had lower MNA and MMSE scores than elderly people who live in the community. Different reports also suggest that being a woman is one of the sociodemographic risk factors for CI.[27,28] Low educational attainment is another risk factor for community immersion. The fact that women in this study had significantly lower educational status may help to explain this finding (current study). Given that women's educational attainment is lower than men's, gender concerns in CI in our country should be given priority. Although female literacy rates are on the rise in India, older

Table 2: Distribution of institutionalised elderly women according to malnutrition indicator score in relation to age, MMSE, GDS, marital status and literacy status (*n*=125)

Parameters	Malnutrition Indicator Score			Total *n* (%)	Chi-square test (*P*)	OR (95% of CI)
	Malnourished (%)	At Risk *n* (%)	Normal *n* (%)			
Age (years)						
60-69	10 (20.41)	35 (71.43)	4 (8.16)	49 (100)	3.319 (0.506)	0.50 (0.10-2.33)
70-79	13 (27.66)	30 (63.83)	4 (8.51)	47 (100)		
80-89	3 (10.34)	23 (79.31)	3 (10.34)	29 (100)		
MMSE						
Severe	1 (25)	3 (75)	0 (0)	4 (100)	14.35 (0.001)	11.72 (3.7-36.3)
Moderate	21 (38.18)	34 (61.82)	0 (0)	55 (100)		
Mild	4 (9.76)	33 (80.49)	4 (9.76)	41 (100)		
Normal	0 (0)	18 (72)	7 (28)	25 (100)		
GDS						
Severe	15 (29.41)	35 (68.63)	11 (21.57)	51 (100)	0.37 (0.829)	0.804 (0.19-3.40)
Mild	18 (27.69)	47 (72.31)	0 (0)	65 (100)		
Normal	3 (33.33)	6 (66.66)	(0)	9 (100)		
Marital Status						
Married	15 (17.24)	61 (70.11)	11 (12.64)	87 (100)	6.55 (0.038)	0.514 (0.20-1.25)
Widowed	11 (28.95)	27 (71.05)	0 (0.00)	38 (100)		

MNA=Mini Nutritional Assessment, GDS=Geriatric Depression Scale, MMSE=Mini-Mental State Examination, The Odds Ratio (OR) and Chi-square were analysed using two by two table according to normal and malnourished/at risk group

Table 3: Distribution of geriatric depression scales and mini-mental state examination scores in community-dwelling elderly and institutionalised older women (*n*=125)

Parameter	Community-Dwelling Elderly, Median (IQR) *n*=125		Institutionalised Elderly, Median (IQR) *n*=125	
	GDS	MMSE score	GDS	MMSE score
MNA Score				
Normal nutritional status	23.5 (3.75)	18 (2)	16 (6)	17 (3.75)
At risk of malnutrition	15 (7)	22 (3)	11 (6.25)	21 (5.25)
Malnourished	8 (2.25)	27.5 (4)	8 (3)	26 (4)
Statistical Test				
Spearman's *rho* (*P*)	-0.68 (0.00)*	0.68 (0.00)*	-0.35 (0.00)*	0.53 (0.00)*
Kruskal–Wallis H test (*P*)	45.40 (0.00)*	59.07 (0.00)*	18.08 (0.00)*	34.98 (0.00)*

*Statistically significant. MNA=Mini Nutritional Assessment, GDS=Geriatric Depression Scale, MMSE=Mini-Mental State Examination, IQR=Interquartile range

Table 4: A comparison of cognitive functions, depression scale and nutritional status in institutionalised residents and community-dwelling elderly

Parameters	Community-Dwelling Elderly Median (IQR) *n*=125	Institutionalised Elderly Median (IQR) *n*=125	Mann–Whitney *U* test (*P*)
MMSE	23 (4)	21 (7)	-5.851 (0.00)
MNA	23 (2.5)	19 (5.5)	-7.492 (0.00)
GDS	12 (9)	11 (8)	-0.507 (0.612)

MNA=Mini-Nutritional Assessment, GDS=Geriatric Depression Scale, MMSE=Mini-Mental State Examination, IQR=Interquartile range

ladies in West Bengal may already be at risk due to inadequate schooling. Improving senior nutrition education could reduce this risk. These statistics may indicate a problem with the medical nutrition therapy and nutritional care provided to the elderly individuals residing in institutions. Residents of old age homes and non-institutionalised elderly both of their cognitive abilities were significantly affected by their marital status ($P > .05$). This might have happened as a result of the fact that single life increases depression and leads to poor appetite, which ultimately leads to malnutrition. Living with a partner may include cognitive and social challenges that guard against cognitive impairment (CI) later in life, according to research by Håkansson *et al.*[29] This finding is compatible with the brain reserve concept. While educational activities may support cognitive capacities, a stronger nutritional status may come from better nutritional services and well-established individual-based nutritional care for inhabitants of elderly homes. Primary healthcare practitioners should keep a careful eye on elderly community members to maintain their nutritional and mental well-being. While educational activities may support cognitive functioning, improving nutritional services and providing well-established individual-based nutritional care to old age home residents may result in a higher nutritional status. Primary healthcare providers should keep an eye on older residents in the community to preserve their nutritional and cognitive status.

Conclusion

A population of elderly women who are vulnerable is revealed by this cross-sectional study. The majority of the elderly persons showed little to high cognitive impairment and high malnutrition risk. It was well understood that the depression, cognitive functions and nutritional statuses were all differently interdependent. Cognitive impairment and a higher depression rate are associated with the risk of malnutrition. Community-dwelling elderly were relatively healthy compared to old age home residents. Maintaining the nutritional, cognitive, and mental health of institutionalised and community-dwelling elderly women requires the implementation of physical and cognitive stimulation activities as well as interventions targeted at improving a healthy diet. These initiatives ought to concentrate on gaining more autonomy and independence since doing so will enhance these groups' general well-being and ability to take care of them.

Conflicts of interest

There are no conflicts of interest.

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