NUTRITIONAL AND FUNCTIONAL STATUS OF HOSPITALIZED ELDERLY PATIENTS.

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Objective: To assess the nutritional and functional status of hospitalized elderly patients and whether their nutritional status was affecting functional status.

Methodology: An observational study conducted on 50 elderly patients (>60 years old) admitted at Masina Hospital for medical treatment. Nutritional assessments include Mini nutritional assessment (MNA) and Nutritional checklist (NCL) whereas Barthel index were used for functional assessment and symptoms, biochemical parameter was also noted. Information was collected from the patients, their relatives and responsible staff. Chi Square test was used to compare the nutritional and functional assessment.

Result: According to the NCL 38% of participants were at high risk, 40% were at moderate risk of malnutrition, and 22% had good nutrition. There was a high nutritional risk in patients with low income. As per MNA grading, 28% were at risk of malnutrition, 46% were malnourished and 26% were having normal nutritional status. There was significant correlation ($p<0.05$) found between nutritional and functional status of patients. Barthel index score was significantly lower in those at high risk of malnutrition. Weight loss and Gastrointestinal symptoms were majorly observed.

Conclusion: Hospitalized elderly were at risk of malnutrition due to poor intake and gastrointestinal symptoms which might affect their functional status. Therefore, early nutritional assessment and nutritional care plan is important for this vulnerable group.

Keywords: Nutritional checklist, Mini nutritional assessment, Barthel index, Elderly patients, Malnutrition

Introduction

Aging is associated with various physiological changes and needs, which make elderly people vulnerable to malnutrition[1]. It is estimated that almost half of the adults who are hospitalized are 65 years of age or older, although those older than 65 years represent only 12.5 percent of the population[2]. Multi-morbidity associated with increasing age is common and is found to be more frequent in resource-poor countries[3].

The World Health Organization (WHO)

estimates that the total number of older or elderly people (≥60 years) worldwide would cross the figure of 1.2 billion by 2025, including around 840 million people from low-income countries[4]. Between 2010 and 2050, with a predicted global increase in life expectancy, the population over the age of 80 yr will grow from 11.5% to 21.0% worldwide and from 9.0% to 19.0% in the developed countries[5]. This will result in an increase of older adults at risk of malnutrition [6]. In India, the elderly (aged 60 years and above) constitute 7.7% of the total population of 1.20 billion and this number is increasing[7]. The magnitude of malnutrition among the elderly in India is under-reported. The few studies that have been done showed that more than 50% of the older population is underweight and more than 90% has an energy intake below the recommended allowances.[8,9].

Malnutrition is a major geriatric problem associated with poor health status and high mortality, and the impact of a patient's nutritional condition on the clinical outcome has been widely recognized[10]. It is also related to a decline in general functional status and to decreased bone mass, immune dysfunction, delayed post surgery recovery, high hospitalization and readmission rates, and increased mortality[11]. Therefore, malnutrition is a prognostic factor associated with morbidity, mortality, and costs of care[12]. Older adults tend to be more prone to nutritional deficiencies[13], as aging may come with an accumulation of diseases and impairments. These include cognitive and physical decline, depressive symptoms, emotional variations, and poor oral health, along with socioeconomic changes[13,14,15].

All of these factors may directly influence the balance between nutritional needs and intake[14]. Even in cases of adequate nutrient and energy intake, the nutritional status of older adults can be challenged by a compromised nutrient metabolism (such as absorption, distribution, storage, utilization, and excretion), drugnutrient interactions, or altered nutrient needs[16].

One-fourth of the patients who are nutritionally at risk do not receive nutritional support or counseling, despite having been in contact with healthcare professionals[17]. Application of nutritional support based on nutritional screening results significantly reduced the incidence of complications and the length of hospital stay[18]. Therefore, early identification of malnutrition, nutritional assessment and its care plays an important role in early recovery and improving quality of life.

Methodology

This study has been carried out on 50 elderly patients (>60 years old) admitted at Masina Hospital during the period between May 2019 to September 2019.

According to age, subjects were classified into young old (65-74. 9 years), old old (75-84. 9 years), and oldest old (≥85 years)[19]. Patients who required treatment in specialized units such as the intensive care units and on Ryle's Tube feeding were excluded. Written consents were taken from the subject. Information such as Medical history, Biochemical parameters and Clinical symptoms were collected on admission from doctor and staff nurse. Nutritional assessment using Mini Nutritional Assessment (MNA), and Nutrition CheckList (NCL) whereas Barthel Index was used for functional assessment.

NCL was used for nutritional screening which included 10 items with a total score of 21 points. A score from 0 to 2 was considered as

good nutrition, 3 to 5 as moderate nutritional risk, and 6 or more as high nutritional risk. The nutritional checklist includes illness and tooth or mouth problems affecting feeding, number of meals per day, and types of foods and drinks, also ability to eat alone, to cook shop or feed oneself, and weight gain or loss, was included [20].

As regards functional assessment, the Barthel self-care index of activities of daily living, first developed in 1965[21] and later modified by Granger et. al[22]. It measures functional disability by quantifying patient performance in 10 activities of daily life. The Barthel Index has been reported to have excellent reliability and validity and adequate responsiveness to change, in measuring neurologic physical disability. Barthel self-care index included bowels, bladder, grooming, toilet use, feeding, transfer, mobility, dressing, stairs, and bathing. Total possible scores range from 0 to 20, with lower scores indicating increased disability [23].

The MNA is a short, non-invasive, reliable and extensively evaluated nutritional assessment tool for elderly populations. It is composed of 18 questions which are divided into four main categories; dietary assessment, subjective assessment, global assessment and anthropometric data. MNA gives a maximum of 30 points and it classifies the elderly in: malnourished (MNA < 17 points), at risk of malnutrition (MNA:17-23.5) and well nourished (MNA > =24 points) [24].

Kuppuswamy's Socioeconomic Status Scale is used in the urban population, for assessment of the socioeconomic status [25].

Data were checked, entered, and analyzed using chi square for data processing and statistics. For all analyses, *P* value <0.05 was considered statistically significant.

Result

A total of 50 subjects were included in study in which 62% were male and 38% were female. The admission was due to gastrointestinal troubles in 18 patients, cardiac troubles in 10, chest troubles in 11, neurological in 5, or other causes in 6 patients.

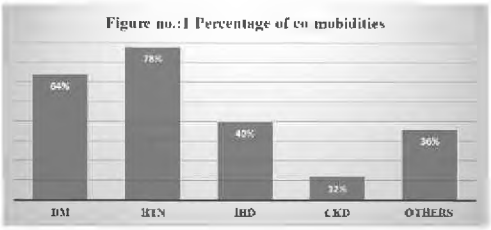
According to age categorization 60% were belonging to the young old, 28% were old and 12% were belonging to the oldest old category. As per Kuppuswamy's Socioeconomic Status Scale majority of population were belonging to lower middle class (40%). As for marital status, 70% were married, 20% were widowed and 10% were unmarried. The majority of patients had completed primary education (26%) and only 12% were on regular exercise (Table no-1).

Table No. 1 Demographic Data

Data	NO.	%
Gender		
Male	31	62
Female	19	38
Age		
Young old (65–74.9 years)	30	60
Old old (75-84.9years)	14	28
Oldest old (> 85 years)	6	12
Education		
Illiterate	8	16
Primary	13	26
Middle	12	24
High school	11	22
Intermediate	4	8
Graduate	1	2
Processional degree	1	2
Marital status		
Married	35	70
Unmarried	5	10
Widow	10	20
Exercise		
Yes	44	88
No	6	12

Table no. 1: Demographic data

Majority of the patients had hypertension (78%) followed by other co-morbidity such as asthma, hypothyroidism, hyperthyroidism, psoriasis and pyelonephritis were also noted. (Figure no.-1).



Biochemical parameter of the patients revealed that hemoglobin, protein and albumin were lower in majority of the subjects whereas creatinine was in the normal range in majority (figure no.: 2,3, 4 & 5). There was a significant difference between age and hemoglobin and albumin levels (p<0.05).

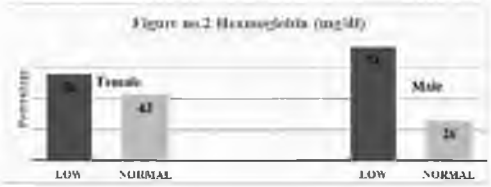
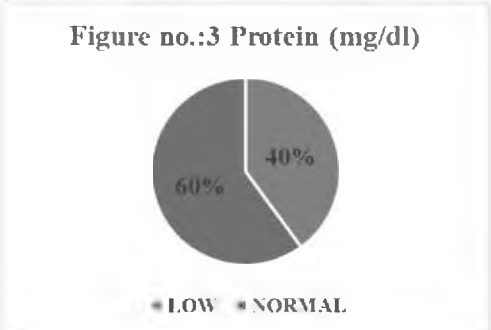
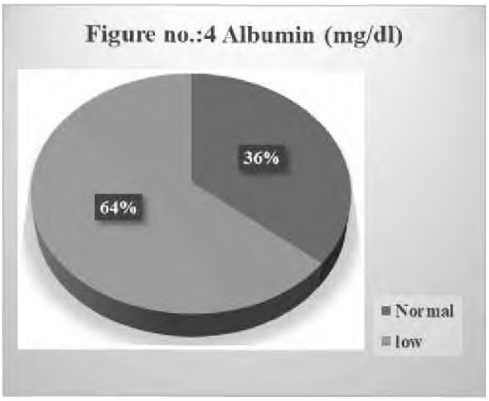


Fig. 1





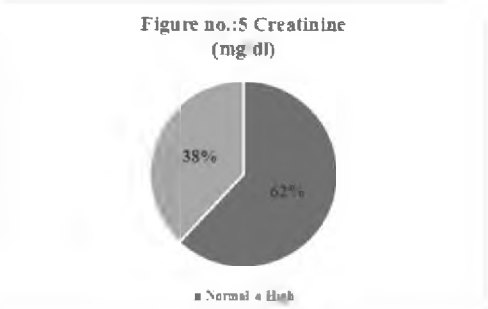
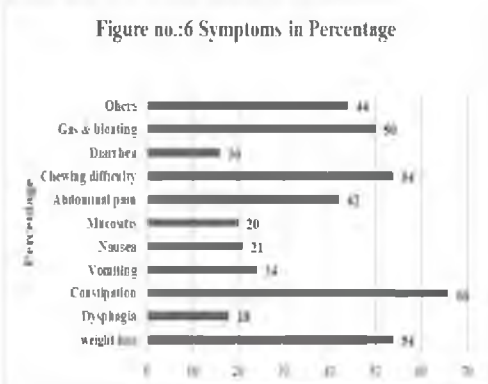


Figure No.6 shows the symptoms observed in subjects. More than half of the subjects suffer from constipation, weight loss, chewing difficulty and gas & bloating. Other symptoms such as loss of appetite, oliguria, weakness, malena, breathlessness and dizziness were also observed.



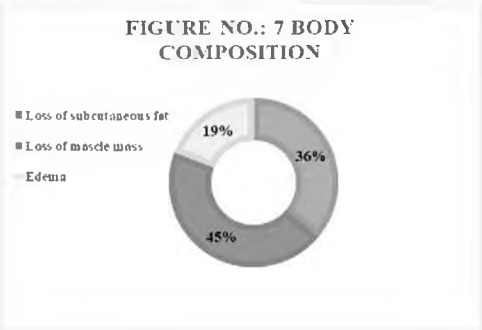
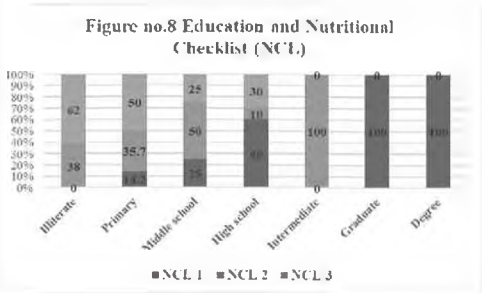


Figure No.7 depicts the body composition observed among the subjects. 34% subjects had loss of subcutaneous fat, 42% subjects had loss of muscle mass whereas 18% had edema.

Figures 8 and 9 described the comparison between education and nutritional status. We found that high nutritional risk represented 62% and 63% in illiterate patients as per MNA and NCL respectively. Comparatively, among professional degree holder elderly patients, 100% were well nourished according to MNA and NCL both. There was significant correlation found between education and nutritional status of subjects ($p < 0.05$).



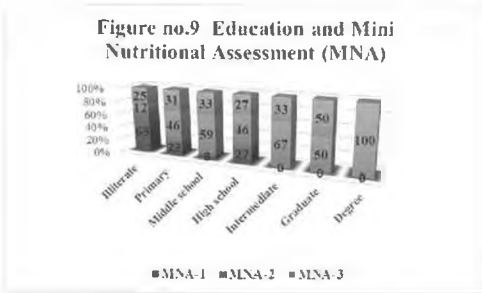
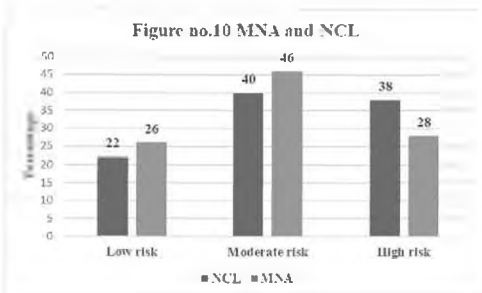


Figure No. 10, same as mentioned above represents nutritional assessment according to MNA and NCL of the subjects. It shows that 38 % and 28% were at high risk or malnourished as per NCL and MNA respectively.



Discussion

The prevalence of malnutrition is reported malnutrition is reported to be 18-30% in to be 18-30% in different population of elderly .[26-27] Among hospitalized elderly malnutrition incidence range from 12% to 50% and 23% to 60% among institutionalized older adults[28].

When combining risk factors, the prevalence of malnutrition is higher in the older population than in younger adults [29]. Aging and consequently frailty progress, can be indirectly related to the development of malnutrition caused by health decline, which

comes with onsets of physical and psychological diseases, increased medication intake [30], cognitive impairment, and dementia. Although one could expect a great number of diseases to be related to malnutrition development, only Parkinson disease, constipation [31], and basal oral dysphagia and signs of impaired swallowing [32] were observed to have a significant impact on the nutritional status of elderly. Depression, use of anorexigenic drugs, and dependency on staff for feeding are the common reasons for weight loss in institutionalized elderly[33]. Prevalence of weight loss was high (54%) in our study. Nutritional inadequacy can be caused by one or more factors such as physiologic, pathologic, sociologic and psychologic. Underlying medical treatment and pathology can directly cause anorexia and malnutrition[34, 35]. In our study similar symptoms such as constipation, chewing difficulty, gas and bloating were found in the majority of patients, which might affect their nutritional status.

NCL was designed to be self-administered, could also be administered by a healthcare professional[36]. A study indicated that 37 - 62% conducted in Canada of elderly were at risk of poor nutrition[37], and the percent was 50.3% in another study in India[38]. The prevalence of under nutrition and nutritional risk was 17.8% and 41.5%, respectively, using the NCL in china [39]. The MNA is a short, non-invasive, reliable and extensively evaluated nutritional assessment tool for elderly populations[22]. Another recent study in Makkah found that among 102 recently hospitalized elderly and according to the mini nutritional assessment (MNA) tool, 22.6% were classified as malnourished, 57.8% were at risk of malnutrition, and 19.6% were well nourished [40]. Also, another study found that 10.2% of elderly individuals were malnourished and 39.9% were at risk of malnutrition according to the MNA screening tool [41]. In our study 28% were classified as malnourished, 46% were at risk of malnutrition, and 26% were well nourished according to the MNA tool. Differences in prevalence rates of malnutrition among the different studies may be due to difference in selection criteria of elderly, different assessment tools, and differences in sociodemographic variables.

In this study, there was an association between NCL and MNA with age group. We found that 78% and 66% of the oldest old had high nutritional risk according to NCL and MNA respectively. Whereas in old old group 33% and 22% were at moderate risk of malnutrition as per NCL and MNA respectively. Among young old group 27% and 33% were well nourished as per NCL and MNA respectively. Our results agree with that obtained by Fang et al. who found that the prevalence of nutritional risk was significantly higher in patients >70 years of age than in patients <70 years (64% versus

32%, $P < 0.001$) [42]. Yap et al. found that high nutritional risk was more in older patients but with no significant association with age[43].

In this study we found that high nutritional risk represented 62% and 63% in illiterate patients as per MNA and NCL respectively. Comparatively, among professional degree holder elderly patients 100% were well nourished according to MNA and NCL both. Due to small sample size, we cannot depend on this finding. However, the previous study found no significant correlation between NCL and education[44].

As regards functional assessment, the Barthel self care index of activities of daily living was used. In this study, we found a significant correlation between disability and age, where functional activity decreased with advancing age. Hairi et al. showed that advancing age was significantly associated with functional limitation [45]. Increased incidence of disability was associated with malnutrition in this study. These results agree with Oliveira et al. who assessed the relationship between nutritional status and indicators of functional capacity among recently hospitalized elderly in a general hospital, and showed that these indicators were significantly more deteriorated among the malnourished individuals [46]. Using mini nutritional assessment (MNA) and Barthel index on 123 resident elderly, Cereda et al. showed that the poorer functional status was associated with low nutrition [47].

Anemia is a risk factor for adverse outcomes in older adults, including morbidity, hospitalization, and mortality[48]. The studies have shown that IL-6 levels increase with aging, and other causes include chronic disease, iron deficiency, or myelodysplastic syndrome[49, 50]. In a study of 232 patients, 24% were found to be anemic among 65 to 98 year of age[51]. Our study indicated that 74% male and 56% female were anemic.

Hypoalbuminemia can be caused by inflammatory state and, particularly, high concentrations of IL-6 and TNF-alpha. Hypoalbuminemia is a mortality prognostic factor of hospitalized and institutionalized elderly people. It is associated to delay recovery following acute pathologies [52]. Prevalence of hypoalbuminemia in our study was 64%. In a research performed in 179 hospitalized elders, 84.3% (n=151) of the patients had hypoalbuminemia and an average of 2,74 ± 0,46g/dl, statistically different from the group with normal albumin levels (p=0,001)[53].

Conclusion

Hospitalized elderly are at risk of malnutrition; therefore, the early identification of malnutrition is important. High nutritional risk was more with older age, uneducated patients, and low socioeconomic groups. Malnutrition might affect the functional capacity of hospitalized elderly. Significant associations were noticed

between both nutritional and functional status and specific sociodemographic variables. These interrelationships require further research studies on this special group of population.

Also, it is important to pay special attention to functional capacity when planning nutritional care for this vulnerable group.

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