Research Article

Co-morbidities with Nutritional and Micronutrient Status of Elderly People Attended at a Tertiary Medical Center in COVID-19 era

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Abstract

Background: With increasing age, a regulatory function of the vital organs of the body decreases and develops or aggravates different co-morbidities; multiple socio-demographic factors. Health policy makers couldn't find adequate evidence-based information on co-morbidities, nutrition and micronutrient status for the elderly population in current COVID-19 era in preparing for appropriate health, nutrition and social support guideline for the elderly in Bangladesh at present situation.

Objective: The present study attempted to assess the health, nutritional and micronutrient status of elderly people in a tertiary medical center in Dhaka, Bangladesh. Methods: It was a cross sectional descriptive study. The subjects were selected purposively. The study was conducted among 60+ elderly attending department of Internal Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU). Anthropometric data such as height and weight of the study subjects were collected by using standard techniques. Nutritional status was measured according to WHO guideline. Micronutrients were measured at Biochemistry lab, BSMMU.

Results: Among 79 participants with an average age of 64.06 years (SD 5.15), 53% were male and 47% female. Only 40% of elderly individuals had a BMI within the optimal range (18.5-24.9 kg/m²). Half of the participants had a normal BMI, 6% were moderately obese, and one individual was severely obese. Additionally, 20% were mildly undernourished, 3% had moderate undernutrition, and about 1% suffered from severe undernutrition. There was a significant association between gender and levels of Serum Ferritin, RBS, and Vitamin D (P-value < 0.05). However, no significant relationship was found between co-morbidities and nutritional status.

Conclusion: The study found that aging leads to decreased organ regulatory functions, resulting in co-morbidities and deficiencies in key micronutrients, particularly in the elderly population. Addressing these co-morbidities and micronutrient status is essential to improve the overall health condition of the elderly, especially after the COVID era.

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Introduction

It is widely known that population ageing is a demographically inevitable process, since it is linked to the demographic transition and therefore to the fall of births and in mortality rates, mostly at older ages. Depending upon on the set, speed and intensity of the demographic transition, the ageing process will vary both in speed and in extent on a geographical basis. The pace of

population ageing is much faster in developing countries compared to developed countries [1-3]. The ageing process is wide spread and involves individual, households and sub populations the elderly and the working age population in particular. Bangladesh is one of the twenty developing countries with largest number of elderly population. By 2025 along with other four Asian countries, Bangladesh will account about half of the world's total elderly population [4]. The growth of the aged population will continue and that has laid down several issues related to their status and roles, care and living, health, social support and overall wellbeing [1]. The elderly people require a combination of physical and material supports which they can receive properly from their family members.

The cultural and religious tradition of Bangladesh is expected that families and communities will care for their own elderly members but rapid socioeconomic and demographic transitions, mass poverty, changing social and religious values, influence of western culture and other factors have broken down the community care system [5,6]. Kabir [6] stated that Bangladesh is expected have a rapid increase in their aged population.

In Bangladesh also because of increasing life expectancy elderly population will increase. Depending upon the achievement of replacement fertility by 2050 one in 10 will be elderly and by 2050 one in 5 will be elderly in Bangladesh. Bangladesh will face many difficulties in managing the many challenges for large elderly population. This includes factors such as changing family structure, poverty, social and cultural norms, and inadequate health care facilities for the elderly population. This condition demands more health and welfare services and more provision to the elderly support system [7,8].

It had been reported that atleast 1% of the healthy elderly individuals at community level suffer from malnutrition which increased from 20% to 37% among those who required hospitalization or institutionalized care [9]. Low food intake or consumption of compromised dietary variety by the elderly with poor appetite and difficulty in mastication may lead elderly more vulnerable to malnutrition and micronutrient deficiency. Such health disorders are further accentuated by social, psychological and physical factors [10-12]. Several studies have been conducted to address the overall nutritional status of elderly both indeveloped [13] (Woo J et. Al 2011) as well as developing countries [14-16]. However, in most of the developing countries including Bangladesh, maternal and child nutrition [17,18] are still the main where elderly nutrition remains at the bottom of the priority list. The average life expectancy at birth in Bangladesh has increased to over 60 years resulting increased number of elder person [19]. Although, a small proportion (around 6%) of the total population of Bangladesh constitutes as elderly, but

the absolute number of them is quite significant (about 7.2 million) and the rate of their increase is fairly high [20]. A recent study aimed to assess the health profiles of elderly people of Bangladesh revealed that about 56% of the elderly population was in average state of health and only 20% were not in good health [21]. Another study demonstrated that only 40% of the elderly individuals had a Body Mass Index (BMI) within the optimal range (18.5-$24.9 kg/m^2$) and at least half of elderly women were chronic energy deficient [22]. There is also lack of evidence-based information on micronutrient deficiencies in elderly people.

Micronutrients are essential elements needed by the body in a very small quantity generally less than 100mg/day, and they include microminerals (iron, cobalt, chromium, copper, iodine, manganese, selenium, zinc, molybdenum) and vitamins.

In COVID-19 Era due to long time staying at home elderly people are more likely to suffer from compromised nutrition status and micronutrient malnutrition. With increasing age, regulatory functions of the vital organs of the body decrease and develop or aggravate different co-morbidities; multiple socio-demographic factors may also influence these functions. It will be essential to identify the predictors for such micronutrient status and also need to know the nutritional and micronutrient level among these populations to address the knowledge gap.

Materials and Methods

This was a Cross-Sectional Analytical study. The study was conducted with the elder patients of (out-patient and in-patient) Department of Internal Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh from September, 2020 to August, 2021 after getting the approval from IRB of Bangabandhu Sheikh Mujib Medical University (BSMMU). It was defined 'elderly' as those aged 60 years or older based on WHO criteria, and there were 79 people taken as cases. All study participants were consecutively selected from in-patient and out-patient department of Internal Medicine Department. Potential participants were asked for their current or previous history of chronic illnesses or co-morbidities such as hypertension (was assess by measuring blood pressure, diabetes mellitus was detect based on Random blood sugar level and HBA1C and ischemic heart disease (was assess by signs and symptoms consistent with ischemic heart disease). Participants were enrolled if they provided written informed consent. Data were collected by pre tested semi structured questionnaires and in face to face interview. Information about health status, nutritional status, and dietary pattern along with socio-demographic characteristics was obtained. The field work was conducted in BSMMU Hospital. The respondents were selected consecutively who met the inclusion and exclusion criteria. The height and weight of all

the participants were measured with locally made wooden height scale and digital weighing scale and Body Mass Index (BMI) were calculated(kg/m²) according to WHO guideline. Five milliliters (5.0ml) of venous blood was collected before 9:00am following an overnight fasting after a light fat free evening meal. For hemoglobin 0.5 ml blood was put into an Eppendorf tube containing Ethylene diamine tetra acetic acid (EDTA) and, serum was separated. All specimens were sent for further diagnosis. Immediately to the Biochemistry Laboratory of BSMMU for the biochemical analyses of: RBS (Random Blood Sugar), HbA1c, hemoglobin, serum uricacid (Roche), alanine transaminase (ALT), creatinine, calcium, Phosphate, vitaminB12 (IMMULITE), S.Ferritin ,25-hidroxyvitaminD (vitaminD) (IDS), Mg, zinc (AAS), Calcium following standard laboratory procedures.

Ethical Consideration

The purpose and procedure of the study was properly explained to the responded or their attendants and informed written consent was taken. All participants in this research study had the right to have the information they provide to be kept confidential. Additionally, in order to conduct a research study, it is imperative to consider any harm that might occur to participants. Furthermore, the purpose of the study will be clearly indicated to participants prior to the study being conducted. An informed consent section will be included as the first page of the study.

Result

Table 1 shows that among 79 patient whose information was collected, participants age was (mean, SD): 64.06 (5.15) years and Male vs. Female were 53% vs. 47%. Only 40% of elderly individuals had a BMI within the optimal range (18.5-24.9 kg/m²). The table 2 also narrates that 50% of participants had a normal BMI, 6% were moderately obese, and one individual was severely obese. Additionally, 20% were mildly undernourished (BMI 17-18.5), with 3% having moderate undernutrition and about 1% suffering from severe undernutrition. Table 3 shows that male-female distribution of Serum Ferritin, RBS and Vit. D significantly associated with each other (P-value is <.05). In table 4 it would be found that different co-morbidities of elderly people have different nutritional levels. But significant association didn't find between co-morbidities and different nutritional status.

Table 1: Socio-demographic characteristics (N=79).

Variables	n (%)
Sex	
Male	42(52)
Female	37(47)
Age	
60-64 years	54(67)
Educational qualification	
Below Grade XII completed	68(86)
Completed Grade XII and above	11(14)
Monthly income	
Medium(BDT)	20,000-39,000
Types of occupation (multiple responses)	
Homemaker	31(39)
Service holder	16(20)
Business	15(19)
Agriculture	11(14)
Others	6(08)
Residence	
Own house	63(80)
Rented/Govt. house	16(20)

Table 2: Nutritional status of study person's (n=79).

Nutritional status	n	(%)	M±D
Severe Under nutrition (BMI: <16)	1	1	
Moderate Under nutrition (BMI: 16-17)	2	3	
Mild Under nutrition (BMI: 17-18.4)	16	20	
Healthy (BMI: 18.5-24.9)	40	50	
Over weight (BMI: 25-29.9)	14	17	4.0±.98
Moderately Obese (BMI: 30-34.9)	5	6	
Severely Obese (BMI: 35-39.9)	1	1	
Total	79	100	

Discussion

The study highlighted that at least 1% of healthy elderly individuals at the community level suffer from malnutrition, which significantly increases to 20% to 37% among those who require hospitalization or institutionalized care [9]. This indicates a considerable gap in nutritional support for elderly individuals in more intensive care settings.

In low and middle-income countries, factors such as low food intake, compromised dietary variety, poor appetite, and difficulty in mastication make the elderly more susceptible to malnutrition and micronutrient deficiencies [10-12]. These deficiencies often lead to various health disorders that are further exacerbated by social, psychological, and physical factors.

Table 3: Male-Female distribution of micronutrient status (n=79).

Micro-nutrients		Male		Female		P-value
		n	%	n	%	
Hb. level	Below normal	17	41	17	46	0.591
	Normal	24	57	20	54	
	Above normal	1	2	0	0	
S. iron	Below normal	22	52	13	35	0.228
	Normal	18	43	23	62	
	Above normal	2	5	1	3	
S. ferritin	Below normal	3	7	1	2	0.01
	Normal	13	31	24	65	
	Above normal	26	62	12	32	
RBS	<7.8 mmol/L	38	91	23	62	0.003
	>7.8 mmol/L	4	10	14	38	
HbA1c	<4.5 %	1	2	0	0	0.545
	4.5-6.3 %	28	62	23	62	
	>6.3 %	13	31	14	38	
S. Vit. B12	<239 pgm/ml	10	24	9	24	0.5
	239-931 pgm/ml	31	74	25	68	
	> 931 pgm/ml	1	2	3	8	
S. Calcium	<8.5 mg/dl	12	28	10	27	0.388
	8.5-10.5 mg/dl	28	67	28	73	
	>10.5 mg/dl	2	5	0	0	
S.Vit.D	<10 ngm/dl	0	0	4	11	0.029
	10-100 ngm/dl	42	100	33	89	
S.Zinc	<65 ng/dl	17	43	12	32	0.153
	65-107 ng/dl	10	25	17	46	
	>107 ng/dl	13	32	8	22	
S. ALT	<30 U/L	28	68	27	73	0.445
	30-60 U/L	9	22	9	24	
	>60 U/L	4	10	1	3	

Table 4: Co-morbidities and it's co-relation with Nutritional Status (n=79).

	Nutritional Status			
Co-morbidities	<Normal level	Normal level	>Normal level	P-value
	n(%)	n(%)	n(%)	
Hypertension	5(15)	17(50)	12(35)	0.104
Diabetes Mallitus	3(13)	14(58)	7(29)	0.284
Dyslipidemia	2(11)	8(44)	8(44)	0.075
IHD	0(0)	5(56)	4(44)	0.138
Bronchial Asthma	1(25)	2(50)	1(25)	0.999
COPD	1(20)	3(60)	1(20)	0.91
CKD	1(13)	3(38)	4(50)	0.23
Anaemia	18(29)	32(52)	12(19)	0.029
Jaundice	1(17)	4(67)	1(17)	0.716

Numerous studies have been conducted to assess the nutritional status of the elderly across different countries. Research from developed nations [13] and developing countries [14-16] has shown varying degrees of concern and intervention regarding elderly nutrition.

A recent study assessing the health profiles of elderly people in Bangladesh found that about 56% were in an average state of health, while only 20% were considered to be in poor health [21]. This suggests a mixed picture of elderly health, with a majority being relatively stable but still a notable proportion in poor health.

Only 40% of elderly individuals had a BMI within the optimal range (18.5-24.9 kg/m²), highlighting a concern for undernutrition and malnutrition among the elderly [22]. The study found that 50% of participants had a normal BMI, 6% were moderately obese, and one individual was severely obese.

The study highlights critical nutritional issues facing the elderly population, particularly in developing countries like Bangladesh. The high prevalence of malnutrition and micronutrient deficiencies, combined with specific health indicators such as anemia and vitamin deficiencies, underscores the need for improved nutritional interventions and health care strategies.

Addressing these issues requires targeted nutritional programs, enhanced dietary diversity, and improved health care access to mitigate the risk of malnutrition and its associated health problems among the elderly. This approach is crucial for enhancing the quality of life and overall well-being of the aging population.

Conclusion

The study found that aging leads to decreased organ regulatory functions, resulting in co-morbidities and deficiencies in key micronutrients, particularly in the elderly population.

Addressing these co-morbidities and micronutrient status is essential to improve the overall health condition of the elderly, especially after the COVID era.

Acknowledgment

Conflict of interest

The authors declare that they do not have any conflict of interests.

Author contributions

Jannatara Shefa and Mohammad Ferdous Ur Rahaman developed the original idea, and they wrote the protocol, abstracted and analyzed data. Maleeha Sheefa and Zahida Jabbar collected data and reviewed writing.

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