EXPLORING THE HEALTH ISSUES, NUTRITIONAL WELL-BEING, AND FOOD SECURITY OF THE ELDERLY POPULATION IN BANGLADESH

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ABSTRACT

The elderly population in Bangladesh is rapidly growing, posing significant challenges to healthcare, nutrition, and social support systems. This study investigates the nutritional status, morbidity patterns, and food security among the elderly in Sirajganj and Chapainnawabganj districts. A cross-sectional study was conducted on 400 elderly individuals. Nutritional status was assessed using the Mini Nutritional Assessment (MNA) and Body Mass Index (BMI), while morbidity data were gathered from self-reports and medical records. Socio-demographic factors were analyzed for their association with comorbidities, nutritional status and food insecurity using multivariable logistic regression. The study found that 36% of the elderly were malnourished, and 45% were at risk of malnutrition. Musculoskeletal pain (81%), visual impairment (65.2%), hypertension (41%), and cardiovascular disease (24.7%) were the most prevalent health issues. Age, gender, marital status, income, education, no of children, and nutritional status were significant predictors of comorbidity, poor nutritional status and food insecurity. Participants aged 71 and above, females, widowed individuals, and those with lower incomes had higher odds of multiple comorbidities. The findings reveal a high burden of malnutrition and chronic diseases among the elderly in rural Bangladesh. Socioeconomic vulnerabilities and poor nutritional status contribute to health risks, underscoring the need for comprehensive interventions targeting food security, healthcare access, and disease management for the elderly population.

KEYWORDS: Elderly, Bangladesh, Comorbidities, Nutritional status, Food security.

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Introduction

Older age is a stage of life typically associated with people aged 65 and older. This period is marked by various physical, emotional, and social changes, including retirement, potential health challenges, and evolving relationships. Many elders experience a decrease in physical capabilities, making healthcare and support crucial during this time. Social connections, mental well-being, and active lifestyles contribute significantly to healthy aging (Zadworna and Stetkiewicz-Lewandowicz, 2023). While some may face issues like loneliness or age-related diseases, others find this phase fulfilling, pursuing hobbies, traveling, or spending time with family. Respect and care for the elderly are essential for promoting dignity and quality of life. In elder age, nutritional status plays a critical role in health and well-being (Wilson et al., 2021). Older adults often face challenges like reduced appetite, difficulty chewing, and altered metabolism, which can lead to malnutrition. Poor nutrition is closely linked to increased morbidity, with higher risks of chronic diseases such as diabetes, cardiovascular issues, and weakened immune function (Buffel et al., 2023). Food security is also a concern, as financial limitations, limited mobility, and social isolation can hinder access to healthy, sufficient food. Ensuring adequate nutrition and food security in the elderly is vital for maintaining their health, reducing morbidity, and promoting a better quality of life (Malak et al., 2020).

According to the WHO the estimation, the proportion of persons over 60 years in the globe will increase from 12% to 22% between 2015 and 2050, and by that time, there will be 2.1 billion people aged over 60, a doubling of the current population. One in six individuals on the earth will be 60 years of age by 2030 (WHO, 2022). The population makeup of Bangladesh has seen significant shifts. In recent decades, Bangladesh has observed an unparalleled rise in the aging population rate due to rising life expectancy and a decreasing birth rate (Islam et al., 2022). The proportion of people over 60 years is now 8% and is expected to rise to 11.5% (21.526 million) by 2030 and 21.5% (43.491 million) by 2050 (Sarker, 2021). The number of senior citizens in Bangladesh is 9.28% of the total population (more than 2.5 crore). The increase rate of the number of elderly people is 3.41 times higher than the population growth (islam, 2022).

A geriatric nutrition plan helps manage the physical, psychological, and behavioral elements of an elderly individual while also attempt to mitigate the impacts of aging and getting sick (Holmus, 2021). Sufficient nutrition has a beneficial impact on aging, preventing chronic illness, but this demographic group have a higher chance of poor nutritional status particularly concerning micronutrients, due to physiological and social changes such reduced food intake, diminished sensory perception, mal-absorption, diminishing activity, and greater disability (Kehoe et al., 2019). According to research conducted among senior citizens, the frequency of malnutrition varies from 0.8% in Northern Europe to 24.6% in South-East Asia and higher prevalence observed in rural areas and among females (Crichton et al., 2019). A study in Nepal has showed that Nepalese 49.7% senior citizens live at high risks of malnutrition and undernourishment is suffered by 11.6% (Chataut et al., 2021b), while another study in India showed malnutrition prevalence at 18.29% and 48.17% at risk (Kushwaha et al., 2020), alongside a separate study reporting a possible prevalence of malnutrition is 49.3% in India (Vaish et al., 2020). Being a developing country, Bangladesh faces significant challenges with malnutrition among older adults, where about 50% of the older adults are malnourished (Alam et al., 2021), contrasting with the global statistics where only 23% of older adults are malnourished (Rahman et al., 2021). A study in Bangladesh found that malnutrition was prevalent in 24% among hospital-attending older patients (Islam et al., 2021) while a second one conducted in four districts indicated that more than half of old men and women are at risk of under-nutrition with higher prevalence rates being observed among male participants (Alam et al., 2021). According to a separate study conducted in Sunamgonj district revealed quite alarming figures where 40% were found to be suffering from malnutrition, 59 % were at risk while only 1 % had normal nutrition (Uddin et al., 2020).

Food insecurity, undernutrition and poor health status are the most common features of elderly people in Bangladesh. Elder people in Bangladesh experience poverty, have low food security and require targeted assistance. Availability of food, stability of food supplies and access are therefore three essential determinants of food security. A household can be said to be food secure only if it is secure in terms of both the acquirement and the utilization of food. Chronically poor people suffer persistent food insecurity, own no cultivation land or assets, are often illiterate and may also suffer serious illnesses or disabilities. The demographic shift presents significant challenges for a country still grappling with widespread food insecurity. Rural areas in Bangladesh are particularly affected by food insecurity due to factors such as poverty, limited access to healthcare, and inadequate social support systems (Chataut et al., 2021a). The elderly in these areas are often dependent on agricultural livelihoods, which can be precarious and insufficient to meet their nutritional needs.

To the best of our knowledge, no studies have been conducted to investigate the nutritional status, morbidity profile and food security among older people in Bangladesh. As older people are very much vulnerable to nutritional deficiency diseases so this study aim to determine the association of socio-demographic characteristics with comorbidities, nutritional status and food insecurity among the elderly population of Bangladesh, particularly focusing on the population in north-western Bangladesh.

Methods and Materials

Study setting, study duration and study participants

A three-month cross-sectional study was conducted among elderly population in Sirajganj and Chapainnawabganj, Bangladesh from April 2024 to May 2024.

Individuals aged 60 years or above who were residing in Sirajganj and Chapainnawabganj for one year and above were included in this study. The elderly people who were critically ill and deny to participate in the study were excluded. The sample size (n) was calculated with Cochran's formula of $n = \frac{Z^2 P\,(1-P)}{d^2}$.

Here, d was the acceptable standard error, and z was the normal distribution value (at 95% confidence level, it was 1.96). P was the predicted prevalence (assuming 50 % in this case, p = 0.05). This equation offered a total sample size of 384, which was increased to 405 after calculating a 5 % non-response rate. Following a comprehensive review of the data gathered, records of five participants were removed from the study because of incompleteness of their data and to ensure the integrity of the study. Final analysis contained data from 400 elder people.

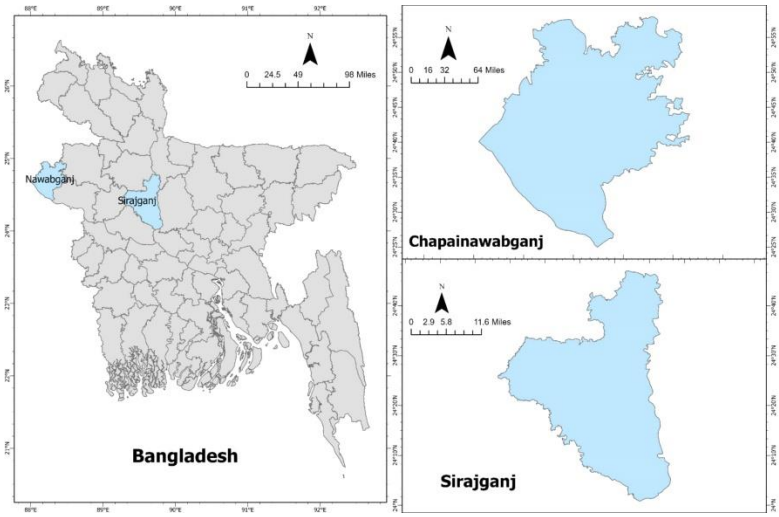

Figure 1. Selected areas of study.

Development of questionnaire

A standardized questionnaire in English based on the previous studies (Razon et al., 2022, Sánchez-Ortiz et al., 2023, Zhou et al., 2022, Gabrani et al., 2021) has been designed. Two public health specialists looked at the survey designed and draft questionnaire. The questionnaire was modified concurring to the recommendations and comments of the analysts. The validity and reliability of the questionnaire was also checked by conducting a pilot study on 25 participants (around 5% of the test estimate). Finally, a standardized and pretested questionnaires was used in the field to assemble the information through face-to-face interview.

Socio-demographic information

The socio-demographic information of the participants such as age, gender, residence, level of education, occupation, marital status, monthly household income and household number were collected.

Anthropometric Assessment

The participants' anthropometric data (weight and height) were collected in the morning while fasting to calculate their body mass index (BMI) using the formula weight (kg)/height (m^2). Height was measured twice to the nearest 0.1 cm using a stadiometer, without shoes, and weight was recorded to the nearest 0.1 kg using a bathroom scale, with minimal clothing and no shoes. The nutritional status was classified based on the World Health Organization's Asian BMI criteria, where underweight, normal, overweight, pre-obese, and obese were defined as having a BMI of <18.5, 18.5–22.9, 23–24.9, 25–29.9, and ≥30 kg/m^2, respectively (WHO, 2004).

The Mini Nutrition Assessment (MNA) is a valid tool for screening and assessment of malnutrition among the elderly population worldwide (Urgessa, 2022). The Mini Nutritional Assessment - Short Form questionnaire was used containing six items: decrease in food intake, weight loss during the last three months, mobility, recent psychological stress or acute disease, neuropsychological problems, and the Body Mass Index (BMI). The maximum score was 14, and a score of 12 or fewer points considered as a risk of malnutrition (Kaluźniak-Szymanowska et al., 2022).

Morbidity Characteristics

The incidence of diseases of the participants was recorded either by investigation of their medical documents or by directly the asking them with close ended questions, for example, "Do you suffer from any of these health problems (e.g., diabetes mellitus, cardiovascular disease, food allergies, hypertension, hearing problem, visual impairment, dental problems, musculoskeletal pain, bedsore, sense of thirst etc.)?" Participants had two option "Yes" or "No. If they had any other disease that had not asked in the questionnaire were also recorded.

Measurement of food security

Food security of the participants was determined using Food Insecurity Experience Scale. It is a globally recognized tool developed by the Food and Agriculture Organization (FAO) to assess individuals' or households' access to adequate food. It is based on self-reported experiences related to food insecurity, such as difficulties in obtaining sufficient food due to financial or resource constraints. The FIES consists of a set of eight questions that capture a range of food insecurity levels, from mild (worrying about running out of food) to severe (going entire days without eating).

Ethical consideration

All experimental processes were carried out with the recommended standards and regulations. The participants have been informed about the objectives and details of the study. They were free to join or not to join in the study. They also had the opportunity to skip interviews at any stage of the study. Both oral and written informed consent was obtained from the participants before data collection. Anonymity and confidentiality of their information were also maintained.

Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences, version 27 for Windows (SPSS, Inc. Chicago. IL.USA). Data were expressed as frequency (n) and percentage (%). Chi-square test and odd ratio (OR) with 95 % CI were performed where necessary. A p value of ≤ 0.05 was set as statistically significant for all the test.

Results

Table 1 presents the socio-demographic characteristics of 400 elderly participants in Sirajganj and Chapainnawabganj, Bangladesh. Key findings include that the majority of participants were male (59.8%), and 72% were married. Regarding age distribution, nearly half of the participants (46%) were aged 60-65, while 30% were aged 66-70, and 24% were 71 or older. Educational attainment was low, with 78.3% of participants having no formal education. Most participants were unemployed or retired (50.5%), followed by homemakers (25%), with only a small portion engaged in agriculture (16.3%). Family structures revealed that the majority of participants lived in households with 3-5 members (68.5%), and a significant proportion had 3-4 children (43.8%).

Table 1. Socio-demographic and related characteristics of the participants.

Variables	n (%)
Gender	
Male	239 (59.8)
Female	161 (40.3)
Marital status	
Widowed	112 (28)

Married	288 (72)
Age in years	
60-65	184 (46)
66-70	120 (30)
≥ 71	96 (24)
Education	
No formal education	313 (78.3)
Up to primary education	60 (15)
Secondary and above	27 (6.8)
Current occupation	
Agriculture	65.2 (16.3)
Labor	6 (1.5)
Productive work	14 (3.5)
Homemaker	100 (25)
Unemployed/ Retired	202 (50.5)
Other	14 (3.3)
Family members	
1-2	47 (11.8)
3-5	274 (68.5)
≥ 6	79 (19.8)
Number of children	
2 or less	138 (34.5)
3-4	175 (43.8)
≥5	87 (21.7)
Number of earning members	
Single	195 (48.8)
Dual	188 (47)
Three or more	17 (4.3)
Economic status	
Poor	146 (36.5)
Middle class	211 (52.8)
Rich	43 (10.8)
Monthly household expenditure	
Lowest to 10000	109 (27.3)
10000 to 18000	234 (58.5)
18000 to highest	57 (14.2)
House ownership	
Own	392 (98)
Rented	8 (2)
Decision making	
Own	93.2 (23.30)
Spouse	31.2 (7.80)
Son/ Daughter/ Others	276 (69)

Figure 2 presents the nutritional status of 400 elderly participants, assessed using the MNA and BMI. About 18% of participants were classified as underweight (BMI <18.5), which is a significant indicator of malnutrition and health vulnerability. The majority (53.5%) had a BMI between 18.5 and 22.9, classified as normal weight according to Asian BMI criteria. However, 15.3% were overweight (BMI 23.0–24.9), and 13.3% were obese (BMI ≥25).

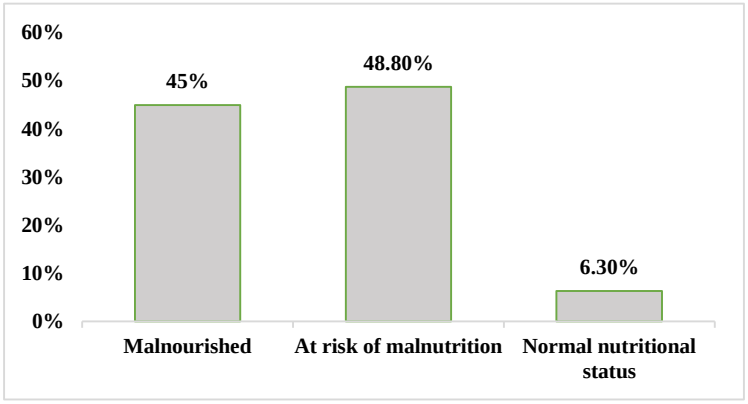

Figure 2 (a). Nutritional status of the participants based on BMI (Body mass index).

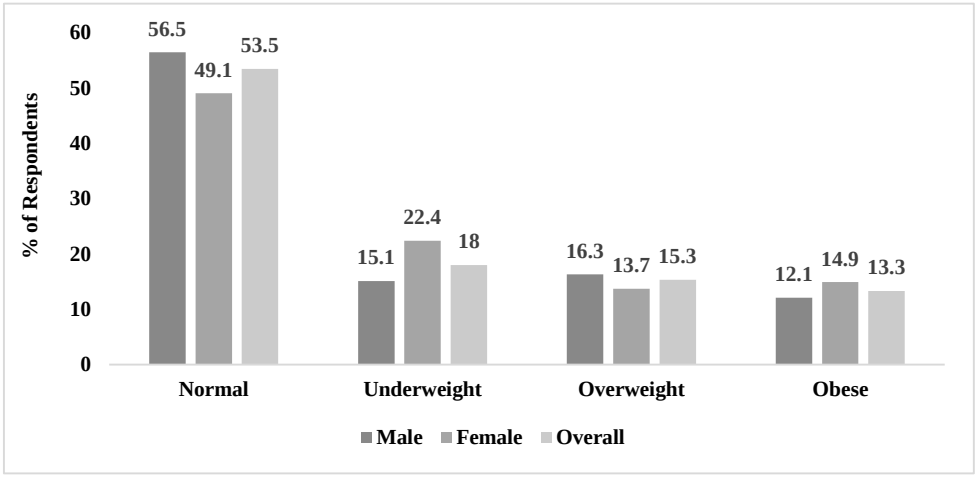

Figure 2 (b). Nutritional status of the participants based on MNA (Mini nutritional assessment).

Table 2 outlines the morbidity status of 400 elderly participants in Sirajganj and Chapainnawabganj, Bangladesh, emphasizing the prevalence of various health conditions within this population. The most prominent finding is the high prevalence of musculoskeletal pain, affecting 81% of participants, making it the most common health issue. Visual impairment was also widespread, with 65.2% of the elderly reporting vision problems, while dental issues were present in 72.2% of the participants, indicating significant challenges in maintaining oral health. Hearing problems affected 37.5% of the elderly, further highlighting sensory impairments as a major concern. Hypertension was found in 41% of participants, making it a major cardiovascular risk factor within this population. Additionally, 24.7% of participants were diagnosed with cardiovascular diseases, and 16.3% had diabetes mellitus, indicating a significant burden of non-communicable diseases (NCDs). These conditions are known to be linked to aging, poor nutrition, and lifestyle factors, which are prevalent in rural populations. Other notable findings include that 51.7% of participants experienced a diminished sense of thirst, which could increase the risk of dehydration and related complications. Food allergies were reported by 42.7% of the participants, potentially complicating their dietary management and nutrition. Fortunately, the incidence of bedsores was relatively low, affecting only 4.8% of the participants.

Table 2. Morbidity status of the participants.

Variables	Frequency (%)
Visual impairment	
No	139 (34.8)
Yes	261 (65.2)
Hearing problem	
No	250 (62.5)
Yes	150 (37.5)

Musculoskeletal pain	
No	76 (19.0)
Yes	324 (81.0)
Bedsore	
No	381 (95.2)
Yes	19 (4.8)
Food allergy	
No	229 (57.3)
Yes	171 (42.7)
Sense of thirst	
No	193 (48.3)
Yes	297 (51.7)
Dental problem	
No	111 (27.8)
Yes	289 (72.2)
Diabetes mellitus	
No	335 (83.7)
Yes	65 (16.3)
Cardiovascular disease	
No	301 (75.3)
Yes	99 (24.7)
Hypertension	
No	156 (59.0)
Yes	244 (41.0)

Table 3 presents the association between socio-demographic and nutritional status-related characteristics of elderly participants. A significant association was found between marital status and nutritional status ($p < 0.05$). Widowed participants were more likely to be underweight (25%) compared to married individuals (15.3%). The 60–65 age group had the highest proportion of overweight and obese individuals (19% overweight, 16.8% obese), with a significant age-related association ($p < 0.05$). Those with no formal education were more likely to be underweight (21.4%) compared to those with secondary or above education (7.4%), showing a significant association ($p < 0.05$). Larger families (≥6 members) had a higher percentage of underweight individuals (26.6%) compared to smaller families, with significant differences ($p < 0.05$). Participants with ≥5 children had a higher prevalence of underweight (29.9%), while those with fewer children were more likely to be normal or overweight ($p < 0.05$). Households with only a single earning member had more participants who were underweight (26.2%) compared to those with dual or more earning members ($p < 0.05$).

Table 3. Association between socio-demographic and nutritional status related characteristics of the participants.

Variables	**Nutritional status**				**p - value**
	Underweight	**Normal**	**Overweight**	**Obese**	
Gender					
Male	36 (15.1)	134 (56.3)	39 (16.4)	29 (12.2)	0.207
Female	36 (22.2)	80 (49.4)	22 (13.6)	24 (14.8)	
Marital status					
Widowed	28 (25)	58 (51.8)	10 (8.9)	16 (14.3)	<0.05
Married	44 (15.3)	156 (54.2)	51 (17.7)	37 (12.8)	
Age in years					
60-65	25 (13.6)	93 (50.5)	35 (19)	31 (16.8)	<0.05
66-70	30 (25)	69 (57.5)	12 (10)	9 (7.5)	
≥ 71	17 (17.7)	52 (54.2)	14 (14.6)	13 (13.5)	
Education					
No formal education	67 (21.4)	161 (51.4)	43 (13.7)	42 (13.4)	<0.05
Up to primary education	3 (5)	42 (70)	11 (18.3)	4 (6.7)	
Secondary and above	2 (7.4)	11 (40.7)	7 (25.9)	7 (25.9)	
Current occupation					

Agriculture	11 (16.9)	33 (50.8)	13 (20)	8 (12.3)	0,916
Labor	2 (33.3)	3 (50)	1 (16.7)	0 (0)	
Productive work	1 (7.1)	10 (71.4)	2 (14.3)	1 (7.1)	
Homemaker	21 (21)	48 (48)	14 (14)	17 (17)	
Unemployed/ Retired	34 (16.8)	114 (56.4)	29 (14.4)	25 (12.4)	
Other	3 (23.1)	6 (46.2)	2 (15.4)	2 (15.4)	
Family members					
1-2	10 (21.3)	24 (51.1)	4 (8.5)	9 (19.1)	<0.05
3-5	41 (15)	142 (51.8)	50 (18.2)	41 (15)	
≥ 6	21 (26.6)	48 (60.8)	7 (8.9)	3 (3.8)	
Number of children					
2 or less	23 (16.7)	69 (50)	28 (20.3)	18 (13)	<0.05
3-4	23 (13.1)	102 (58.3)	25 (14.3)	25 (14.3)	
≥5	26 (29.9)	43 (49.4)	8 (9.2)	10 (11.5)	
Number of earning members					
Single	51 (26.2)	90 (46.2)	23 (11.8)	31 (15.9)	<0.05
Dual	19 (10.1)	111 (59.0)	37 (19.7)	21 (11.2)	
Three or more	2 (11.8)	13 (76.5)	1 (5.9)	1 (5.9)	
Economic status					
Poor	33 (22.6)	71 (48.6)	17 (11.6)	25 (17.1)	0.206
Middle class	32 (15.2)	120 (56.9)	36 (17.1)	23 (10.9)	
Rich	7 (16.3)	23 (53.5)	8 (18.6)	5 (11.6)	
Monthly household expenditure					
Lowest to 10000	28 (25.7)	53 (48.6)	10 (9.2)	18 (16.5)	0.103
10000 to 18000	35 (15)	129 (55.1)	41 (17.5)	29 (12.4)	
18000 to highest	9 (15.8)	32 (56.1)	10 (17.5)	6 (10.5)	
House ownership					
Own	70 (17.9)	210 (53.6)	61 (15.6)	51 (13)	0.506
Rented	2 (25)	4 (50)	0 (0)	2 (25)	
Decision making					
Own	17 (18.3)	50 (53.8)	13 (14)	13 (14)	0.914
Spouse	4 (12.9)	17 (54.8)	7 (22.6)	3 (9.7)	
Son/ Daughter/ Others	51 (18.5)	147 (53.3)	41 (14.9)	37 (13.4)	

Table 4 presents the multivariable logistic regression analysis of predictors for comorbidity counts among elderly individuals, highlighting the associations between socio-demographic factors, nutritional status, and comorbidities. Age is a significant predictor of comorbidity. Elderly participants aged 71 and older had five times higher odds (AOR 5.04, $p < 0.001$) of having multiple comorbidities compared to those aged 60-65. This emphasizes the growing burden of diseases as individuals age. Gender also plays a role, with females having 2.73 times higher odds ($p < 0.05$) of comorbidities compared to males, indicating that elderly women are at greater risk of facing multiple health issues. Marital status shows a strong association, where widowed individuals had 3.43 times higher odds ($p < 0.001$) of comorbidities compared to married participants. This may reflect the social and emotional vulnerabilities faced by widowed individuals, impacting their health.

Monthly income is another critical factor. Participants with a monthly income between 12,001 and 16,000 BDT had 2.49 times higher odds ($p = 0.004$) of comorbidities compared to those with higher incomes. This highlights the economic challenges faced by middle-income households, which may affect access to healthcare and healthy living conditions. Regarding occupation, laborers had significantly higher odds of comorbidities (AOR 24.13, $p = 0.012$) compared to those in agriculture, suggesting that labor-intensive work increases health risks in old age. Nutritional status also plays a key role, with underweight individuals showing three times higher odds ($p = 0.044$) of having multiple comorbidities compared to those classified as obese.

Table 4. Multivariable logistic regression analysis of predictors for comorbidity counts in elderly individuals.

Variables	AOR (95% CI)	p-value
Age in years		
60-65	1 (Ref.)	
66-70	1.63 (0.88, 3.00)	0.119
≥71	5.04 (2.37, 10.75)	<0.001
Gender		
Male	1 (Ref.)	
Female	2.73 (1.09, 6.81)	0.031
Marital status		
Widowed	3.43 (1.78, 6.59)	<0.001
Married	1 (Ref.)	
Education level		
No formal education	0.96 (0.30, 3.05)	0.949
Up to primary education	1.45 (0.52, 4.01)	0.474
Secondary and above	1 (Ref.)	
Monthly income (BDT)		
<= 12000	1.14 (0.62, 2.12)	0.671
12001 to 16000	2.49 (1.34, 4.62)	0.004
16001+	1 (Ref.)	
Current occupations		
Agriculture	1 (Ref.)	
Labour	24.13 (2.00, 290.45)	0.012
Productive work	1.332 (0.32, 5.57)	0.694
Homemaker	0.64 (0.21, 1.98)	0.440
Unemployed/ Retired	1.39 (0.64, 3.01)	0.404
Other	1.49 (0.27, 8.35)	0.647
Nutritional Status (Asian BMI cut offs)		
Normal	2.02 (0.84, 4.87)	0.119
Underweight	3.00 (1.03, 8.75)	0.044
Overweight	1.56 (0.70, 3.46)	0.276
Obese	1 (Ref.)	
Mini Nutritional Assessment (MNA)		
Malnourished	1.84 (0.62, 5.48)	0.275
At risk of malnutrition	3.20 (0.97, 10.59)	0.056
Normal nutritional status	1 (Ref.)	

Co-morbidity < 7 = yes, Co-morbidity ≥ 7 = No

Table 5 examines the association between socio-demographic factors and food security among the elderly participants. It categorizes participants into food-secured and food-insecure groups and analyzes variables such as gender, marital status, age, education, occupation, family members, number of children, number of earning members, economic status, household expenditure, house ownership, and decision-making. Significant associations ($p < 0.05$) are observed for gender, family size, number of earning members, economic status, household expenditure, and decision-making. These factors are related to food insecurity, with female participants, larger families, and lower-income households being more vulnerable to food insecurity. Higher household expenditures were associated with better food security, with those spending more having greater food security (28.1%) compared to those with lower expenditure (5.5%) ($p < 0.05$). Participants who made their own decisions were more food-secure (17.2%) compared to those who relied on others ($p < 0.05$).

Table 5. Association between socio-demographic and food security related characteristics of the participants.

Variables	Food insecurity status		P-value
	Food secured	Food in-secured	
Gender			
Male	31 (13.0)	207 (87.0)	<0.05
Female	8 (4.9)	154 (95.1)	
Marital status			
Widowed	8 (7.1)	104 (92.9)	0.273
Married	31 (10.8)	257 (89.2)	
Age in years			
60-65	11 (6.0)	173 (94.0)	0.062
66-70	15 (12.5)	105 (87.5)	
≥ 71	13 (13.5)	83 (86.5)	
Education			
No formal education	27 (8.6)	286 (91.4)	0.303
Up to primary education	9 (15.0)	51 (85.0)	
Secondary and above	3 (11.1)	24 (88.9)	
Current occupation			
Agriculture	5 (7.7)	60 (92.3)	0.059
Labor	0 (0.0)	6 (100.0)	
Productive work	4 (28.6)	10 (71.4)	
Homemaker	6 (6.0)	94 (94.0)	
Unemployed/ Retired	24 (11.9)	178 (88.1)	
Other	0 (0.0)	13 (100.0)	
Family members			
1-2	3 (6.4)	44 (93.6)	<0.05
3-5	19 (6.9)	255 (93.1)	
≥ 6	17 (21.5)	62 (78.5)	
Number of children			
2 or less	9 (6.5)	129 (93.5)	0.258
3-4	19 (10.9)	156 (89.1)	
≥5	11 (12.6)	76 (87.4)	
Number of earning members			
Single	6 (3.1)	189 (96.9)	<0.05
Dual	27 (14.4)	161 (85.6)	
Three or more	6 (35.3)	11 (64.7)	
Economic status			
Poor	4 (2.7)	142 (97.3)	<0.05
Middle class	19 (9.0)	192 (91.0)	
Rich	16 (37.2)	27 (62.8)	
Monthly household expenditure			
Lowest to 10000	6 (5.5)	10.3 (94.5)	<0.05
10000 to 18000	17 (7.3)	217 (92.7)	
18000 to highest	16 (28.1)	41 (71.9)	
House ownership			
Own	39 (9.9)	353 (90.1)	0.348
Rented	0 (0.0)	8 (100.0)	
Decision making			
Own	16 (17.2)	77 (82.8)	<0.05
Spouse	1 (3.2)	30 (96.8)	
Son/ Daughter/ Others	22 (8.0)	254 (92.0)	

Discussion

The presence of overweight and obesity, although lower in comparison to underweight individuals, still suggests that a portion of the population is dealing with diet-related health risks such as cardiovascular diseases and diabetes. These Figure 2 reflect widespread nutritional deficiencies among the participants, indicating that a large proportion of the elderly are either undernourished or at high risk. These findings reveal a dual burden of malnutrition, with both undernutrition and overnutrition being prevalent among the elderly in Bangladesh. This underscores the need for targeted interventions to improve food security, access to balanced diets, and healthcare support for managing both malnutrition and obesity-related conditions. The overall nutritional health of this population is at risk, which could lead to higher morbidity and reduced quality of life. The morbidity profile from Table 2 underscored the significant health challenges faced by the elderly population, particularly in terms of musculoskeletal, sensory, and cardiovascular conditions. The high prevalence of chronic diseases such as hypertension, cardiovascular disease, and diabetes suggests a pressing need for improved healthcare services, preventive interventions, and chronic disease management strategies for the elderly in rural Bangladesh.

Table 3 explores the association between socio-demographic factors and nutritional status among elderly participants, revealing that widowed and older participants have higher underweight prevalence, aligning with findings by Volkert et al. (2019) on malnutrition risks in older populations due to social isolation and age-related decline. Further, participants with lower educational attainment also show greater underweight prevalence, supporting studies indicating that education impacts health literacy and dietary choices (Rahman et al., 2021). These associations underscore the need for targeted nutritional support for vulnerable elderly groups.

The association between socio-demographic and morbidity profile of the participants from Table 4 highlighted the link between poor nutritional status and the increased risk of health complications. Elderly participants aged 71 or older had a significantly higher likelihood (AOR 5.04) of comorbidities, consistent with the findings of (Islam et al., 2022), which associates aging with increased morbidity in Bangladesh. Gender also plays a role, with females experiencing 2.73 times higher odds of comorbidities, likely due to socio-economic constraints and nutritional inadequacies (Rahman et al., 2021). The association of widowhood with increased comorbidities aligns with global research linking widowhood to reduced social support, exacerbating health risks in elderly women (Volkert et al., 2019). Lastly, the impact of economic status on health, where labor-intensive occupations correlated with higher morbidity, underscores the importance of healthcare accessibility for lower-income elderly populations.

The association between socio-demographic factors and food security among elderly participants in Bangladesh from Table 5. Key findings show that gender, family size, number of earning members, economic status, household expenditure, and decision-making significantly influence food security status among this population. For instance, women, larger families, households with fewer earning members, and those with lower monthly expenditures experience higher food insecurity levels. Comparing these results with existing literature reveals a similar pattern in food insecurity risk factors among the elderly. Studies indicate that socio-economic vulnerabilities, particularly gender and household income, play crucial roles in food security among older adults. For instance, Buffel et al. (2023) highlight that low-income older adult and those with limited social support face heightened risks of food insecurity, often resulting from limited mobility, which restricts access to adequate nutrition. Additionally, a study by Volkert et al. (2022) emphasizes that larger households with fewer resources per capita experience greater food insecurity, particularly when income sources are limited. These studies consistently report that food security is lower among older adults with limited autonomy in decision-making or lacking economic independence, mirroring the findings in Table 5.

Limitation

The study's cross-sectional nature limits the ability to establish causality between socio-demographic factors, nutritional status, and comorbidities. Data were collected from two districts, which may not represent the entire elderly population of Bangladesh, limiting the generalizability of the findings. Some health and morbidity data were self-reported, which may introduce recall bias or underreporting of conditions. The study did not capture detailed dietary intake, which could provide more insights into the specific nutritional deficiencies contributing to malnutrition. The study did not fully explore mental health conditions, which are often linked to physical health outcomes in elderly populations.

Conclusion

This study highlights the alarming prevalence of malnutrition and comorbidities among the elderly population in Sirajganj and Chapainnawabganj, Bangladesh. A significant proportion of the elderly are either malnourished or at risk of malnutrition, with a substantial number suffering from chronic health conditions such as musculoskeletal pain, visual impairment, hypertension, and cardiovascular diseases. Socio-demographic factors like age, gender, marital status, and income are strongly associated with the likelihood of multiple comorbidities, poor nutritional status and food insecurity underscoring the need for targeted interventions to improve nutritional status and manage chronic conditions. The findings call for urgent action from policymakers to address the healthcare and nutritional needs of the growing elderly population in rural Bangladesh.

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