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Nutritional status and depression among the elderly women in selected rural areas of Meherpur District, Bangladesh

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Abstract
Background: Poor nutrition is a growing public health concern, particularly affecting elderly individuals, with women being the most vulnerable to nutritional deficiencies. However, there is limited research on the nutritional status of the elderly population in Bangladesh and its potential link to depression.
Methodology: A cross-sectional study was conducted to evaluate the nutritional status and prevalence of depression among elderly women in rural areas. The study included women aged 60 years and above, residing at Sadar Upazilas of Meherpur district. A total of 185 participants were randomly selected and interviewed using a pretested questionnaire. Nutritional status was assessed based on Body Mass Index (BMI), while the level of depression was measured using the 30-item Geriatric Depression Scale (GDS-30).
Results: Among the respondents, 74.6% had a normal BMI, while 14.1% were classified as overweight. Regarding mental health, 49% of the participants exhibited mild depression, whereas 43% of the participants exhibited severe depression and only 8% experienced normal depression. Statistical analysis revealed a significant association between depression and factors such as age, education, occupation, overweight. Notably, overweight individuals tended to be mildly depressed, and some women with a normal BMI also exhibited symptoms of mild depression.
Conclusion: The study findings indicate a significant relationship between nutritional status and varying levels of depression among elderly women. Financial dependence on family members and lack of economic stability contribute to feelings of helplessness and increased depressive symptoms among elderly rural women. These findings emphasize the need for targeted interventions to improve both the nutritional and mental well-being of this vulnerable population.

Keywords: Nutritional status, depression, elderly women, rural area

Introduction
The United Nations defines older individuals as those aged 60 years and above, while those over 80 years are categorized as the oldest-old. In rural areas of developing countries, elderly populations, particularly women, are highly susceptible to poor nutrition. Under nutrition, deteriorating health conditions, and depression are frequently observed among elderly individuals in rural Bangladesh. In 2010, the elderly population in Bangladesh accounted for approximately 6.87% of the total population [1]. Many older adults face financial instability due to a lack of income sources, making them reliant on family members for support. This dependency often leads to feelings of helplessness and contributes to depression. Furthermore, elderly individuals commonly suffer from chronic illnesses but often lack access to adequate healthcare services. The absence of proper medical attention and emotional support further exacerbates their mental health conditions. Malnutrition among the elderly is frequently associated with illness and reduced appetite. Ensuring financial security for elderly individuals may enhance their overall well-being, both physically and psychologically.
Aging is a natural physiological process that involves the gradual degeneration of bodily functions. Although rural elderly individuals often experience hardship, they make significant contributions to their families in Bangladesh. Many older adults provide essential support in household activities, including supervision of domestic tasks.

Additionally, some elderly individuals contribute financially as either primary or supplementary earners in their households [2].

Elderly Welfare and Policy Interventions

To address disparities between high-income and low-income countries, the United Nations introduced the Millennium Development Goals (MDGs) in 2015, aiming to promote sustainable development, poverty reduction, and economic growth. One of the key objectives of the MDGs is to "eradicate extreme poverty and hunger," with a focus on increasing per capita income and reducing food insecurity [3]. In Bangladesh, the majority of the elderly population resides in rural areas, where healthcare services, economic opportunities, and employment options are extremely limited. Research indicates that over 50% of the elderly population in Bangladesh is either widowed or single, while 63% are unemployed. Among those who are employed, 14-15% engage in agricultural labour or daily wage activities. This situation is in stark contrast to Tehran, where approximately 85% of elderly individuals remain informally employed [4].

Older adults in Bangladesh frequently suffer from non-communicable diseases, including cardiovascular conditions (heart disease, stroke), chronic respiratory illnesses (chronic obstructive pulmonary disease, asthma), kidney disease, cancer, diabetes, and other chronic health disorders [5]. To address the challenges faced by elderly individuals, the Government of Bangladesh enacted the Parent Care Act in 2013, which mandates that children must provide financial support and care for their parents for at least three years. However, the implementation of this law remains inadequate [6].

Nutritional Status and Depression among the elderly

Nutritional status is determined by the body's ability to consume and utilize food effectively. Good nutritional status refers to an adequate intake of essential nutrients that meet the body's energy and maintenance requirements, whereas poor nutritional status results from insufficient nutrient intake, leading to compromised health and growth. Elderly individuals are particularly vulnerable to malnutrition due to inadequate dietary intake, economic instability, and social marginalization. Despite these challenges, elder nutrition has not yet been prioritized in many developing countries, although demographic trends suggest that the issue requires urgent attention [7].

Major depressive disorder (MDD) affects approximately 5-10% of the general population, with prevalence rates reaching up to 20% among individuals with medical conditions. Depression is a significant contributor to disability and suicide risk. When depression coexists with chronic medical conditions, it exacerbates functional impairments, reduces adherence to medical treatments, and can even lower life expectancy. The severity of depression can range from mild to moderate or severe. Depression may arise as a consequence of medical conditions, but it can also contribute to medically unexplained symptoms (MUS). Therefore, physical examinations are essential to identify underlying medical conditions associated with depression [8].

Poor nutritional status has been recognized as a risk factor for depression. Studies estimate that approximately 16% of elderly individuals consume fewer than 1,000 kilocalories per day, an amount insufficient for maintaining a healthy body weight. Older adults typically experience prolonged recovery periods from depression and are at higher risk of relapse compared to younger individuals [9].

Socioeconomic Factors and Food Security in Bangladesh

Bangladesh continues to experience high levels of poverty and food insecurity, necessitating targeted interventions to support vulnerable populations. Annual natural disasters, such as cyclones and floods, along with high population density, contribute to widespread poverty across all age groups. According to the United Nations Development Programme (UNDP) Human Development Index (2006), Bangladesh ranked 137th out of 177 countries, with an estimated 36% of the population living on less than $1 per day [10]. A significant proportion of the elderly population is affected by poverty, but their needs are often overlooked in favour of other vulnerable groups with stronger advocacy efforts. Addressing the nutritional and economic challenges faced by elderly individuals requires comprehensive policies that prioritize elder care, economic empowerment, and healthcare accessibility.

Materials and Methods

Study area: The study was conducted at the Sadar Upazila of Meherpur district.

Study period& duration: The study period was from 8thApril 2017 to 7th August 2017, duration 4 Months.

Study population: Elderly women of 60 years and above in selected rural areas of Meherpur district.

Study design: The study was descriptive type of cross sectional.

Sample size: The following formula was used to calculate the sample size.

$$N = \frac{z^2pq}{d^2}$$

Where,

N=Sample size

Z=Level of confidence or level of significance

D=Standard error

P=The proportion in the population possessing the characteristic of interest.

In a study conducted in Haryana, India. The prevalence of depression found among elderly was 14.4% [11].

Here p=14.4% in the formula yields the maximum value of ‘n’ and the sample was yield at least the designed accurateness. A 95% confidence interval (z=1.96) with 0.05 standard error (d=0.05) was to be desired in this study. Hence, the sample size was calculated in 185.

Sampling technique

Sample sites Study area was selected through a random sampling technique. In the first stage (for selecting primary sampling unit), Upazila / Union /Village were selected through random sampling technique. In the second stage, household was selected through using random sampling technique.

Inclusion criteria: Elderly women resident of the area.

Exclusion criteria

- Known case of Psychiatric disorder
- Physically unable to respond

Data collection method:

Questionnaire was prepared and pretested. Then it was modified and finalized. Data were collected by interviewer administered, Semi structured questionnaire. Level of depression was assessed by using 30 Item Geriatric Depression Scale (GDS-30), Geriatric Depression Scale (Long Form) [12].

Data handling and processing

At the end of each day of data collection, each questionnaire was checked to see whether it was filled completely and consistently. The data entry was started immediately after completion of data collection. Data processing and analysis were done using SPSS. Data were analyzed according to the objectives of the study. The test statistics in used to analyze the data were descriptive statistics, Chi square (x^2). Level of significance was set at 0.05. Log transformation was done in case of BMI distribution. The results were presented in the form of tables and graphs.

Results

Table 1: Socio-demographic characteristics of the respondents (N=185)

Age	Frequency	Percent (%)
60-65 years	104	56.2%
66-70 years	37	20.0%
71-75 years	15	8.1%
76-80 years	17	9.2%
>80 years	12	6.5%
	Mean=67.11; (SD=7.408)	
Educational qualification	**Frequency**	**Percent (%)**
Illiterate	158	85.4%
Primary	19	10.3%
Secondary	8	4.3%
Occupation	**Frequency**	**Percent (%)**
Day labor	1	0.5%
House wife	183	98.9%
Retired	1	0.5%
Current earning status	**Frequency**	**Percent (%)**
No	168	90.8%
Yes	17	9.2%
Body Mass Index	**Frequency**	**Percent (%)**
Under weight (<18.5 kg/m^2)	21	11.4%
Normal (18.5-24.9 kg/m^2)	138	74.6%
Over weight (>25 kg/m^2)	26	14.1%

Table-1 showed the socio-demographic characteristics of the respondents. Among 185 respondents, Majority of the respondents were younger old.56.2 percent of the elderly were 60-65 years (younger old), 20 percent were 66-70 years (older old). The mean age of the respondents was 67.11 years with minimum age of 60 and maximum age of 87 years. From the table showed majority of 85.4% elderly respondents had illiterate and 10.3% had primary education and the rest of them had secondary level of education. Among the respondents about 99% were housewife and the rest of the respondents are engaged in some sorts income. Among them 0.5% percent were day laborer, 0.5% were in retired persons. Among the 185 respondents, majority 90.8% were not earning and the rest of them were still earning. Among the respondents, about 11.4 percent were underweight group and about 14.1 percent were overweight group and the rest of them are within normal BMI.

Table 2: BMI with socio demographic characteristics

Age group	BMI			Total
	Underweight, n (%)	Normal, n (%)	Overweight, n (%)	
60-65 years	11(10.6)	73(70.2)	20(19.2)	104(100.0)
66-70 years	3(8.1)	32(86.5)	2(5.4)	37(100.0)
>70 years	7(15.9)	33(75.0)	4(9.1)	44(100.0)
Total	21(11.4)	138(74.6)	26(14.1)	185(100.0)

Chi-square=6.899, DF=4, P-value=0.14

No particular age group was found to be significant with the nutritional status of rural elderly women (P=0.14).

Table 3: Relationship between current earning and BMI

Current earning	BMI			Total
	Underweight, n (%)	Normal, n (%)	Overweight, n (%)	
No	17(10.1)	128(76.2)	23(13.7)	168(100.0)
Yes	4(23.5)	10(58.8)	3(17.6)	17(100.0)
Total	21(11.4)	138(74.6)	26(14.1)	185(100.0)

Chi-square=2.242, DF=2, P-value=0.19

There are no particular current earning was found to be significant with the nutritional status of rural elderly women (P=0.19).

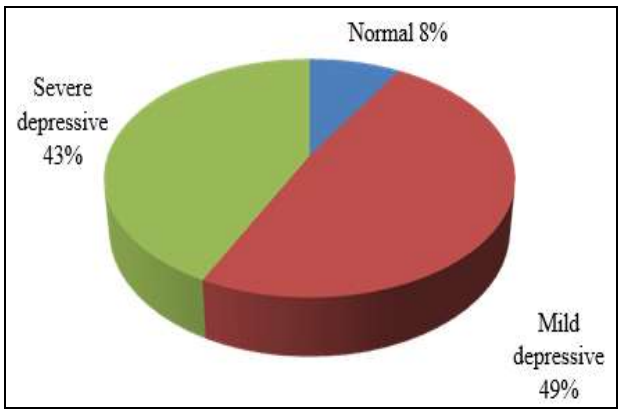

Fig 1: Distribution of the respondents by depressive scoring

From the figure it showed that about fifty (49%) respondents were said mild depressive according to 8% were normal and 43% respondents were severe depressive respectively.

Among the 60 to 65 years group, about 13.5 percent were normal, 54.8 percent were mildly depressed and 31.7 percent were severely depressed. Among the 66 to 70 years group, 35.1 percent were mildly depressed and the rest of 59.5 percent were severely depressed. Among the more than 70 years group, 45.4 percent were mildly and 54.4 percent were severely depressed. There was a significant association (P=0.003) between age and depression among the rural elderly women.

Table 4: Relationship between age and depression

Age group	Geriatric Depression Scale			Total
	Normal	Mild Depression	Severe Depression	
	Frequency (%)	Frequency (%)	Frequency (%)	
60-65 years	14(13.5)	57(54.8)	33(31.7)	104(100.0)
66-70 years	2(5.4)	13(35.1)	22(59.5)	37(100.0)
>70 years	0(0.0)	20(45.4)	24(54.4)	44(100.0)
Total	16(8.6)	90(48.6)	79(42.7)	185(100.0)

Chi-square=16.143, DF=4, P-value=0.003

Table 5: Relationship between earn now and depression

Earn now	Geriatric Depression Scale			Total
	Normal	Mild Depression	Severe Depression	
	Frequency (%)	Frequency (%)	Frequency (%)	
No	14(8.3)	84(50.0)	70(41.7)	168(100.0)
Yes	2(11.8)	6(35.3)	9(52.9)	17(100.0)
Total	16(8.6)	90(48.6)	79(42.7)	185(100.0)

Chi-square=1.356, DF=2, P-value=0.50

This table showed earning of rural women and the measurement of their depression level. There is significant association with no earning money and depression level (P=0.50). 17 women out of 185, among the three groups of depression, said that they were earning money.

Table 6: Relationship between BMI and depression

BMI	Geriatric Depression Scale			Total
	Normal	Mild Depression	Severe Depression	
	Frequency (%)	Frequency (%)	Frequency (%)	
Under weight (<18.5 kg/m2)	0(0.0)	12(57.1)	9(42.9)	21(100.0)
Normal (18.5-24.9 kg/m2)	14(10.1)	61(44.2)	63(45.7)	138(100.0)
Over weight (>25 kg/m2)	2(7.7)	17(65.4)	7(26.9)	26(100.0)
Total	16(8.6)	90(48.6)	79(42.7)	185(100.0)

Chi-square=6.36, DF=4, P-value=0.17

Among the subjects of overweight, 65.4 percent were mildly depressed and 26.9 percent were severe depressed in normal BMI subjects. 57.1 percent of the underweight group was mildly depressed. There is no significant association between BMI and depression.

Discussion

This study aimed to examine the relationship between nutritional status and depression among elderly women in rural Bangladesh. A cross-sectional study was conducted among 185 women aged 60 years and above, residing in three Upazilas of Meherpur district, Dhaka division. The mean age of the participants was 67.11 years (SD=7.408), with the majority classified as younger-old. Approximately 56.2% of the respondents were aged 60-65 years, which is consistent with the findings of a previous study conducted by Moni *et al*. [13].

The study revealed that 85.4% of the elderly women were illiterate, while 10.3% had received primary education, and a small percentage had attained secondary-level education. Although no significant association was observed between age and BMI in this study, previous research conducted both nationally and internationally has reported a significant correlation. A UK-based study indicated that individuals aged 75 years or older had a poorer nutritional status compared to those below this age threshold. Even after adjusting for non-nutritional clinical risk factors, aging was independently linked to poor nutritional outcomes. The discrepancy between the present study and previous research may be attributed to variations in sample size and sampling techniques [14].

Among the elderly women, those suffering from chronic diseases had lower BMI, whereas those without chronic conditions exhibited higher BMI levels. The most frequently reported health issue was chronic peptic ulcer disease (29%), followed by dental problems (20.4%), chronic respiratory tract infections (7%), diabetes (6.8%), coronary diseases (3.9%), and other chronic illnesses. Nutritional status was assessed using Body Mass Index (BMI), where underweight individuals had a BMI of $\leq$ 18.49 kg/m², overweight individuals had a BMI $\geq$ 25.0 kg/m², and those within the normal range had a BMI of 18.5-24.9 kg/m². Among the respondents, 11.4% were classified as underweight, 14.1% as overweight, and 76.5% had a normal BMI. No specific educational category demonstrated a significant association with BMI (P=0.14).

Although occupation did not show a significant relationship with depression, educational level (P=0.00) and monthly family income (P=0.003) were found to be significantly associated with depression, aligning with the findings of Miech [15]. Elderly women from higher socioeconomic backgrounds experienced lower levels of depression, while those from lower socioeconomic groups exhibited higher depression levels. The mean Geriatric Depression Scale (GDS) score was highest among overweight individuals and lowest among underweight individuals, indicating a positive correlation between BMI and depression severity. However, this result contrasts with the findings of Arnold *et al*., which may be due to differences in study design and sample size.

Conclusion

This cross-sectional study aimed to examine the relationship between nutritional status and depression among elderly women in rural areas. The findings indicated that 48.6% of participants experienced mild depression, while 42.7% suffered from severe depression, and only 8.6% exhibited no signs of depression. Several factors, including age, education, occupation, marital status, current activities, and monthly family expenditure, were found to have a significant association with depression. The study explored how nutritional status varied across different levels of depression, highlighting a potential link between the two. However, despite this observation, no statistically significant association between nutritional status and depression was established.

Conflict of interest

The author declares no conflict of interest

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