

Prevalence and Associated Factors of Multimorbidity among Elderly People of Bangladesh

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Abstract

Original Research Article

Background: Human aging is a dynamic and progressive natural process which is depends on interacting hereditary, biological, social, environmental, historical and cultural factors that determine the quality of life of an older individual. *Multimorbidity* was defined as the co-occurrence of at least two chronic diseases in a person whether as a coincidence or not. Little attention has been paid to the study of the prevalence of multimorbidity among the elderly in Bangladesh. The study aimed to find out the prevalence and associated factors of multimorbidity among elderly people of Bangladesh. **Methods:** It was a hospital-based cross-sectional study, conducted in Department of Community Medicine, International Nursing College, Tongi, Bangladesh from January to December 2022. Data were collected from 250 participants. Categorical data were presented as proportion, and continuous data were presented as mean (SD). The Chi-square test and multivariate logistic regression were used to find out the association between frailty and other variables. **Results:** Total Two hundred fifty eligible elderly persons were approached for the study. So, were analysed (response rate = 85%). The mean age (SD) of the participants was 70 (7.0) years. About half (55.2%) of them were female, 48% were living in a rural areas, and 68% were Muslim by religion. About two-thirds (58%) of participants were married (currently in union), and were living with either their spouses or children. Nearly one-third (64.4%) of participants were illiterate. The prevalence of multimorbidity was significantly higher among women than among men, among illiterate than among literate persons, among persons who belonged to the non-poorest quintiles than among the poorest quintile, and also significantly higher among single than among married persons. The most common disorders were arthritis (57.2%) and hypertension (38.4%). The prevalence of arthritis was significantly higher among the illiterate than among the literate group (62.5% vs 50.0%, $p=0.007$) and also higher among persons belonging to the non-poorest group than among persons in the poorest quintile (59.5% vs 48.1%, $p=0.041$) (data not shown). In a series of multivariate logistic regression analyses, gender and asset index were independently associated with multimorbidity. Literacy and marital status had a crude association with multimorbidity, which disappeared after adjusting for other sociodemographic variables. **Conclusion:** In concluded, the prevalence of multi-morbidity is high in a less-developed region, especially among women and in the non-poorest group of the aged population. Given the high prevalence and increased ageing of the population, clinicians and researchers should pay special attention to the diagnosis of multimorbidity among the elderly people. Since multimorbidity may cause significant cognitive and functional consequences, one of the relevant implications relating to our findings is that researchers and policymakers should work together to develop effective intervention strategies and programmes to reduce the burden of multimorbidity.

Keywords: Associated Factors, Multimorbidity, Elderly Patients.

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INTRODUCTION

Human aging is a dynamic and progressive natural process which is depends on interacting hereditary, biological, social, environmental, historical and cultural factors that determine the quality of life of an older individual. *Multimorbidity* was defined as the

co-occurrence of at least two chronic diseases in a person whether as a coincidence or not. Little attention has been paid to the study of the prevalence of multimorbidity among the elderly in Bangladesh. According to the World Health Organization report, the global population of older adults aged 60 years or more is expected to rise

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to around 2 billion by 2050 [1]. Human aging is a dynamic and progressive natural process which is depends on interacting hereditary, biological, social, environmental, historical and cultural factors that determine the quality of life of an older individual [2]. It is anticipated that by 2050, there will be 19% more elderly individuals than there were in 2015[3]. It is critical to quantify the burden of frailty to help policymakers to understand the changing difficulties and requirements of the growing geriatric population. The prevalence of frailty in India has been reported to range from 11% to 58% using different assessment methods [4, 5–7] The fact that more and more people are reaching their older adulthood has resulted in a change in the disease pattern such that chronic medical conditions have become prominent also in low-income populations. Chronic health conditions are now common in elderly persons, and the prevalence of multiple chronic conditions is expected to increase [8]. Chronic diseases, by nature, will accumulate with ageing and present as multiple morbidities. People's experiences of multiple chronic diseases and their prevalence are essential to establish an appropriate health-care service; however, the prevalence of multimorbidity is not sufficiently known for developing countries. Afshar *et al.*, compared the prevalence of multimorbidity across low- and middle-income countries, and investigated patterns by age and education, as a proxy for socioeconomic status by using chronic disease data from 28 countries of the World Health Survey (2003) [7,8]. The Bangladesh Bureau of Statistics (BBS) conducted a Health and Morbidity Status Survey in 2012, where self-reported data were collected on multimorbidity [9]. Khanam and colleagues conducted a study on multimorbidity in Bangladesh in 2011, where they only collected data for nine specific diseases by clinical examination 27; however, they failed to include diabetes, respiratory tract infection, upper gastrointestinal (GI) tract disorders, lower GI tract disorders, as well as many other chronic diseases that have been found as most prevalent among the elderly in many other studies [10].

MATERIALS AND METHODS

It was a hospital-based cross-sectional study, conducted in Department of Community Medicine, International Nursing College, Tongi, Bangladesh from

January to December 2022. Data were collected from 250 participants. Categorical data were presented as proportion, and continuous data were presented as mean (SD). The Chi-square test and multivariate logistic regression were used to find out the association between frailty and other variables.

Inclusion Criteria

- Older adults aged 60 years and above.

Exclusion Criteria

- ❖ Elderly with terminal illness, bedridden or wheelchair bound, severe hearing or visual impairment and with any acute illness at the time of the survey.

Data Collection: After obtaining written informed consent, face-to-face interviews were conducted and data were collected using a pre-tested, semi-structured, interviewer-administered, questionnaire. The questionnaire consists of three parts-sociodemographic and health-related information, frailty and fall assessment. The variable 'morbidity' referred to the presence of any chronic diseases which include hypertension, chronic heart diseases, stroke, any chronic lung disease, diabetes, cancer or malignant tumour, any bone/joint disease or any neurological/psychiatric disease. These were taken as self-reported by the participants. The monthly per capita consumption expenditure (MPCE) was assessed as household expenditure on food in the last month and on non-food in the last year. The variable was then categorized into five quantiles from poorest to richest.

Statistical Analysis: Data were analysed using PSSP 21.0. Categorical variables such as gender, frailty status etc were presented as proportions. Continuous variables such as age, BMI etc were presented as mean (SD). Chi-square test was applied to find out the association between two categorical variables. Further, multivariate logistic regression was used, and the model was built with variables having $p < 0.05$ in bivariate analysis. P value < 0.05 was considered statistically significant for all computations.

RESULTS

Table 1: Characteristics of study population by multimorbidity(n=250)

Age group	Number (%)	Multimorbidity				p value
		Yes		No		
		N	%	N	%	
60-70	149 (59.6)	75	50.3	74	49.7	0.070
≥71	101 (40.4)	58	57.4	43	42.6	
Sex						
Male	112 (44.8)	44	39.2	68	60.8	<0.0001
Female	138 (55.2)	90	65.2	48	34.8	
Literacy						
Illiterate	161 (64.4)	94	58.3	67	41.7	0.006
Literate	89 (35.6)	41	46.1	48	53.9	

Asset index						
Poorest	44(17.6)	18	41.0	26	59.0	0.026
Non-poorest	206 (82.4)	115	55.8	91	44.2	
Marital Status						
Single	105 (42.0)	66	62.8	39	37.2	0.001
Married	145(58.0)	68	46.8	77	53.2	

Total Two hundred fifty eligible elderly persons were approached for the study. So, were analysed (response rate = 85%). The mean age (SD) of the participants was 70 (7.0) years. About half (55.2%) of them were female, 48% were living in a rural areas, and 68% were Muslim by religion. About two-thirds (58%) of participants were married (currently in union), and were living with either their spouses or children. Nearly

one-third (64.4%) of participants were illiterate. The prevalence of multimorbidity was significantly higher among women than among men, among illiterate than among literate persons, among persons who belonged to the non-poorest quintiles than among the poorest quintile, and also significantly higher among single than among married persons (Table 1).

Table 2: Frequency (prevalence per 100 people) of 9 individual chronic health conditions used in defining multimorbidity by sex (n=250)

Chronic health condition	No	%	P value
Arthritis	143	57.2	0.231
Hypertension	96	38.4	0.192
Impaired vision	89	35.6	<0.0001
Signs of thyroid hypofunction	26	10.4	0.166
Obstructive pulmonary symptoms	17	6.8	<0.0001
Symptoms of heart failure	11	4.4	0.088
Hearing impairment	06	2.4	0.062
Obesity	06	2.4	0.186
Stroke	02	0.8	0.388
Signs of hypothyroidism	05	2.0	0.112
Signs of Chronic Obstructive Pulmonary Disease	04	106	0.117

Table 2 shows the prevalence of chronic health conditions used for defining multimorbidity in the study. The most common disorders were arthritis (57.2%) and hypertension (38.4%). The prevalence of arthritis was significantly higher among the illiterate than among the literate group (62.5% vs 50.0%, $p=0.007$) and also higher among persons belonging to the non-poorest group than among persons in the poorest quintile (59.5% vs 48.1%,

$p=0.041$) (data not shown). Hypertension was significantly more common in the older age-group than in the younger group (45.0% vs 32.5%, $p=0.006$). It was also slightly more frequent among persons belonging to the non-poorest quintile than among persons in the poorest quintile (40.5% vs 31.5%, $p=0.097$) (data not shown).

Table 3: Frequency (prevalence per 100 people) of chronic medical conditions by age group and sex (n=250)

No. of chronic conditions	Age							
	60-69 years (n=140)				71 years and above (n=110)			
	Men (n=60)		Women (n=80)		Men (n=50)		Women (n=60)	
	No	%	No	%	No	%	No	%
No disease	15	25.0	7	8.7	22	44.0	41	68.3
1 disease	8	13.3	19	23.7	3	6.0	18	30.0
2 diseases	14	23.3	30	37.5	19	38.0	23	38.3
3 or more diseases	8	13.3	20	25.0	3	6.0	18	30.7

Table 3 shows the prevalence of multimorbidity by age-groups (60-69 years and ≥ 71 years) and sex according to the number of adverse medical conditions.

The rates of prevalence of multimorbidity were significantly higher among women than among men in both the age-groups.

Table 4: Unadjusted and adjusted odds ratios and 95% confidence intervals of multimorbidity: results from logistic regression analyses

Characteristics	N (%)	Multimorbidity	
		Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age-group (years)			
60-69	126 (58.4)	1.00	1.00
70+	145 (58.0)	1.35 (0.93-1.98)	1.29 (0.84-1.97)
Gender			
Men	99 (39.6)	1.00	1.00
Women	151 (68.4)	2.86 (1.95-4.20)	3.32 (1.88-5.86)
Literacy			
Illiterate	147 (58.8)	1.00	1.00
Literate	115 (46.0)	0.60 (0.41-0.88)	0.85 (0.54-1.32)
Asset index			
Poorest	107 (42.8)	1.00	1.00
Non-poorest	140 (56.0)	1.68 (1.02-2.74)	1.93 (1.14-3.27)
Marital Status			
Single	157 (62.8)	1.00	1.00
Married	117 (46.8)	0.52 (0.36-0.76)	1.20 (0.68-2.11)

In a series of multivariate logistic regression analyses, gender and asset index were independently associated with multimorbidity (Table 4). Literacy and marital status had a crude association with multimorbidity, which disappeared after adjusting for other sociodemographic variables.

DISCUSSION

In this study, multimorbidity was defined as the presence of two or more chronic health problems in an elderly person, which is consistent with most of the literature [9-11]. While previous studies in Bangladesh have collected self-reported data, this is the first study where the prevalence and pattern of multimorbidity have been measured from hospital-based medically diagnosed report data. Thus, the prevalence and pattern of multimorbidity presented in the study are based on more authentic data than self-reported disease data. We found that the overall prevalence of multimorbidity was 53.8% among the elderly people and that there were higher rates of prevalence among women, illiterates, and persons who were single or who belonged to the non-poorest quintiles. Overall, this study has shown a high prevalence of multimorbidity among the elderly people in rural Bangladesh, similar to what is frequently reported from many developed nations, e.g. Europe (61- 80% in the Dutch population, 55% in the Swedish population) [12, 13], Australia (75%) [14], and North America (65%) [15], although the criteria or definitions were not identical in those studies. Female sex was associated with a higher prevalence of multimorbidity among this population. In both the age-groups, women had significantly higher proportions of multimorbidity than had men. In both the sexes, the relationship between age and the number of chronic diseases was almost identical, showing a weak association between age and the number of chronic diseases. The absence of significant differences by age-groups is contrasting to other studies performed in the West on the prevalence of

multimorbidity [12, 14, 15] and is likely due to the fact that ageing of the population is rather a new phenomenon in Bangladesh. The proportion of people aged 60 years and above was 16.1% in the United States, 20.6% in the UK, and 22.4% in Sweden during 2000 whereas, in Bangladesh, it was only 4.9% in the same time period [16]. Hence, 'selective survival' is likely to be a major explanation of the absence of age differences in our study. The concept of selective survival is that some people are more robust to fight against several illnesses and managed to be alive while others die. This selection might have taken place already at a younger age, by childhood illnesses, which may have produced cohorts more resistant to diseases at later age. The consequence of this reasoning is that reduction in infant and child mortality and morbidity will have a stimulating impact on the future prevalence of diseases at older ages. Still, the findings of the present study call for recognition of the urgent need of older persons, especially women, for healthcare services in Bangladesh. The 'non-poorest quintiles' was associated with a higher prevalence of multimorbidity in this population. The persons who were relatively better-off suffered from more chronic conditions, e.g. arthritis and hypertension. It is important to stress 'relatively better-off', since we are dealing with a poor population. However, even within the poor communities, the differences do exist: unequal access to health services and differences in survival at infancy and early childhood. We used the asset index rather than income to assess the socioeconomic status. Possession of assets and characteristics of infrastructure are easier to survey than income and are, therefore, less likely to be misreported. The prevalence of hypertension was higher in the non-poorest quintiles but was only of borderline significance, which is consistent with findings of other studies that cardiovascular risk factors are associated with the economic development and where the mean level of population blood pressure is not correlated, or only weakly correlated, with economic factors [17]. A

study from the same research project reported a lower prevalence of arthritis using a rather stringent definition of the condition [18]. The present study found a higher prevalence of arthritis by applying a revised definition based on a combination of medical history and current clinical examination. The prevalence of arthritis was higher among the illiterate people than among the literate people in this population. Higher prevalence rates were also observed among the people in the non-poorest group. The relationship among arthritis, literacy, and wealth needs to be further explored in this population. Of the rural people participating in this study, women, illiterates, singles, and persons in the non-poor quintiles had the highest prevalence rates of multimorbidity. After adjusting for the sociodemographic characteristics, female sex and asset index were still associated with a higher risk of multimorbidity. Thus, the data suggest that our health system should focus on elderly women in particular. Other recent studies in Bangladesh have found a high prevalence of self-reported health problems among elderly persons, and approximately 80% of elderly women reported having four or more health problems [19]. Gender might be linked to multimorbidity through various mechanisms. Vulnerability for co-occurring diseases may be due to genetic factors, including gender. Also the living and working environment, life-events, lifestyle, behavioural risk factors, or risk associated with socioeconomic status often differ between the genders and may affect the occurrence and outcome of multimorbidity. In our study, a random sample was selected from the community dwellers, and approximately 50% of the original sample participated in this study. People who initially participated in household interview but did not attend clinical examinations were mostly women and elderly people [20]. Thus, the high prevalence figures presented here may, in fact, represent an underestimation of the problem. The high prevalence of multimorbidity observed in the study calls into question the very organization of our health services. Most developing countries, including Bangladesh, are least prepared to meet the challenges of societies with rapid increase in ageing population [21]. The findings of our study showed that any effort to reorganize primary care for the elderly people should also consider the high prevalence of multimorbidity. Importantly, interventions that suit patients with a single disease may not be appropriate for patients with multiple conditions [22]. The present study offers evidence to the present primary healthcare programmes in Bangladesh to concentrate on the elderly people with multimorbidity. The study finding should be taken with few limitations. This study was conducted in a hospital-based setting, which may not represent the general population. The study did not examine cognition, which is a key factor in frailty. Self-reported information on some crucial components of the frailty assessment tool may have resulted in imprecision.

CONCLUSION

In concluded, the prevalence of multi-morbidity is high in a less-developed region, especially among women and in the non-poorest group of the aged population. Given the high prevalence and increased ageing of the population, clinicians and researchers should pay special attention to the diagnosis of multimorbidity among the elderly people. Since multimorbidity may cause significant cognitive and functional consequences, one of the relevant implications relating to our findings is that researchers and policymakers should work together to develop effective intervention strategies and programmes to reduce the burden of multimorbidity.

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