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Prevalence of Multimorbidity and Its Associations with Health Literacy and Quality of Life Among Older Adults in an Urban Slum

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Abstract

Introduction:

Multimorbidity, defined as the presence of two or more chronic conditions, is increasingly common among older adults and is associated with poor health outcomes, reduced quality of life, and increased healthcare utilization. Older adults living in urban slums are particularly vulnerable due to poverty, inadequate healthcare access, and poor living conditions. This study assessed the prevalence of multimorbidity and its association with health literacy and health-related quality of life.

Methodology:

A community-based cross-sectional study was conducted among 400 adults aged 60 years and above residing in an urban slum in Mysuru, Karnataka, from January to March 2025. Data were collected using a semi-structured questionnaire, the 47-item Health Literacy Scale, the 12-item Short Form Survey (SF-12), and the Multidimensional Scale of Perceived Social Support. Associations were assessed using the Chi-square test, with $p < 0.05$ considered statistically significant.

Results

The prevalence of multimorbidity was 68.5% (274/400). It was significantly associated with increasing age ($p < 0.001$), female sex (56.6%; $p < 0.001$), widowhood (32.8%; $p < 0.001$), illiteracy (44.2%; $p < 0.001$), lower socioeconomic status (23.4% in Class V; $p < 0.001$), limited healthcare access (21.2%; $p = 0.023$), physical inactivity (26.3%; $p < 0.001$), and poorer health-related quality of life (79.2%; $p = 0.011$). Although 69.1% of participants with multimorbidity had inadequate health literacy, the association was not statistically significant ($p = 0.266$).

Conclusion

Multimorbidity is highly prevalent among older adults living in urban slums and is associated with adverse sociodemographic, behavioral, and quality-of-life outcomes. Targeted geriatric care and health literacy interventions are needed.

Introduction

Population ageing is one of the most significant demographic transitions of the 21st century. As life expectancy increases, older adults are increasingly affected by chronic non-communicable diseases (NCDs) such as hypertension, diabetes mellitus, chronic respiratory disease, osteoarthritis, and cardiovascular disorders. The coexistence of two or more chronic conditions in the same individual, known as multimorbidity, has emerged as a major public health challenge because it complicates

disease management, increases healthcare utilization, and adversely affects quality of life (QoL) [1]. Multimorbidity is particularly common among adults aged 65 years and above, with prevalence estimates ranging from 50% to 80% depending on the population studied and the criteria used for defining chronic conditions [2, 3].

In India, the burden of multimorbidity is rapidly increasing due to epidemiological transition, urbanization, and population ageing. Recent analyses from the Longitudinal Ageing Study in India (LASI) have demonstrated that more than half of older adults live with at least two chronic conditions, with higher prevalence observed among socioeconomically disadvantaged groups [4–6]. Multimorbidity is associated with increased disability, frailty, depression, loneliness, and mortality, imposing substantial economic and social burden on families and health systems [7–9]. In addition, studies have consistently shown a negative association between multimorbidity and health-related quality of life, affecting both physical and mental well-being [10–12].

Older adults residing in urban slums constitute one of the most vulnerable segments of the population. These communities are characterized by overcrowding, poor sanitation, inadequate housing, financial insecurity, and limited access to healthcare services. Such adverse living conditions increase exposure to chronic diseases and hinder their effective management [13]. Despite this vulnerability, urban slum populations remain underrepresented in geriatric health research.

Health literacy—the ability to obtain, understand, and use health information to make informed decisions—is a critical determinant of chronic disease management. Older adults with low health literacy often have poorer medication adherence, inadequate self-care, and worse health outcomes. Limited health literacy may therefore exacerbate the impact of multimorbidity and contribute to reduced quality of life [14].

Although multimorbidity, health literacy, and quality of life have been studied individually, there is limited evidence examining their interrelationship among older adults living in urban slums in India. Understanding these associations is essential for designing targeted community-based interventions and strengthening primary healthcare services. Therefore, the present study was undertaken to assess the prevalence of multimorbidity and to explore its association with health literacy and quality of life among older adults residing in an urban slum in Mysuru, Karnataka.

Methodology

A community-based cross-sectional study was conducted among older adults residing in the urban field practice area of the Department of Community Medicine, JSS Medical College. The study was carried out over a period of three months from January to March 2025. The objective of the study was to assess the prevalence of multimorbidity and to examine its association with health literacy and quality of life among older adults living in an urban slum.

The study population comprised all individuals aged 60 years and above who had been residing in the selected urban slum for at least six months. Participants who were willing to provide written informed consent were included in the study. Individuals who were bedridden, unable to communicate due to severe cognitive impairment or hearing difficulties, and those unwilling to participate were excluded.

The sample size was calculated using the single population proportion formula, considering a prevalence of multimorbidity of 45% based on previous Indian study. [14] With a 95% confidence level, 5% absolute precision, and adjustment for design effect, the minimum sample size was estimated to be 380. To account for possible non-response and incomplete questionnaires, the final sample size was rounded up to 400 participants.

A purposive sampling approach was adopted, and all eligible older adults available during house-to-house visits were recruited consecutively until the required sample size was achieved. Data were collected using a pretested semi-structured questionnaire administered through face-to-face interviews by the principal investigator. Information on sociodemographic characteristics, lifestyle factors, medical history, and diagnosed chronic conditions was obtained.

Multimorbidity was defined as the presence of two or more self-reported physician-diagnosed chronic diseases. Health literacy was assessed using the 47-item European Health Literacy Survey Questionnaire (HLS-EU-Q47), which evaluates healthcare, disease prevention, and health promotion domains. Health-related quality of life was measured using the 12-item Short Form Survey (SF-12), which provides physical and mental component summary scores. Perceived social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS).

Data were entered into Microsoft Excel and analyzed using IBM SPSS software version 26 (Statistical Package for Social Science, Windows, Version 26.0, IBM Corp. Released 2019. IBM SPSS Statistics for Armonk, NY, USA). Continuous variables were summarized as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages. Associations between multimorbidity and sociodemographic characteristics, lifestyle factors, health literacy, perceived social support, and health-related quality of life were assessed using the Chi-square test or Fisher's exact test, as appropriate. A p-value of < 0.05 was considered statistically significant.

Results

The present community-based cross-sectional study included 400 older adults aged 60 years and above residing in an urban slum area.

Figure 1 illustrates the prevalence of multimorbidity among the study participants. Of the 400 participants, 274 (68.5%) had two or more chronic conditions and were classified as having multimorbidity, while 126 (31.5%) had either no chronic condition or only one chronic condition.

Table 1
Summary of the socio-demographic profile of the participants:

Variable	Category	No/Single morbidity N (%)	Multi-comorbidities N (%)	p-value
Age (years)	60–65	64 (50.8)	50 (18.2)	**< 0.001***
	65–70	40 (31.7)	82 (29.9)	
	70–75	20 (15.9)	63 (23.0)	
	75–80	2 (1.6)	42 (15.3)	
	> 80	0 (0.0)	37 (13.5)	
Sex	Males	92 (73.0)	119 (43.4)	**< 0.001***
	Females	34 (27.0)	155 (56.6)	
Religion	Hindu	106 (84.1)	248 (90.5)	**0.005***
	Muslim	10 (7.9)	4 (1.5)	
	Christian	10 (7.9)	22 (8.0)	
Marital status	Married	112 (88.9)	184 (67.2)	**< 0.001***
	Widow/Divorced	14 (11.1)	90 (32.8)	
Education	Illiterate	38 (30.2)	121 (44.2)	**< 0.001***
	Primary	24 (19.0)	76 (27.7)	
	Middle school	8 (6.3)	18 (6.6)	
	Secondary	44 (34.9)	22 (8.0)	
	High school/Diploma	12 (9.5)	12 (4.4)	
	Graduate/PG	0 (0.0)	25 (9.1)	
Socioeconomic status (Modified BG Prasad)	Class I	4 (3.2)	25 (9.1)	**< 0.001***
	Class II	32 (25.4)	50 (18.2)	
	Class III	26 (20.6)	65 (23.7)	
	Class IV	58 (46.0)	70 (25.5)	
	Class V	6 (4.8)	64 (23.4)	
Healthcare access	Adequate	54 (42.9)	148 (54.0)	**0.023***

* Statistically significant p value (Fisher's Exact test)

Variable	Category	No/Single morbidity	Multi-comorbidities	p-value
		N (%)	N (%)	
	Moderate	48 (38.1)	68 (24.8)	
	Limited (> 5 km)	24 (19.0)	58 (21.2)	
* Statistically significant p value (Fisher's Exact test)				

Table 1 summarizes the socio-demographic profile of the participants according to multimorbidity status.

A statistically significant association was observed between age and multimorbidity ($p < 0.001$). The proportion of participants with multimorbidity increased with advancing age. Among participants aged 60–65 years, only 18.2% belonged to the multimorbidity group, whereas 13.5% of participants aged above 80 years were in the multimorbidity group, while none in this age group were in the no/single morbidity category.

Sex was significantly associated with multimorbidity ($p < 0.001$). Females constituted a higher proportion of the multimorbidity group (56.6%), whereas males predominated in the no/single morbidity group (73.0%).

Marital status also showed a significant association ($p < 0.001$). Widowed or divorced participants were more likely to have multimorbidity (32.8%) compared to those with no or single morbidity (11.1%).

Educational status was significantly associated with multimorbidity ($p < 0.001$). Illiteracy was more common among participants with multimorbidity (44.2%) compared to those with no or single morbidity (30.2%).

Socioeconomic status, assessed using the Modified B.G. Prasad classification, was significantly associated with multimorbidity ($p < 0.001$). Participants from lower socioeconomic classes, particularly Class V, had a higher proportion of multimorbidity (23.4%) compared to the no/single morbidity group (4.8%).

Healthcare access was also significantly associated with multimorbidity ($p = 0.023$). Limited healthcare access (> 5 km from health facility) was reported by 21.2% of participants with multimorbidity compared to 19.0% among those with no or single morbidity.

Table 2
Lifestyle factors among the study participants

Variable	Category	No/Single morbidity N (%)	Multi-comorbidities N (%)	p-value
Physical activity	Inactive	0 (0.0)	72 (26.3)	< 0.001*
	Moderate activity	62 (49.2)	167 (60.9)	
	Active	64 (50.8)	35 (12.8)	
Smoking status	Never	70 (55.6)	213 (77.7)	< 0.001*
	Smoker	44 (34.9)	34 (12.4)	
	Quit	12 (9.5)	27 (9.9)	
Alcohol consumption	Never	76 (60.3)	205 (74.8)	0.009*
	Drinks	24 (19.0)	38 (13.9)	
	Quit	26 (20.6)	31 (11.3)	
Dietary pattern	Vegetarian	36 (28.6)	110 (40.1)	0.026*
	Mixed	90 (71.4)	164 (59.9)	

* Statistically significant p value (Fisher's Exact test)

Table 2 presents the distribution of lifestyle factors according to multimorbidity status.

Physical activity was significantly associated with multimorbidity ($p < 0.001$). Active physical activity was more common among participants with no or single morbidity (50.8%) than among those with multimorbidity (12.8%). Conversely, physical inactivity was observed exclusively among participants with multimorbidity (26.3%).

Smoking status showed a significant association ($p < 0.001$). Participants who had never smoked constituted a larger proportion of the multimorbidity group (77.7%), while current smoking was more common among those with no or single morbidity (34.9%).

Alcohol consumption was significantly associated with multimorbidity ($p = 0.009$). Participants who never consumed alcohol were more likely to have multimorbidity (74.8%) compared to those with no or single morbidity (60.3%).

Dietary pattern was also significantly associated with multimorbidity ($p = 0.026$). A vegetarian diet was reported more frequently among participants with multimorbidity (40.1%) than among those with no or single morbidity (28.6%).

Table 3
Association between Multi-morbidity with Perceived Social Support, Health Literacy and Health-Related QOL:

Variable	Category	No/Single morbidity N (%)	Multi-comorbidities N (%)	p-value (Chi-square test)
Perceived Social Support	High support	126 (31.5)	274 (68.5)	–
HR-QOL	Severe impairment	20 (20.8)	76 (79.2)	0.011*
	Clinically significant impairment	106 (34.9)	198 (65.1)	
Health literacy	Inadequate	116 (30.9)	260 (69.1)	0.266
	Problematic	10 (41.7)	14 (58.3)	
* Statistically significant p value (Chi-square test)				

Table 3 shows the association between multimorbidity and perceived social support, health literacy, and health-related quality of life.

Among participants reporting high perceived social support, 68.5% had multimorbidity and 31.5% had no or single morbidity. Statistical significance could not be assessed because all participants fell within the same category.

Health-related quality of life (HR-QoL) was significantly associated with multimorbidity (p = 0.011). Severe impairment was observed in 79.2% of participants with multimorbidity compared to 20.8% of those with no or single morbidity.

Health literacy was poorer among participants with multimorbidity; 69.1% of those with inadequate health literacy had multimorbidity compared to 30.9% in the no/single morbidity group. However, this association was not statistically significant (p = 0.266).

Discussion

The present community-based cross-sectional study conducted among 400 older adults aged 60 years and above residing in an urban slum revealed that 274 participants (68.5%) had multimorbidity, while 126 (31.5%) had either no chronic disease or only one chronic condition. This prevalence is considerably high and reflects the substantial burden of chronic diseases among older adults living in socioeconomically deprived urban settings. Martin Fortin et al. reported in a systematic review that the prevalence of multimorbidity among older adults ranged from 55% to 98%, depending on the study setting and disease definitions used [1]. Similarly, Nicolas Garin et al., in a multicountry study involving 28 countries, observed that multimorbidity prevalence ranged from 3.9% to 90.5% and increased sharply with age [2].

The prevalence observed in the present study lies within these reported ranges and likely reflects the combined influence of ageing, poverty, and limited healthcare access.

Age was significantly associated with multimorbidity ($p < 0.001$). In the present study, 50 of 114 participants aged 60–65 years (43.9%) had multimorbidity, whereas all 37 participants aged > 80 years (100%) were multimorbid. Alicia Marengoni et al. found that the prevalence of multimorbidity increased from approximately 55% in individuals aged 60–69 years to more than 80% among those aged 80 years and above [3]. In India, Madhusmita Barik et al. reported significantly higher odds of multimorbidity among those aged ≥ 80 years compared with younger elderly groups [4]. These findings are consistent with our observation that advancing age is a strong determinant of multimorbidity.

Female sex was also significantly associated with multimorbidity ($p < 0.001$). Among the 274 participants with multimorbidity, 155 (56.6%) were females and 119 (43.4%) were males. Shobhit Chauhan et al. reported a multimorbidity prevalence of 31.9% among women compared to 24.6% among men using LASI data [5]. Likewise, Priyanka Patel et al. found that women had significantly higher disease-specific multimorbidity than men [6]. This may be attributed to longer life expectancy, hormonal changes, and greater healthcare utilization among women.

Several socio-demographic factors were significantly associated with multimorbidity. Illiteracy was present in 121 of 274 participants (44.2%) with multimorbidity compared to 38 of 126 (30.2%) in the no/single morbidity group. Widowed or divorced status was more common among participants with multimorbidity (32.8%) than among those without multimorbidity (11.1%). Participants from the poorest socioeconomic class (Class V) constituted 23.4% of the multimorbidity group compared to 4.8% of the no/single morbidity group ($p < 0.001$). Limited healthcare access (> 5 km from health facility) was also more frequent among those with multimorbidity (21.2% vs. 19.0%; $p = 0.023$). Sibnath Ansari demonstrated that lower education and economic disadvantage were strongly associated with poor outcomes in older adults with multimorbidity [7]. Sibnath Ansari, Tausif Muhammad, and Mousumi Dhar further reported that socially vulnerable older adults with multimorbidity were more likely to experience loneliness and psychosocial distress [8].

Lifestyle factors showed significant associations with multimorbidity. Physical inactivity was observed exclusively among participants with multimorbidity, affecting 72 of 274 participants (26.3%), while only 35 (12.8%) were physically active. In contrast, 64 of 126 participants (50.8%) in the no/single morbidity group were physically active ($p < 0.001$). A vegetarian diet was reported by 110 participants (40.1%) with multimorbidity compared to 36 (28.6%) in the no/single morbidity group ($p = 0.026$). Smoking and alcohol consumption also showed significant associations, though these may reflect cessation after diagnosis of chronic disease rather than protective effects. Ari Menotti et al. similarly reported that lifestyle factors and clustering of chronic conditions significantly increased mortality risk among older adults [9].

Health-related quality of life was significantly impaired among participants with multimorbidity ($p = 0.011$). Of the 96 participants with severe HR-QoL impairment, 76 (79.2%) had multimorbidity, compared

to only 20 (20.8%) with no or single morbidity. Among those with clinically significant impairment, 198 of 304 participants (65.1%) had multimorbidity. Martin Fortin et al. concluded that each additional chronic condition was associated with progressively poorer physical and mental quality-of-life scores [10]. Similarly, Jing Gu et al. reported significantly lower SF-12 scores among elderly individuals with multimorbidity [11].

Inadequate health literacy was highly prevalent. Among 376 participants with inadequate health literacy, 260 (69.1%) had multimorbidity compared to 116 (30.9%) with no or single morbidity. However, this association was not statistically significant ($p = 0.266$). High perceived social support was reported by all participants, with 274 (68.5%) belonging to the multimorbidity group. Although this may appear paradoxical, it likely reflects increased dependence on family members and caregivers. Ravi Subbaraman et al. emphasized that slum residents often rely heavily on family and informal social networks to manage chronic illness [12]. Anushree Sinha et al. similarly highlighted the combined burden of multimorbidity, poverty, and barriers to healthcare among the urban poor in India [13].

Overall, the present study demonstrates that multimorbidity affects more than two-thirds of older adults living in urban slums and is associated with advanced age, female sex, widowhood, illiteracy, lower socioeconomic status, physical inactivity, and poor quality of life. These findings emphasize the need for integrated geriatric services, health literacy interventions, and community-based strategies to address the growing burden of multimorbidity among vulnerable urban populations.

The study has a few limitations. First, its cross-sectional design precludes establishing causal relationships between multimorbidity, health literacy, and quality of life. Second, chronic conditions were identified based on self-reported physician diagnoses, which may have introduced recall bias and underreporting. Third, the study was conducted in a single urban slum using purposive sampling, limiting the generalizability of the findings to other settings. Finally, potential confounding factors such as nutritional status, cognitive function, and severity of individual chronic diseases were not evaluated.

Conclusion

The present community-based cross-sectional study demonstrated that multimorbidity is highly prevalent among older adults residing in urban slums, affecting 68.5% of participants aged 60 years and above. Multimorbidity was significantly associated with increasing age, female sex, widowhood, illiteracy, lower socioeconomic status, limited access to healthcare, and physical inactivity. Participants with multimorbidity had markedly poorer health-related quality of life, with severe impairment observed in 79.2% of those affected. Inadequate health literacy was common among participants with multimorbidity, although the association was not statistically significant. These findings highlight the substantial health burden experienced by elderly individuals living in socioeconomically disadvantaged urban settings. There is an urgent need for comprehensive geriatric care, regular screening for chronic diseases, health literacy enhancement, and community-based interventions aimed at improving self-management and quality of life among older adults with multimorbidity in urban slum populations.

Declarations

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Author Contributions

DA and LSA planned and designed this study. DA and LSA collected and analysed the data, and drafted the manuscript. SKD and VRV participated in the analysis and interpretation, and read and approved the final manuscript. All authors read and approved the final manuscript. VRV is the guarantor and accepts full responsibility for the finished work and/or the conduct of the study, had access to the data and controlled the decision to publish.

Ethical considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee of JSS Medical College (Approval No. JSSMC/IEC/240123/15NCT/2024-25) in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants prior to enrolment. Confidentiality and anonymity of the collected information were maintained throughout the study, and participation was entirely voluntary.

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Data availability

The datasets generated and analyzed during the current study are not publicly available due to ethical restrictions related to participant confidentiality but are available from the corresponding author on reasonable request and with permission from the institutional ethics committee.

Consent for publication: Not applicable. No personally identifiable information is included in this manuscript.

Competing interests: The authors declare that they have no competing interests

Clinical trial number: Not applicable.

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Figures

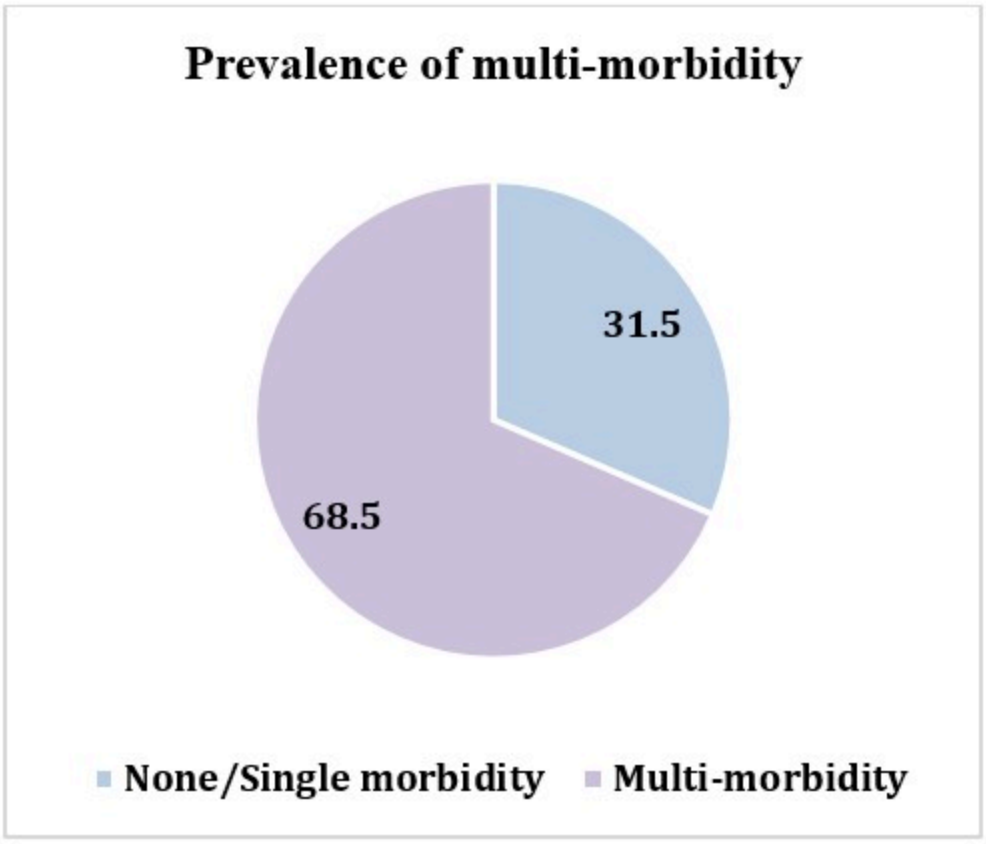


Figure 1

Prevalence of multi-morbidity