

PREVALENCE AND PATTERNS OF MULTIMORBIDITY AMONG OLDER ADULTS IN RURAL AREA OF RAJASTHAN

Community Medicine

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ABSTRACT

Background: Health at older ages is a key public health challenge especially among the developing countries. Older adults are at greater risk of vulnerability due to their physical and functional health risks. With rapidly rising ageing population and increasing burden of non-communicable diseases older adults in India are at a greater risk for multimorbidities. Therefore, to understand this multimorbidity transition and its determinants we used a sample of older Indian adults to examine multimorbidity and its associated risk factors among the older-adults aged 45 and above. **Methods:** Using the sample of 196 older adults, this study employed the chi-square test to study the association between risk factors & multimorbidity. Multimorbidity was computed based on the assumption of older-adults having two or more than three disease risks. **Results:** Our results confirm the emerging diseases burden among the older adults in Rajasthan. One of the significant findings of the study was the contrasting prevalence of multimorbidity among older adults 46.42%. Similarly females were more likely to have more prevalence of multimorbidity 29.59% as compared to men 16.83% among the older adults in rural area of Rajasthan. **Conclusion:** Our results confirm an immediate need for proper policy measures and health system strengthening to ensure the better health of older adults in Rajasthan.

KEYWORDS

Multimorbidity, Older adults, Diseases Burden

1. INTRODUCTION:

India has been witnessing an unprecedented change in the demographic and social structure in recent decades. India is experiencing an epidemiological transition which witnesses a rising burden of noncommunicable diseases (NCDs).^{1,3} NCDs are rapidly increasing in India mainly because of lifestyle changes.¹

"Multimorbidity" or the coexistence of two or more chronic conditions in the same individual has a specific impact on safety issues in primary care.

Globally, the lifespan of the individuals is increasing rapidly. This rise in the average age lifespan and a fall in the death rate both contribute to an increase in the number aging population resulting in people suffering from several comorbid conditions, which is referred to as "multimorbidity." Multimorbidity, in a nutshell, is characterized as the coexistence of two or more chronic illnesses that have become prominent in a widespread manner.⁴ A systematic review stretching across low-, middle-, and high-income countries found that the prevalence of multimorbidity increases with age.⁵ Different patterns of multimorbidity can recognize the common risk factors, pathogenesis, and drug interactions among chronic diseases.^{6,7}

It is now widely acknowledged that multimorbidity is a significant public health problem on a global scale, and that it is related with a greater number of negative health outcomes, such as disability, mortality, poor quality of life, hospitalizations, and the subsequent use of medical resources and finances in WORLD.⁸

The overall global prevalence of multimorbidity was 37.20%. South America (45.7%) had the highest prevalence of multimorbidity, followed by North America (43.1%), Europe (39.2%), and Asia (35%). The subgroup study highlights that multimorbidity is more prevalent in females (39.4%) than males (32.8%).⁹

The main purpose of this study was to determine the prevalence and pattern of multimorbidity in terms of distribution by demographics and socioeconomic status among the elderly people in rural area of Rajasthan.

With this background, the present study was undertaken to Assess the Prevalence, Pattern of multimorbidity in geriatric population in rural area of Rajasthan with the following objectives

1. To study the prevalence of multimorbidity among older adult population.
2. To determine the sociodemographic profile for geriatric population.

3. To assess the smoking, alcohol consumption among them.

2. MATERIALS AND METHODS

Study design

The study followed a facility (rural health training centre of AIIMS, Udaipur) based cross-sectional analytical study.

Study setting

The study was conducted in RHTC of community medicine department at AIIMS Udaipur from January 2024 to March 2024. The available studies on the prevalence of non-communicable diseases (NCD) indicate a high prevalence of comorbidities among individuals with diabetes in the district.

Study population

Older adults (> 45 to > 75 years) who were seeking care from the selected RHTC of Community Medicine were approached to be included in the study. The participants were residents of the district at least for the last twelve months. Those who did not give informed consent or were physically or mentally unfit to answer the questions and/or undergo clinical measurements or were pregnant/lactating mothers were excluded.

Sample size

According to a study done by kshatri JS et al in (2020)¹⁰ it was found that 48.8% of adult population were suffering from multimorbidity. The sample size was calculated as 196 using the Daniel's formula¹¹:

$$n = \frac{Z_{1-\alpha/2}^2 p(1-p)}{e^2}$$

Where, Z is 1.96 at 95% confidence level, Margin of Error (E) is 6% (0.06), Prevalence (P) is 48.8%, $q = 1 - p = 0.512$. A simple random sample techniques was used for the selection of samples.

Data collection

Data collection was done in the Rural Health Training Center. We used a self-administered semi-structured questionnaire was predesigned and pretested Questionnaire to collect data regarding multimorbidity, which was prepared in English and Hindi for data collection. Printed copies of the survey were placed in front of the participants for reference.

The questionnaire had three sections: Section A: Consisted of questions related to sociodemographic characteristics Section B: Consisted of questions related to acute illness Section C: Comprised of questions on chronic disease and health seeking. Education was

measured by capturing the highest level of formal education, and this variable was ordered into no formal schooling, primary education (Class I – Class VII), secondary education (Class VIII – Class X) and higher secondary or above. All efforts were made to keep the questions simple and unambiguous according to the objectives of the study. All data will be collected, coded and entered into a secure database by using MS excel. Data were analyzed using SPSS version 27. Appropriate tables were prepared and inferences were drawn using Chi-square test.

Data analysis:

Qualitative data were tested for normality and accordingly will be expressed as mean $\pm$ standard deviation for normally distributed data. Categorical variables were presented in the form of rate, ratio, frequency (percentage). At the end of the study, all the data were compiled systematically and will be analyzed using chi-square test. Statistical packages of social sciences (IBM software, version 27) were used to compare the continuous variables between the two groups. $P < 0.05$ will be considered as statistically significant.

Operational definitions

Multimorbidity: The coexistence of two or more chronic conditions, from the listing of the following 9 conditions (hypertension, diabetes mellitus, depression, anxiety, chronic heart failure, cataract and cancer) in the same individual.

Hypertension: As per Joint National Committee-7 guidelines.¹²

Diabetes mellitus: A random capillary blood glucose value above 140mg/dl.¹³⁻¹⁴ **Depression:** PHQ-9 score of 10 or above.¹⁶ **Anxiety:** GAD-7 score of 10 or above.¹⁵

3. RESULTS

3.1. Distribution of respondents based on various socio demographic background

Overall, 196 participants completed the interview, out of which 112 (57.14%) were women. No participants had missing data. The majority of the respondents were 46–60 years (33.67%), and about 62.24% were married, 78.08% lived in rural areas, 52.55% belonged to the Hindu religion and 27.55% Muslims respectively (Table 1). Additionally, 34.69% and 37.24% of respondents have no formal education and primary education respectively. More than half of the respondents were in not currently working status. Smoking, Alcohol and tobacco use were reported.

Table 1 Characteristics of study population based on various socio demographic background

Variable	Number (196)	Percentage (%)
Age		
> 45 years	50	25.51
46-60	66	33.67
61-75	56	28.57
>75 years	24	12.24
Sex		
Male	84	42.85
Female	112	57.14
Religion		
Hindu	103	52.55
Muslim	54	27.55
Other	39	19.89
Current Material status		
Married	122	62.24
Currently married	2	1.02
Widow / separated / divorced	53	27.04
Other	19	9.69
Education status		
No formal education	68	34.69
Primary education (Class 1st-7th)	73	37.24
Secondary (Class 8th -10th)	38	19.38
Higher secondary or above	17	8.67
Currently working		
Yes	89	45.40
No	107	54.59

Smoking, tobacco and alcohol use		
Smoking		
Yes	69	35.20
No	127	64.79
Alcohol Consumption		
Yes	93	47.44
No	103	52.55
Any form of tobacco		
Yes	81	41.32
No	115	58.67

3.2 Prevalence and patterns of multimorbidity

Prevalence of multimorbidity. Among the study population, diabetes was the most prevalent morbidity (46.42%) followed by hypertension (34.18%) (Table 2).

Table 2 Prevalence of individual chronic health conditions

Conditions	Total (N= 196)	Men	Women
Hypertension	67 (34.18%)	22 (32.83%)	45 (67.16%)
Diabetes	91 (46.42%)	33 (36.26%)	58 (63.73%)
Stroke	28 (14.28%)	2 (7.14%)	0
Cataract	64 (32.65%)	33 (51.56%)	31 (48.43%)
Cancer	13 (6.63%)	4 (30.76%)	9 (69.23%)
Depression	34 (17.34%)	10 (29.41%)	24 (70.58%)
Anxiety	15 (7.65%)	4 (26.66%)	11 (73.33%)
Heart Failure	22 (11.22%)	10 (45.45%)	12 (54.54%)
Obesity	14 (7.14%)	5 (35.71%)	9 (64.28%)

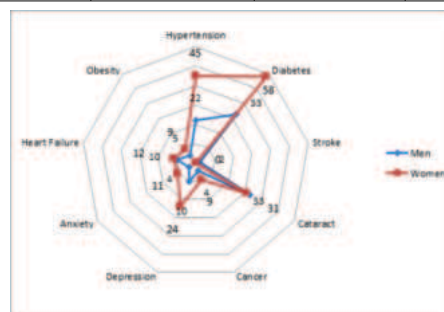


Figure 1: Web graph of chronic disease

3.3 Prevalence of multimorbidity among male & female

One condition was reported by 83 (42.34%) participants, while 64 (32.65%) presented with two and 27 (13.77%) participants reported three or more coexisting conditions. Overall, 91 participants (46.42%) reported multimorbidity (Figure 2).

Table 3 Prevalence of multimorbidity among male & female

Gender	Multimorbidity			
	Zero	One	Two	Three or more
Male	19 (22.61%)	32 (38.09%)	23 (27.38%)	10 (11.90%)
Female	13 (11.60%)	41 (36.60%)	41 (36.60%)	17 (15.17%)

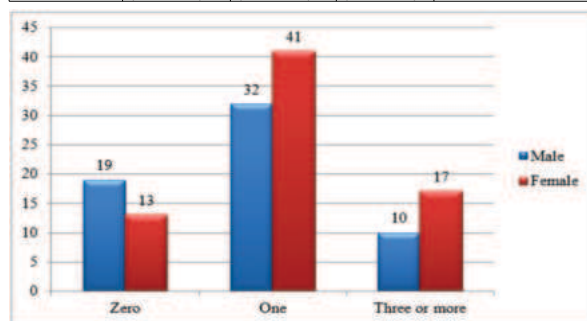


Figure 2: Multimorbidity prevalence among male & female

3.4 Prevalence of multimorbidity based on education status

The prevalence of multimorbidity increased with age and decreased

with an increase in the educational level of the study participants (Figure 3). Age-wise, the highest prevalence of multimorbidity was in the 61-75 year age group. The prevalence of multimorbidity among women (29.59%) was relatively higher than that in men (16.83%).

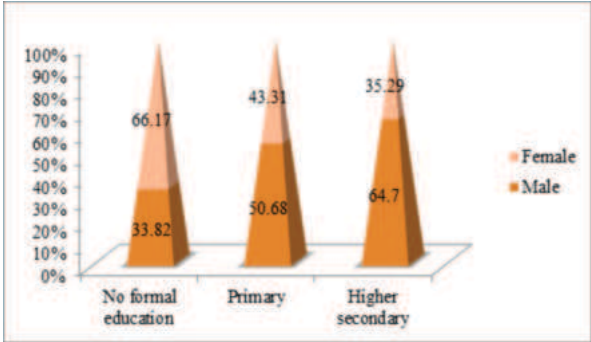


Figure 3: Prevalence of multimorbidity based on education status

3.5 Factors associated with multimorbidity among older adults
Multimorbidity was associated with the educational status, age group, and obesity. The propensity for multimorbidity was higher in individuals in the higher age group, for 61–70 years ($\chi^2 = 3.0154$, $p=0.00$) as compared to other age groups. While controlling the cofounders in the model, it was found that the gender has no association with multimorbidity. In terms of religion no significant association was observed with multimorbidity.

The respondents with primary education were more likely to have multimorbidity than with the secondary or higher secondary education status. The data reveals statistical significant association between education status and multimorbidity ($\chi^2 = 3.9874$, $p= 0.04$).

Table 3 Factors associated with multimorbidity among older adults

Variable	Participants (n = 196)	Multimorbidity		V	P- value	Odds ratio
		Present (n = 91)	Absent (n = 105)			
Age (years)						
> 45 years	50 (25.51%)	12 (24%)	38 (76%)	13.57 5	0.000	0.1296 ± 0.5536
46-60	66 (33.67%)	29 (43.93%)	37 (56%)			
61-75	56 (28.57%)	33 (58.92%)	23 (41.07%)			
>75 years	24 (14.28%)	17 (70.83%)	7 (29.16%)			
Sex						
Men	84 (42.85%)	33 (39.28%)	51 (60.71%)	3.015 4	0.08	0.3394 ±1.069 2
Women	112 (57.14%)	58 (51.78%)	54 (48.21%)			
Religion						
Hindu	103 (52.55%)	56 (54.36%)	47 (45.63%)	2.532	0.112	0.8976 ±2.77 68
Muslim	54 (27.55%)	23 (42.59%)	31 (57.40%)			
Other	39 (19.89%)	17 (43.58%)	22 (56.41%)			
Current Marital status						
Married	122 (62.24%)	73 (59.83%)	49 (40.16%)	2.170	0.140	0.3404 ±1.16 71
Currently married	2 (1.02%)	2 (100%)	-			
Widowed	53 (27.04%)	42 (79.24%)	11 (20.75%)			
Other	19 (9.69%)	8 (42.10%)	11 (57.89%)			
Education status						

No formal education	68 (34.69%)	41 (60.29%)	27 (39.70%)	3.987 4	0.04	1.0082 ±3.33 13
Primary education (Class 1st-7th)	73 (37.24%)	39 (53.42%)	34 (46.57%)			
Secondary (Class 8th - 10th)	38 (19.38%)	14 (36.84%)	24 (63.15%)			
Higher secondary or above	17 (8.67%)	5 (29.41%)	12 (70.58%)			

4. DISCUSSION

We demonstrate that multimorbidity is almost a norm and prevalent in two in five participants. The inverse relationship between educational status and multimorbidity, with the burden largely concentrated among the low education group, clearly highlights the reversal of social gradient in the prevalence of chronic disease conditions. Multimorbidity is a serious public health problem in the primary care settings in Rajasthan as it impairs the quality of life. The high treatment burden associated with multimorbidity could be partially attributable to the number of chronic conditions and partially to the lack of integrated care for the management of multimorbidity in the primary care system.

The present study explored the pattern and combination of chronic diseases and the factors associated with multimorbidity among women in Rajasthan.

The present study explored the pattern and combination of chronic diseases and the factors associated with multimorbidity among older adult in Rajasthan. In this study, the prevalence rate of multimorbidity is 46.42%, which is similar to study done in India (47.69%).

Prevalence and patterns of multimorbidity
Lack of uniformity in the methods of data collection, study instruments, and the number of conditions covered across different studies limits the opportunity for direct comparison of the prevalence estimates with other studies. In a relatively comparable primary care-based study done in Odisha state, the prevalence of multimorbidity was around 28%.¹⁷ The substantially higher prevalence of multimorbidity in our study is probably due to the advanced epidemiological transition state of Rajasthan as compared to Odisha. It is now understood that areas in advanced epidemiological transition have a higher frequency of multimorbidity.¹⁸

Multimorbidity status assessment with education status of the participants
In recent studies from lower-middle-income countries, increasing levels of deprivation are consistently associated with a higher risk of multimorbidity.¹⁹ In our study, the propensity for multimorbidity was lower in the well-educated group as compared to individuals with poor educational attainment. Education is often considered a good proxy measure of a family's socioeconomic status.²⁰ Our findings highlight the importance of the social determinants of multimorbidity and call for integrated management programmes that incorporate strategies to address social determinants along with the medical needs. The vicious cycle of poor socio-economic status and high burden of NCDs is well established and it may further propel the burden of multimorbidity in the disadvantaged social groups.

Multimorbidity prevalence assessment in subgroups and their implications
The age group of 61-70 years reported the highest prevalence of multimorbidity, which matched with findings from other studies.²¹ Even though five out of ten participants in the older age groups >75 years reported multimorbidity, it was also prevalent in two of five in the age groups 46–60 years. Further, the progression of multimorbidity with more conditions later in life may adversely impact the health and productivity of these individuals. However, it is not clear how multimorbidity progresses in individuals and we need to generate data from well-designed cohort studies or registries of patients with multimorbidity on a regular follow-up to understand the progression. Integrated management with a focus on prevention may help to reduce the burden of multimorbidity in primary care settings. Novel models of prevention and control of multimorbidity need to be developed and evaluated before the wider adoption of these strategies in primary care settings. From the policy perspective, the identification of groups

vulnerable to multimorbidity will help in the selection of preventive public health interventions to reduce the multimorbidity burden in high-risk groups. Alcohol consumption and smoking increased the risk of multimorbidity, especially in men.

Our results showed the significant association between multimorbidity and its associated demographic risk factors like age and education. The results corroborate with the earlier findings where a significant association was found between multimorbidity and sociodemographic outcomes.²²

5. CONCLUSION

This study provides evidence of emerging diseases burden among older adults in India. The study highlights the need for better interventions for older adults to avert the health crisis in later years of life. As the findings of this research specifically indicate the growing burden of multimorbidity, there is an immediate need for proper policy measures and health system strengthening to ensure health ageing in India. Moreover, emphasis should be given to workforce training and quality improvement strategies that can ensure the better physical and functional health of older adults. There is also an immediate need for improving the financial incentives for older adults at older ages, given the challenges they face in terms of health and social security provisions in India.

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