Original article

Prevalence and pattern of multimorbidity among adults in a primary care rural setting

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ABSTRACT

Background: Multimorbidity has substantial impact on the health of the individual in terms of safety, quality of life and functional ability, but little is known about it from rural areas in developing countries. Hence the present study attempted to determine the prevalence and gender difference in multimorbidity from a rural area.

Methods: A register based cross sectional study was done by retrieving data from the family health register of the rural health centre. Data on age, gender and all the morbidities, were collected. The most prevalent morbidities were presented as frequency and percentages, prevalence of multimorbidity were presented as dyads and triads. Multiple Logistic regression was done to find the age adjusted risk of gender on multimorbidity.

Results: The prevalence of multimorbidity was 16.2% (13.05–19.35). The most prevalent morbidities were hypertension, diabetes, dyslipidaemia, visual impairment and thyroid in both males and females and most common dyad was hypertension and diabetes.

Conclusion: In the context of lack of studies from this area, the findings of the study may help the health care providers to plan interventions. Further research has to be done to identify the risk factors of multimorbidity.

1. Introduction

Co-occurrence of two or more chronic conditions, commonly referred to as ‘multimorbidity’ is increasingly being recognised among individuals globally¹ improvement in life expectancy and living conditions. With population ageing, multimorbidity has become progressively more common^{2,3} in developed⁴ as well as developing countries.^{2,5} The higher burden has led to greater concern over the related decline in quality of life and functional ability, high mortality and medical expenditure.⁶

Furthermore, morbidity and mortality rates seem to be higher in older adults with lower education and socioeconomic status.^{7,8}

A systematic review on multimorbidity in primary care demonstrated a high prevalence ranging from 30% in all adults to 60% among those aged 65–74 years, however majority were western studies.⁹ Recently high levels of multimorbidity has been shown in low- and middle income countries as well.¹⁰ A multistate study including rural and urban areas reported a prevalence of 37.3% among adults over 60 years of age. Initially thought to be a geriatric phenomenon, recent studies have revealed that younger adults also exhibit a considerable prevalence of multimorbidity.^{11,12}

People with multimorbidity are more prone for safety issues Poor health, advanced age, susceptible to infections cognitive impairment, demanding self-management regimens and competing priorities, inadequate health literacy; polypharmacy, complex treatment regimens, greater chance of failures in care delivery requiring frequent and complex interactions complex patient needs which need clear communication and patient-centred care.^{13–15}

Awareness about primary care and self-care are essential for the overall health of these patients. It is a challenge to health delivery system, health professionals and managers. Identification and effective management are required to control this rising challenge. In this context, the present study aimed at determining the prevalence and pattern of multimorbidity and associated sociodemographic factors in the adult population in a rural area in South Kerala. The findings may provide primary care clinicians and policy makers with better epidemiological understanding of multimorbidity for planning appropriate care.

2. Methods

A register based cross sectional study was done in the field practice area of rural health training centre(RHTC) of Pushpagiri Institute of

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Table 1
Basic characteristics of the study sample (N = 525).

Characteristics of the study population	No. (%)
Age in years	
18–29	106(20.0)
30–39	96 (18.3)
40–49	90 (17.1)
50–59	86 (16.4)
60–69	86(16.4)
> 70	62(11.8)
Gender	
Male	246(46.9)
Female	279(53.1)
Education	
Illiterate	13(02.5)
Primary & middle school	87(16.6)
High school & higher secondary	272(51.8)
Graduate & above	153(29.1)
Occupation	
Unemployed	242(46.1)
Unskilled, semi-skilled, skilled	255(48.3)
Semi-professional, Professional	28(05.3)

Table 2
Gender specific morbidity pattern in the study sample.

Morbidity	Males: No (%)	Females: No (%)	p value ^a
0	152(61.8)	177(63.4)	0.33
1	58(23.6)	53(19)	
2	29(11.8)	32(11.5)	
3	6(2.4)	13(4.7)	
4	1(1.1)	4(1.4)	
Total	246(100)	279(100)	

^a Chi square test.

Medical Sciences and Research Centre, Kerala for a period of two months. The ward is mostly water logged area with paddy fields, with independent houses. The other health facilities available are government primary and community health centres and a few private clinics with the nearest referral centre being 15 km away. The family register maintained at the RHTC has information on socio-demographic characteristics and self-reported morbidities of all the residents in the field practice area updated in 2017. Data was extracted from the registers after Institutional ethics committee approval was obtained. For the purpose of this study, one ward was selected by simple random sampling, data on twelve disease conditions included in the assessment of multimorbidity, and updated data on age, gender, occupation and

education were extracted. Multimorbidity was defined as having 2 or more chronic conditions. The diseases considered were diabetes, hypertension, dyslipidaemia, cardiovascular diseases, stroke, cancer, dementia, psychiatric disorders, cataract, renal diseases, arthritis, peptic ulcer. The most common conditions, and frequency of dyads, triads and combinations of diseases were calculated. The data are presented as mean (standard deviation) and percentages. Prevalence of multimorbidity was calculated across socio-demographic variables. Linear by linear trend test was done for multimorbidity across the age groups. A *t*-test was done to find the difference in number of morbidities in men and women. Binary logistic regression was done to identify the socio-demographic factors associated with multimorbidity. Statistical analysis was done using SPSS version 25. A confidence interval of 95% was calculated and level of significance was set at $p < 0.05$.

3. Results

The study sample consisted of 525 adults whose basic socio-demographic characteristics are depicted in Table 1.

The mean (SD) age of the study sample was 47.36(18.35) years, and 46.9% were males. Mean (SD) age of males was 47.38(17.42) and females 47.35(19.16) years. Majority(70%) had an education above high school while only 5.3% were engaged in semi-professional and professional jobs.

Multimorbidity was reported in 16.2% (13.05–19.35) of the study sample and 37.3% had at least one of the chronic conditions. There was significant difference ($p = 0.02$) in the mean number of diseases in men (2.11 ± 0.46) and women (2.24 ± 0.72).

Table 2 shows the prevalence of dyads and triads in men and women. There was no significant difference in the pattern of morbidity between males and females.

As shown in Fig. 1, the most common morbidities were similar in men and women viz. diabetes ($p = 0.41$), hypertension ($p = 0.08$), dyslipidaemia ($p = 0.36$). The other common morbidities were visual impairment, thyroid related, asthma and varicose veins which also did not show significant gender difference.

Table 3 describes the association between multimorbidity and sociodemographic variables. The prevalence of multimorbidity ranged from 1.2% in those aged 18–29 years to 27.1% in those above 70 years. The prevalence of multimorbidity among older adults (above 60 years) was 61.2%. The odds of having multimorbidity increased with age and this trend was significant ($p < 0.001$). Out of those having multimorbidity, 57.6% were females and 55.3% were unemployed. Education and occupation were not found to be associated with multimorbidity. Age above 40 years was found to be a risk factor even after adjusting for gender, education and occupation.

Fig. 2 describes the proportion of adult males and females with multimorbidity in the different age groups.

Fig. 1. Gender wise comparison of common diseases in the study sample.

Table 3
Prevalence of Multimorbidity according to sociodemographic characteristics: Results from univariate and multivariate analyses.

Variable	Multimorbidity		Crude Odds ratio(95% CI)	Adjusted Odds ratio(95% CI) ^b	P value
	No	Yes			
	n = 440	(n = 85)			
	n(%)	n(%)			
Age in years					
18–29	104(99.0)	1(1.2)	Reference	Reference	
30–39	93(96.9)	3(3.5)	3.36(0.34–32.81)	2.81 (27–28.99)	0.38
40–49	79(87.8)	11(12.9)	14.48(1.83–114.52)	11.97(1.43–99.22)	< 0.05
50–59	68(79.1)	18(21.2)	27.53(3.59–211.03)	19.42(2.39–157.79)	< 0.01
60–69	57(66.3)	29(34.1)	52.91(7.02–398.66)	37.99(4.68–308.42)	< 0.01
> 70	39(62.9)	23(37.1)	61.33(8.01–469.65)	42.56(5.15–352.42)	< 0.01
Gender					
Male	210(85.4)	36(42.4)	Reference	Reference	
Female	230(82.4)	49(57.6)	0.81(0.50–1.29)	1.23(0.62–2.44)	0.55
Education					
Illiterate	9(69.2)	4(4.7)	Reference	Reference	
Primary & middle school	63(72.4)	24(28.2)	0.86(0.24–3.05)	0.91(0.24–3.47)	0.88
High school & higher secondary	219(80.5)	53(62.4)	0.56(0.16–1.84)	1.20(0.32–4.51)	0.78
Graduate & above	149(97.4)	4(4.7)	0.06(0.01–0.28)	0.18(0.03–1.12)	0.06
Occupation					
Unemployed	195(80.6)	47(55.3)	Reference	Reference	
Unskilled, skilled, semiskilled	172(57.6)	36(42.4)	0.68(0.42–1.09)	0.90(0.44–1.85)	0.77
Semi-professional/Professional	73(88)	2(2.4)	0.32(0.07–1.39)	4.23(.56–32.19)	0.16

Fig. 2. Prevalence of multimorbidity in the study sample, by age and sex.

In males, prevalence of multimorbidity rises at a younger age, increasing rapidly across the middle age and then decreasing. In females, prevalence of multimorbidity gradually increases over the years and peaks at around 60 years to a higher level than that of males with similar decline in the next decade. The trend across the age groups was highly significant ($p < 0.0001$) in both genders.

4. Discussion

The cross-sectional register based study investigated the prevalence and pattern of multimorbidity among 525 adults in a rural area of Kerala. The prevalence of multimorbidity was found to be 16.2% among adults; 61.2% among those above 60 years. A systematic review from South Asia reported prevalence of multimorbidity from 4.5% to

83%.¹⁶ The prevalence was 57.2% (95% CI 56.6%–58.7%) in Brazil¹⁷; 23.2% (23.08–23.21) in Scotland¹⁸; 35.7% (34.8%–36.7%) in Indonesia¹⁹; 28.3% in a northern state in India.²⁰ The lower prevalence in the study may be because of the underutilization of health services, or socio cultural difference in agricultural community. A recent study from Odisha reported 44.4% multimorbidity in those above 70 yrs when compared to 37.1% in the current study, however the former listed 22 health conditions the latter twelve.²⁰ The mean number of diseases in men and women (men 2.11 ± 0.46 ; female 2.24 ± 0.72 ; $p = 0.021$) was higher when compared to studies from other parts of the world, 1.2 ± 1.5 per person in Brazil, 1.27 ± 0.01 in Indonesia.

The study confirms the higher multimorbidity in the older age groups. There was significant association between age and multimorbidity, odds of multimorbidity increased as the age increased. The

risk doubled in a decade from 40 years onwards. The higher likelihood of multimorbidity among older adults was congruent with findings from other states of India and the Western world.¹⁸ A study from Indonesia among adults above 40 years reported 35.7% similar to the findings in our study (33.3%).¹⁹

The most common diseases reported were diabetes, hypertension and dyslipidaemia which was very similar to those reported from other parts of India as well as developed countries.^{14,16,19,21}

Multimorbidity did not show any difference in the two genders in the present study whereas other studies in Asian countries have reported significantly higher prevalence among women (41.5% vs 29.5%; $p < 0.001$)^{19,22} and have also shown higher risk of multiple morbidities among women.¹⁹

The clinical guidelines for treating as single diseases which is most widely practiced, may not be appropriate in individuals with multimorbidity. The study underscores the need for formulating protocols considering the complexity of presentation of multimorbidity, comprehensive screening, and management. The cross sectional design of the study limits the investigation of temporal association. The accuracy of self-reported diagnosis may be leading to under or over reporting, and the information from a single ward may not be generalisable.

5. Conclusion

In the present study prevalence of multimorbidity was 16.2% with no gender difference and more than a third had at least one chronic disease. Diabetes, hypertension and dyslipidaemia were the most prevalent conditions in both genders. Further studies are required to look at the incidence and outcomes to suitably modify health care delivery system, to accommodate for the complexity of multimorbidity.

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Declaration of competing interest

Nil.

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