



Prevalence and correlates of multimorbidity among adults in border areas of the Central Highland Region of Vietnam, 2017

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Abstract

Introduction: The objectives of this study are to estimate the prevalence of multimorbidity (MM) among adults in the Central Highland Region (a poor region) of Vietnam in 2017 and to identify the sociodemographic correlates of these conditions.

Methods: We used data from a cross-sectional study conducted in 2018 on health status among people in four provinces in the Central Highlands Region (Tay Nguyen) of Vietnam. A sample of 1680 adults (aged 15 years and older) were randomly selected for this study. Respondents were asked whether they had been told by a health worker that they had cancer, heart and circulatory conditions, chronic joint problems, chronic pulmonary diseases, chronic kidney problems, chronic digestive problems, psychological illness, diabetes, and/or other chronic conditions.

Results: The prevalence of MM among the study participants was 16.4% (95% confidence interval (CI): 14.6%–18.2%). By looking at the 95% CIs, the differences in MM prevalence between the groups classified by gender, age, education, and occupation were not statistically significant. Only the difference in MM prevalence between farmers and government staff was statistically significant. Multivariate logistic analyses show education and occupations were shown to be significant correlates of MM.

Conclusion: MMs were quite common among the adult populations in the study area, especially among people with lower socioeconomic status. Given the evidence, actions to reduce levels of MM in the setting are clearly urgent. The interventions should address all people in society, with focus on disadvantaged groups, like those with lower education and farmers.

Keywords

Multimorbidity, socioeconomic, Central Highland Region, Vietnam

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Background

The World Health Organization defines chronic diseases as those “are not passed from person to person. They are of long duration and generally slow progression.”¹ Chronic conditions are now the leading cause of mortality worldwide, attributing to 38 million deaths per year.^{2,3} These conditions reduce quality of life for those who are affected

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as well as cause substantial financial burden on the society.^{2,4,5} Multimorbidity (MM) is defined by the US Department of Health and Human Services as “the presence of two or more chronic conditions.”⁶ In recent years, the number of people who have MM has increased,⁷ constituting a growing health care and financial burden on the health system.⁸ People who have MM normally need increased volume of care from clinicians, public health workers, and social programs to improve their overall quality of life.⁹

Vietnam has been undergoing a rapid epidemiological transition, characterized by a rising burden of disease from chronic conditions. Chronic conditions have been the leading cause of death in the country (the number of deaths due to chronic conditions rose from 427,000 in 2012 to 521,000 in 2015).¹⁰ These conditions also impose a heavy economic burden on the families of affected people in the country.¹¹ Vietnam has started experiencing issues with population aging, which also leads to an increase in chronic condition problems.¹² The rising burden of chronic conditions, especially combinations of chronic conditions, in Vietnam has led to higher demands and needs for health care and other social services.^{13,14}

In Vietnam, data on prevalence of MM and related factors are largely lacking, especially in poorer areas of the country. The objectives of this study are to estimate the prevalence of MM among adults living in border areas of the Central Highland Region (a poor region) of Vietnam in 2017 and to identify the sociodemographic correlates of these conditions. Assessing prevalence as well as socioeconomic correlates of MM will help Vietnam in developing prevention and intervention strategies.

Methods

Study setting

We used data from a cross-sectional study conducted in 2018 on health status among people in four provinces in the Central Highlands Region (Tay Nguyen) of Vietnam.¹⁵ The region is considered a remote area on a plateau bordering Laos and Cambodia, with a total population of more than 5.7 million living in five provinces covering an area of 54,508 km². In 2017, the region had a total population of more than 5.7 million. The monthly income per capita was approximately 2.36 million Vietnamese Dong (US\$105).¹⁶ Health-care services were provided at government hospitals, commune health centers, regional polyclinics, private health facilities, and traditional medical practitioners.¹⁷ As the original study focused on health status among people living in border areas, four (of five) provinces with international borders (Kon Tum, Gia Lai, Dak Lak, and Dak Nong) were included. One landlocked province (Lam Dong province) was excluded.

Sample size, sampling, and data collection

The sample size of the original study was calculated to estimate the proportion of people with any type of illness/disease during the last 4 weeks prior to the date of survey. With a level of significant of 0.05, an anticipated proportion of 0.295, a relative precision of 0.15, and a design effect of 2, the sample for each study province was expected to be 410. The sample size for four provinces was expected to be 1640. Accounting for 5% of nonresponse rate, the total sample size for four provinces was expected to be 1722.

In the original study, all the 28 border communes from the four selected provinces were selected; 1722 individuals aged 15 years and older were then randomly selected from the list of all eligible participants living in the 28 chosen communes. The list of all eligible participants were provided by local authorities (based on population registers held at commune).

Data were collected through face-to-face household interviews conducted by 12 trained field workers. The data collectors took part in a 2-day field works training. Data were collected during March to September 2017. Data quality was controlled in the field by supervisors as well as by the investigators of this study. Reinterviews were conducted on 10% of the study sample. All filled questionnaires were reviewed for their completeness, correctness, and consistencies.

Survey questionnaire and variables

In the original, a structured questionnaire was used to collect information on self-reported health problems (both acute and chronic conditions), health service utilization, as well as sociodemographic variables of the study subjects. In this article, we only analyzed that data on self-reported conditions.

The dependent variable was self-reported conditions. Respondents were asked whether they had been told by a health worker that they had cancer, heart and circulatory conditions, chronic joint problems, chronic pulmonary diseases, chronic kidney problems, chronic digestive problems, psychological illness, diabetes, and/or other chronic conditions (such as eye, nose, sore and throat, teeth problems, etc.). The total number of chronic diseases was calculated by counting the number of positive responses to these questions. MM was defined as the presence of two or more chronic conditions.⁶

The independent variables were gender, age group, and socioeconomic status of the study subjects based on educational level and occupational status. Educational level was categorized into three groups: 1: secondary school (for children aged 10–14 with school level from seventh to the ninth class); 2: high school for children aged 15–17 with school level from the tenth to twelfth class); and 3: university/college. Occupational status (main occupation of the

Table 1. Sociodemographic characteristics of the study sample.

Variables	Characteristics	Value
Overall, <i>n</i> (%)	<i>N</i>	1680 (100)
Gender, <i>n</i> (%)	Men	842 (50.1)
	Women	838 (49.9)
Age, median (IQR)		38.0 (30.5–43.0)
Age group, <i>n</i> (%)	15–24	191 (11.4)
	25–34	404 (24.0)
	35–44	720 (42.9)
	45–54	197 (11.7)
	55–64	101 (6.0)
	65+	67 (4.0)
Education, <i>n</i> (%)	Secondary school or less	950 (56.5)
	High school	271 (16.1)
	University	459 (27.3)
Occupation, <i>n</i> (%)	Farmer	864 (51.4)
	Government staff	323 (19.2)
	Business	244 (14.5)
	Other	249 (14.8)

IQR: interquartile range.

study subjects) was grouped as follows: 1: farmer; 2: government staff; 3: business; and 4: other jobs (temporary workers, housekeepers, handicraft makers, jobless, etc.).

Statistical method

Both descriptive and analytical statistics were carried out using Stata 14 software (Stata Corporation, Texas, USA).

Proportions of variables of interest, together with corresponding 95% confidence interval (CI), were calculated. Multivariate logistic regression modeling was performed to examine the probability of having MM in relation to risk factors and sociodemographic status. A significance level of $p < 0.05$ was used. Data with missing values (accounted for less than 3%) were excluded from our analyses.

Ethical considerations

The protocol of this study was approved by the Ethical Committee in Biomedical Research, Hanoi University of Public Health. All human subjects in the study were asked for their consent before collection of data, and all had complete rights to withdraw from the study at any time without any threats or disadvantages.

Results

Of the 1722 people aged 15 years and older selected, 1680 responded to the study (response rate of 97.3%). The sociodemographic characteristics of the final study sample are described in Table 1. The numbers of men and women included in the study were quite similar. The median age of the study participants was 38 years. The largest age group was age 35–44 years (42.9%). Most of the study

participants had received only secondary school education or less (56.5%). The main occupation of the study subjects was farming (51.4%).

Table 2 presents prevalence (with 95% CI) of the main chronic conditions among the study population. Heart and circulatory conditions, digestive chronic problems, and chronic joint problems were the three most prevalent chronic conditions reported by the study respondents. The proportions of people with one, two, three, and four chronic conditions were 8.2%, 10.3%, 4.5%, and 1.6%, respectively.

As shown in Table 3, the overall prevalence of MM among the study participants was 16.4% (95% CI: 14.6–18.2%). The prevalence of MM was higher among men (17.2%) and people aged 65 years and older (17.9%). The prevalence of MM was lower among participants with high school education (14.8%) and the government staffs (11.5%). However, by looking at the 95% CIs, the differences in MM prevalence between the groups classified by gender, age, education, and occupation were not statistically significant. Only the difference in MM prevalence between farmers (18.1%, 95% CI: 15.5–20.8%) and government staffs (11.5%, 95% CI: 8.2–15.4%) was statistically significant.

Multivariate logistic analyses of the effects of sociodemographic status on MM are shown in Table 4. After controlling for other variables in the model (including gender, age, education, and occupation), only education and occupations were shown to be significant correlates of MM. Participants with a high school education had significantly lower odds of having MM compared to those with secondary school education (odds ratio (OR) = 0.8, 95% CI: 0.59–0.98). Government staff had significantly lower odds of having MM as compared to farmer (OR = 0.56, 95% CI: 0.38–0.83).

Discussion

To the best of our knowledge, this is one among a few studies on MM in Vietnam, and the first one on MM among people living in the Central Highlands Region. The evidence on prevalence as well as socioeconomic correlates of MM generated from this article could be useful for health planning and management process in the Central Highlands Region particularly and in Vietnam generally.

We found that 16.4% of the study participants had MM. This is lower than a global MM prevalence of about one-third in 2019.¹⁸ This was higher than the figure of 10% revealed from our previous study in rural Vietnamese adults in 2008.¹⁹ Therefore, our finding highlights the challenge of effectively incorporating multiple suitable treatments to accommodate for a variety of diseases, making it a complex issue for both medical professionals carrying out the treatment and patients applying self-care.²⁰ However, we should note that the discrepancies in self-reported

Table 2. Prevalence of main chronic conditions among the study populations.^a

Chronic conditions	Proportion (%)	95% CI (%)
Heart and circulatory conditions	10.0	8.4–11.6
Chronic joint problems	9.0	7.6–10.7
Chronic pulmonary diseases	3.0	2.1–4.1
Chronic kidney problems	5.6	4.4–7.0
Chronic digestive problems	10.0	8.4–11.6
Psychological illness	1.3	0.8–2.1
Diabetes	3.3	2.4–4.4
Other chronic problems (such as eye, nose, sore and throat, teeth problems, etc.)	8.1	6.7–9.6

CI: confidence interval.

^aNone of the respondents reported having cancer.

prevalence of chronic diseases could be due to the differences in the MM definitions and survey methods.

In our study, we found that men had more MM than women, even though the difference was not statistically significant. This finding differs from results of a study in the United States, which found that women were more likely to have MM than men.²¹ Our study also demonstrated that older people (ages 65 years and older) had more MM compared to younger people, even though the difference was not statistically significant. This finding on age is similar to ones from other studies in both high- and low-income countries.²² In the United States, some studies estimate prevalence of MM to be around 50% for those between the ages of 45 and 65 years and 81% for those above 65 years.²³ Among adults over age 50, MM rates vary depending on the country, from 45% in China to 71% in Russia.²⁴ It is evident that older patients with MM are normally faced with higher health-care needs and subsequent higher burdens of health-care costs on both their families and health-care system.^{8,25}

We found that the prevalence of MM was significantly higher among those with lower education and those who worked as a farmer. A previous study in Vietnam pointed out that living in rural areas, having lower educational attainment, and currently not working were all independently linked with MM.²⁶ International studies also reported that MM are more often present among those with lower levels of education, among people living alone or in a home for the elderly, and among those living in deprived areas.²⁷ Socioeconomic status also plays a role in the prevalence of MM, especially among those with low income, low level of education, and unemployment.²⁸ Studies from Western and Eastern Europe as well as Central Asian countries also suggest a strong link between MM and lower socioeconomic status.¹⁹

As important as the main findings were, some methodological limitations of this study must be taken into consideration. Given the limitation of health information system

Table 3. Prevalence of MM by socioeconomic characteristics of the study participants.

Variables	Characteristics	Prevalence of MM (%)	95% CI (%)
Gender	Men	17.2	14.7–19.9
	Women	15.5	13.1–18.1
Age group	15–24	14.7	10.0–20.5
	25–34	16.8	13.3–20.8
	35–44	17.1	14.4–20.0
	45–54	15.2	10.5–21.0
	55–64	13.9	7.8–22.2
	65+	17.9	9.6–29.2
Education	Secondary or less	16.7	14.4–19.3
	High school	14.8	10.8–19.6
	University	16.6	13.3–20.3
Occupation	Farmer	18.1	15.5–20.8
	Government staff	11.5	8.2–15.4
	Business	16.4	12.0–21.6
	Other	16.9	12.4–22.1
Overall	All	16.4	14.6–18.2

MM: multimorbidity; CI: confidence interval.

in Vietnam, which does not facilitate an estimate of prevalence of disease from hospital records, we had to study the MM based on self-reported approach. Self-reported morbidity might not be completely accurate because of recall bias. The reported prevalence of chronic diseases found in this study was likely a rough estimate because only diagnoses that were recalled were counted. Secondly, due to the cross-sectional nature of the data, the causal relationship between chronic conditions and sociodemographic status and lifestyle cannot be determined. Thirdly, the number of chronic conditions considered in the study may have influenced the results. It has been shown that estimates for MM prevalence could be greatly heterogeneous depending on the number of chronic conditions included into the analysis, thus leading to findings that can vary up to threefold.²⁹ In fact, we selected the chronic diseases for our study based on the experiences from our pilot study. Further, this study was originally intended to study general health problems so that the sample size seemed not adequate for a deep analysis of MM. Specific study on MM is needed in the future.

In summary, the findings from this study, considered as the first empirical evidence from Vietnam on this topic, indicate that MM were quite common among the adult populations in the study area, especially among people with lower socioeconomic status. Given the evidence, actions to reduce levels of MM in the setting are clearly urgent. The interventions should address all people in society, with focus on disadvantaged groups, especially people with lower education and farmers. This is a preliminary study of MM in a poor setting in Vietnam. Further studies over longer periods of time and deeper analyses are required to give greater insights into the epidemiological aspects of MM.

Table 4. Multiple logistic analyses of association between having MM with sociodemographic variables.

Factor	Characteristics	OR	95% CI
Gender	Men	1	
	Women	0.89	0.69–1.16
Age (years)	15–24	1	
	25–34	1.15	0.71–1.86
	35–44	1.16	0.74–1.82
	45–54	1.02	0.58–1.78
	55–64	0.92	0.46–1.83
	65+	1.28	0.61–2.71
Education	Secondary or less	1	
	High school	0.8*	0.59–0.98
	University	1.07	0.72–1.60
Occupation	Farmer	1	
	Government staff	0.56*	0.38–0.83
	Business	0.82	0.49–1.36
	Other	0.94	0.64–1.37

MM: multimorbidity; CI: confidence interval.

Authors' note

The opinions, results, and conclusions reported in this article are those of the authors and are independent from the funding sources for our study.

Author contributions

Nguyen Van Ba and Hoang Van Minh have equally contributed to this article.


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