

## Introduction

- Multimorbidity, known as co-occurrence of 2 or more chronic conditions, associated with reduced quality of life, impaired functional status, and increased disease burden, has emerged as one of the greatest challenges facing health services<sup>[1-3]</sup>.
- Numerous studies have indicated that older individuals and those with diabetes are at a higher risk of multimorbidity than other groups<sup>[4-6]</sup>.
- In China, only a few studies have focused on multimorbidity patterns in patients with diabetes, and exploring differences in treatment costs for different multimorbidity patterns is even rarer.<sup>[7-9]</sup>

## Objective

To evaluate the multimorbidity patterns of middle-aged and older Chinese patients with diabetes and assess treatment costs across different multimorbidity patterns.

## Methods

- This study's data were derived from the cross-sectional data of 2526 patients with diabetes aged 45 or over in the 2018 wave of China Health and Retirement Longitudinal Study (CHARLS) survey..
- Diabetes and multimorbidity patterns were determined based on 14 self-reported chronic disease diagnoses, informed by physicians.
- Treatment costs were primarily based on respondents' self-reported total outpatient and inpatient costs.

## Methods

- Descriptive statistics and latent class analysis (LCA) were used to analyze multimorbidity patterns and related treatment costs.
- Bayesian information criterion (BIC) was used to calculate and find the minimum value to determine the optimal number of categories.

## Results

- In 2526 diabetes patients, almost 93% had two or more chronic diseases, and more than 50% had hypertension or dyslipidemia (**Table 1**).  
Table 1 Study sample characteristics (\*: numbers in the table are proportions except that for Mean age)

Parameter		Parameter		Parameter	
Mean age, years	64.00	Stomach or digestive disorders	0.34	Memory related diseases	0.08
Male*	0.44	Chronic lung disease	0.19	Emotional and mental issues	0.04
Hypertension	0.63	Kidney disease	0.18	Cancer	0.03
Dyslipidemia	0.53	Stroke	0.14	1 chronic disease	0.07
Arthritis or rheumatism	0.45	Liver disease	0.10	2 or more chronic disease	0.93
Heart disease	0.36	Asthma	0.08	3 or more chronic disease	0.77

- The LCA identified 5 multimorbidity clusters among all patients with diabetes: minimal disease, cardiovascular disease, arthritis and gastric disease, respiratory disease, and multisystem diseases. The LCA further identified 3 multimorbidity clusters in the 13 dyads patient groups and 48 groups with ternary diseases: hypertension, dyslipidemia, and multisystem diseases(**Figure 1-3**). Compared to other multimorbidity groups, diabetes patients with multisystem diseases are more likely to have additional liver disease, psychiatric illness, kidney disease, heart disease, stroke, and memory-related conditions.

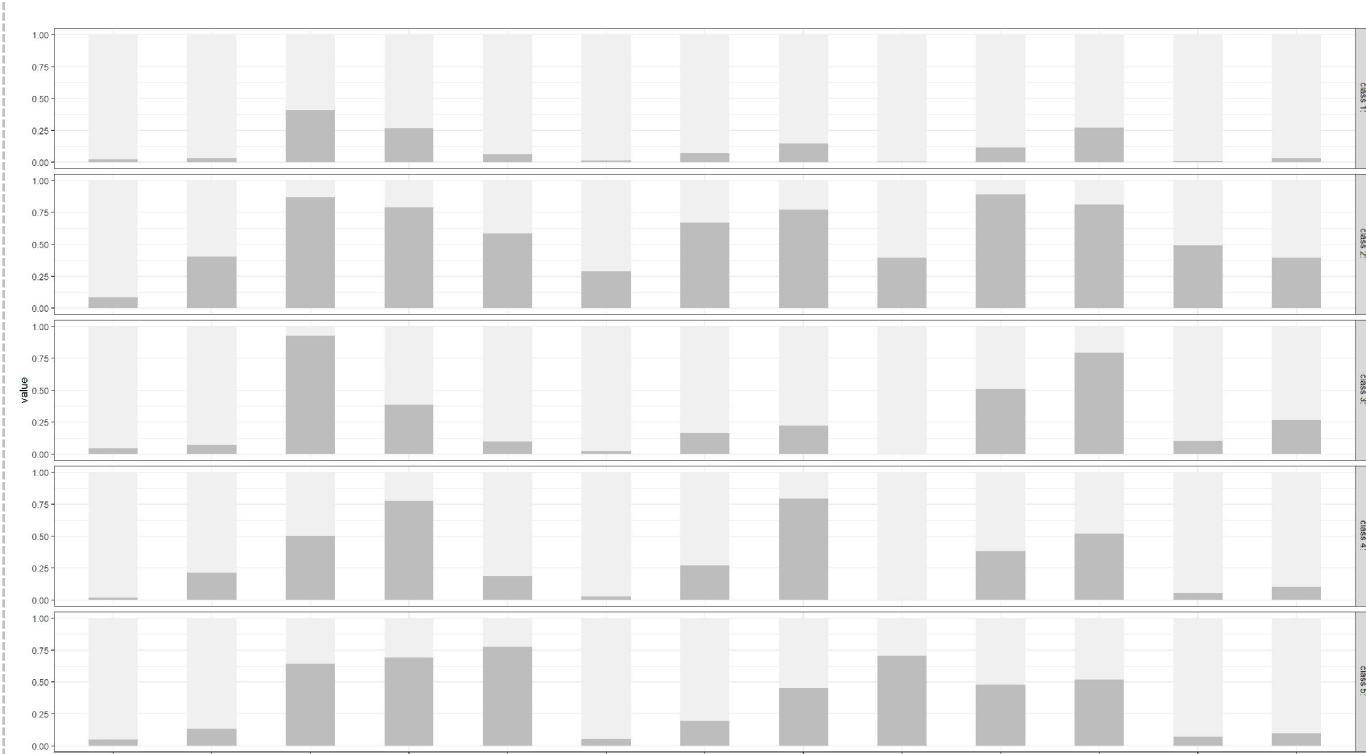


Figure 1 LCA clusters among all patients

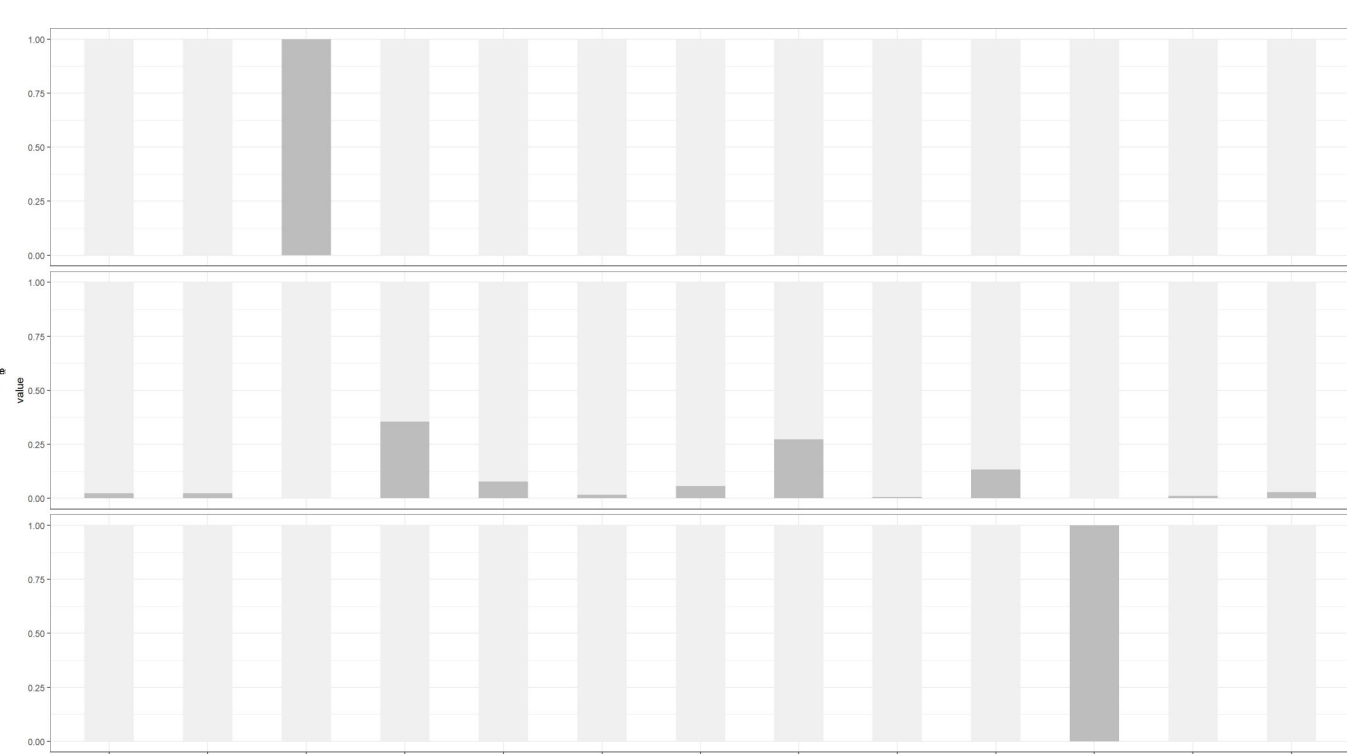


Figure 2 LCA clusters among 13 dyads patient groups

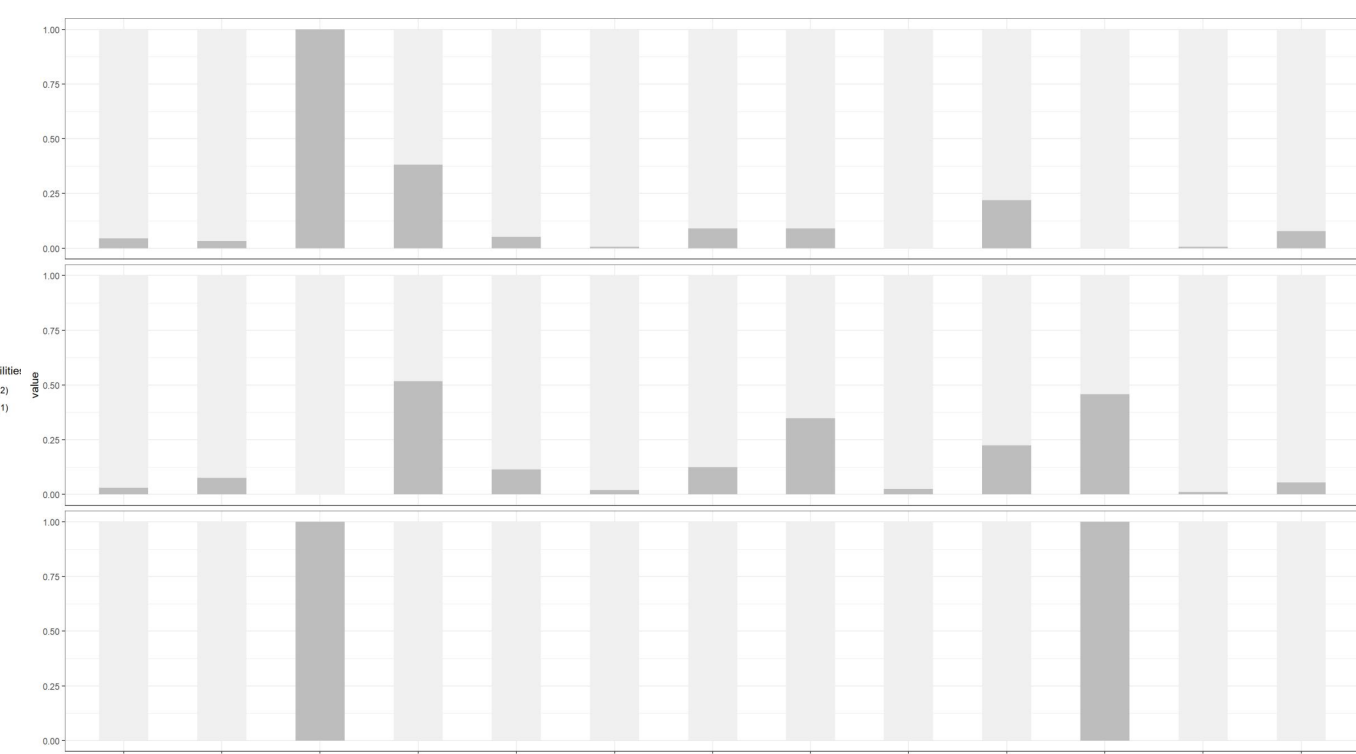


Figure 3 LCA clusters among 48 groups with ternary diseases

- Treatment costs of diabetes patients increased with the number of morbidities. Treatment costs for multimorbidity cluster of multisystem diseases were significantly higher than those of other multimorbidity clusters(**Table 2-4**).

Table 2 LCA clusters, average disease counts, and average treatment cost among all patients

All patients' clusters	Average disease counts	Average treatment cost(\$/year)
Multisystem diseases	9	3065.75
Respiratory disease	6	928.79
Arthritis and gastric disease	5	845.16
Cardiovascular disease	5	769.93
Minimal disease	5	291.69

Table 3 LCA clusters and average treatment cost among dyads patient groups

Dyads patients' clusters	Average treatment cost(\$/year)
Multisystem diseases	466.32
Hypertension	102.74
Dyslipidemia	54.60

Table 4 LCA clusters and average treatment cost among patients with ternary diseases

Clusters among patients with ternary diseases	Average treatment cost(\$/year)
Multisystem diseases	471.99
Dyslipidemia	183.53
Hypertension	168.09

## Conclusions

- There was a high proportion of multimorbidity among middle-aged and older patients with diabetes.
- The extra treatment costs and corresponding distribution of diabetes patients with multimorbidity may associate with both the number of morbidities and what systems were suffered in addition to diabetes.

## References

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