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ORIGINAL RESEARCH

Characteristics and Related Factors of Chinese Herbal Medicine Use in Middle-Aged and Older Patients with Cardiovascular Disease in China: A Cross-Sectional Study

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Background: Cardiovascular disease (CVD) poses a significant health burden in middle-aged and older Chinese populations, with Chinese herbal medicine (CHM) often used as a complementary therapy. This study aimed to analyze the characteristics of CHM use and its influencing factors in middle-aged and older Chinese patients with CVD.

Methods: This was a cross-sectional study based on data from the 2018 China Health and Aging Longitudinal Study (CHARLS). We surveyed 4511 patients with CVD, aged 45 years or older, who reported using CHM to analyze their demographic characteristics, healthcare utilization, and health status.

Results: Approximately 24.05% (1085/4511) of the participants reported managing CVD with CHM. Compared with non-users, CHM users were older (OR=1.21; 95% CI=1.04–1.40), more educated (OR=1.30; 95% CI=1.08–1.57), more likely to reside in a city (OR=1.19; 95% CI=1.01–1.41), and were associated with visiting a Chinese medicine hospital (OR=1.17; 95% CI=1.01–1.37), self-medication (OR=1.48; 95% CI=1.24–1.77), poor health (OR=1.52; 95% CI=1.17–1.98), comorbidities such as kidney disease (OR=1.34; 95% CI=1.02–1.75), asthma (OR=1.67; 95% CI=1.21–2.32), and emotional problems (OR=1.98; 95% CI=1.28–3.07). In an additional interaction analysis, patients with urban residence and mood problems were most likely to use CHM (OR=6.93, 95% CI: 1.77–27.19).

Conclusion: Factors contributing to CHM use in middle-aged and older patients with CVD are multifaceted, encompassing demographic characteristics, health service, and health status.

Keywords: Chinese herbal medicine, cardiovascular disease, middle-aged and older population, cross-sectional study

Introduction

Chronic cardiovascular disease (CVD) includes coronary heart disease, heart failure, hypertension, and arrhythmias that involve pathological changes in the heart or blood vessels.[1] CVD is one of the leading causes of death and disability worldwide, with a growing burden, especially in the context of increasing aging.[2,3] In 2019 alone, 18.6 million people died of CVD globally.[4] CVD costs the European Union up to €282 billion annually, further exacerbating the strain on healthcare resources and financial pressure.[5] The China Cardiovascular Health and Disease Report 2021 shows that the number of patients with CVD in China has reached 330 million, and the CVD burden in China will continue to increase with the aging population and unhealthy lifestyles.[6] As one of the countries with a high CVD prevalence, the middle-aged and older individuals are the main groups affected by CVD, which places a heavy burden on quality of life and social costs.[7,8] Although modern medicine has made significant progress in the

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diagnosis and treatment of CVD, problems with adherence to long-term medication, adverse effects, and the need for individualized treatment still exist.[9,10] In this context, herbal medicine has a unique value as an adjunctive or alternative therapy.

Traditional Chinese medicine (TCM) integrates theoretical and clinical frameworks to deliver personalized treatment based on evidence-based principles.[11] Its therapeutic modalities include Chinese herbal medicine (CHM), acupuncture, massage, dietary therapy, and qigong.[12] Among these, CHM is a core component of China's healthcare system,[13] utilizing natural botanicals, animal-derived substances, and mineral-based medicines, guided by millennia-old compatibility principles.[14,15] In TCM, CVD arises from long-term effects of multiple internal and external factors. Common etiological factors include internal injury, accumulation of damage, and work-rest, dietary, and emotional disorders. These disrupt yin-yang equilibrium, impair organ function, and obstruct qi and blood, ultimately triggering pathological changes that manifest as CVD.[16,17] Modern pharmacological studies corroborate CHM's cardiovascular effects, highlighting mechanisms such as antioxidant activity, anti-inflammatory responses, improved hemodynamics, and enhanced cardiac function.[18,19]

For patients with CVD, vascular damage and inflammatory reactions caused by excessive free radicals and oxidized low-density lipoprotein make antioxidant and anti-inflammatory treatments particularly important.[20] CHM's active ingredients, such as phenols, flavonoids, and polysaccharides, can effectively regulate oxidative stress by reducing lipid peroxidation and free radical production, enhancing free radical scavenging, and increasing antioxidant enzyme activity.[21] The therapeutic effect of CHM does not rely solely on a single mechanism; instead, it works synergistically through multiple pathways to improve CVD progression. For example, ginseng and its active ingredients positively affect CVD treatment and prevention by regulating various ion channels and cell signal transduction, inhibiting platelet aggregation, enhancing vasomotor tension, and improving blood circulation and blood lipid status.[22,23] Dingji Fumai Decoction reduces oxidative stress, regulates Na^+-K^+-ATPase activity, and exerts antiarrhythmic effects without causing any side effects.[24] CHM mitigates cardiac fibrosis through multiple mechanisms, such as reducing inflammation and oxidative stress, inhibiting cardiac fibroblast activation, and reducing extracellular matrix accumulation.[25] Certain yang-tonifying CHM formulations improve ATP synthesis by enhancing mitochondrial electron transport, thereby exerting antioxidant effects.[26] Clinical evidence gathered in recent years have validated the efficacy and safety of Chinese medicines in managing CVD. Meta-analyses have shown that adjunctive CHM significantly improves clinical symptoms and quality of life of patients with coronary artery disease and heart failure, with favorable tolerability.[27,28] Randomized controlled trials have confirmed the efficacy of some compound CHM medicines in patients with stable angina pectoris, chronic heart failure, and hypertension, with no serious adverse effects reported.[29,30] These findings underscore CHM's safety and therapeutic potential in contemporary CVD care. CHM's multi-target, multi-component approach offers holistic benefits, including symptom relief, cardiac fibrosis reversal, and cardiovascular event prevention.[31] This aligns with its theoretical foundation in TCM, which emphasizes systemic balance over isolated interventions.

As the nationally representative aging cohort with documented CVD diagnosis and CHM use, the China Health and Aging Follow-up Survey (CHARLS) provides valuable data for studying CHM use in patients with CVD.[32,33] Therefore, this study aimed to fill this research gap by exploring CHM use in patients with CVD and the associated factors influencing their choice of CHM treatment.

Materials and Methods

Study Design and Population

The CHARLS is a large-scale, long-term, longitudinal survey database designed to study health status, lifestyle, and the impact of socioeconomic factors on health among older adults in China.[34] The CHARLS project began with a national baseline survey in 2011–2012, and the CHARLS database covers approximately 17,708 individuals aged 45 years and older from 28 provinces across China. The CHARLS database generally represents data for middle-aged and older populations in China and provides a valuable resource for epidemiological studies on geriatric diseases. The data quality of the CHARLS has been widely used and recognized by academics. The CHARLS was approved by the Ethics Committee of Peking University School of Medicine (IRB00001052-11015), and all participants signed a written informed consent form.

This study was based on the CHARLS 2018 dataset, comprising 19,816 participants. First, 232 participants aged <45 years and 14,966 participants without CVD were excluded. We then excluded 107 participants with missing information on CHM use. Finally, 4511 participants were included in the study (Figure 1).

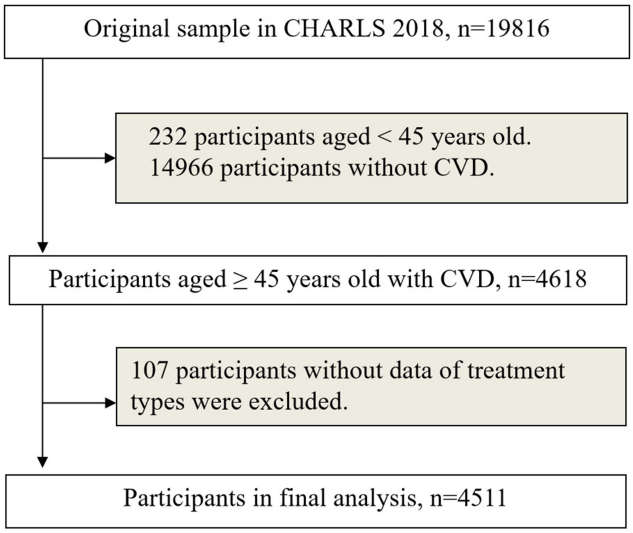

Figure 1 Flowchart of study participants.

Herbal Medicine Use

CHM use was assessed by asking participants, "Are you currently using CHM to treat heart disease, stroke, or related complications?" CHM use was evaluated. Participants who answered yes were categorized as using CHM; those who answered no were not.

Demographic Characteristics and Lifestyle Factors

Demographic and lifestyle data were collected using a uniformly structured questionnaire administered by trained interviewers. This included age (middle-aged: 45–64 years/old: 65 years and above), sex (male/female), education (illiterate/non-illiterate), place of residence (urban/rural), marital status (married/other: unmarried, separated, divorced, and widowed), receipt of income (yes/no: received salary and bonuses in the past year/did not receive them), smoking (never smoked/used to smoke/currently smoke), and alcohol consumption (never drank/used to drink/currently drink).

Health Service Utilization

The survey asked whether participants were currently covered by various types of health insurance, with insurance status categorized as either yes or no. Participants were also asked about the medical institutions they had visited in the past month, including general, specialized, and Chinese medicine hospitals. Additionally, participants were asked whether they had used self-treatment methods in the past month. Data on self-treatment included whether they had purchased their medication or had taken medication given to them by others.

Health Status

Health status included general health, chronic diseases, satisfaction, and depression. General health was categorized as good, fair, or poor. Chronic conditions included hypertension, dyslipidemia, diabetes, cancer, chronic lung disease, liver disease, heart disease, stroke, kidney disease, stomach disease, psychiatric problems, memory-related disorders, arthritis, asthma, and any self-reported history of these conditions. Satisfaction was categorized into satisfactory and unsatisfactory groups based on self-reporting. Depression was assessed using the CES-D short form, with a cutoff score of ≥12.[35]

Statistical Analysis

Baseline demographics were characterized using descriptive statistics. Continuous variables were categorized for analysis and reported as numbers and percentages. To compare the differences between CHM users and non-users, significant differences were assessed using chi-square tests for categorical variables, and *P*-values were calculated to determine the

statistical significance of the differences between the two groups. The most significant factors associated with CHM use were identified using a stepwise backward elimination approach, which systematically eliminated nonsignificant variables while retaining those with significant independent associations ($P < 0.05$). Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated to quantify associations between predictors and CHM use. Logistic regression models were fitted and adjusted for potential confounders to explore the combined effects of certain factors on CHM use. The attributable proportions (APs) and their 95% CIs were determined by calculating the interactions. The AP reflects the attributable role of exposure factors in specific outcomes and is often used to quantify the impact of risk factors.

All analyses were performed using Stata SE version 15.0 (Stata Corp LP, College Station, TX, USA), and a two-tailed P value <0.05 was considered statistically significant.

Results

This study included 4511 patients with CVD aged ≥45 years for analysis; approximately 24.05% (1085/4511) of them used CHM for CVD. Among the 1085 respondents who reported using CHM, 645 (59.45%) also reported using modern Western medicine to treat CVD. Patients using CHM were older, more educated, and more likely to reside in urban areas than non-users. No statistically significant differences existed between both groups regarding sex, marital status, income, smoking status, or alcohol consumption (Table 1).

Table 1 Associations Between CHM Use and Demographic Characteristics Among Chinese Middle-Aged and Older Adults with CVD

Demographic Characteristics	CHM Use			*P*
	Total (n=4511)	No (n=3426)	Yes (N=1085)	
Age				0.035
Middle-aged adults	2068 (45.84)	1603 (46.79)	465 (42.86)	
Older adults	2370 (52.54)	1764 (51.49)	606 (55.85)	
Gender				0.900
Male	1909 (42.32)	1448 (42.27)	461 (42.49)	
Female	2602 (57.68)	1978 (57.73)	624 (57.51)	
Education level				0.017
Illiterate	1112 (24.65)	874 (25.51)	238 (21.94)	
Not illiterate	3399 (75.35)	2552 (74.49)	847 (78.06)	
Area of residence				0.025
Village	3452 (76.52)	2649 (77.32)	803 (74.01)	
Urban	1059 (23.48)	777 (22.68)	282 (25.99)	
Marital status				0.300
Married	3435 (76.15)	2596 (75.77)	839 (77.33)	
Other	1076 (23.85)	830 (24.23)	246 (22.67)	
Receive Income				0.080
Yes	647 (14.34)	514 (15.00)	133 (12.26)	
No	3856 (85.48)	2906 (84.82)	950 (87.56)	
Smoking status				0.610
Never	2687 (59.57)	2036 (59.43)	651 (60.00)	
Ever smoker	884 (19.60)	667 (19.47)	217 (20.00)	
Current smoker	936 (20.75)	719 (20.99)	217 (20.00)	
Alcohol consumption				0.610
Never drinker	3093 (68.57)	2345 (68.45)	748 (68.94)	
Former drinker	238 (5.28)	177 (5.17)	61 (5.62)	
Current drinker	1176 (26.07)	900 (26.27)	276 (25.44)	

Notes: Data are presented as numbers (proportion %). Missing data: Age=73, Receive Income=8, Smoking status=4, Alcohol consumption=4.

To validate the robustness of the study results, we conducted a sensitivity analysis comparing the characteristics of participants excluded due to missing information on CHM use (n = 107) with those of participants ultimately included in the analysis (n = 4511). As shown in Supplementary Table S1, the excluded group exhibited significant disadvantages in multiple socioeconomic, health status, and psychological indicators, and had a higher proportion of missing information, suggesting that this group may represent a vulnerable population with relatively poorer socioeconomic and health status. The excluded sample accounted for only 2.3% of the total sample, and its impact on the main study results may be relatively limited.

Compared with CHM non-users, a higher proportion of CHM users attended general and Chinese medicine hospitals (general hospitals: P=0.013; Chinese medicine hospitals: P=0.031). Additionally, CHM users were more likely to self-medicate (P<0.001). No statistically significant differences existed in insurance status and specialty hospital visits between the two groups (Table 2).

Regarding health status, patients with CVD who used CHM were more likely to report poorer overall health and suffering from other chronic conditions such as kidney disease, gastric problems, mood problems, arthritis, asthma, and depression than those who did not. Differences in hypertension, dyslipidemia, diabetes mellitus, cancer, chronic lung disease, liver disease, memory-related disorders, and life satisfaction between the two groups were not statistically significant (Table 3).

Table 4 lists the statistically significant predictors of CHM use in middle-aged and older patients with CVD. Older participants (OR=1.21; 95% CI=1.04–1.40) were more likely to use CHM than middle-aged participants. Participants with higher levels of education (OR=1.30; 95% CI=1.08–1.57) were more likely to use CHM than those with lower levels. Compared with patients who lived in rural areas, those who lived in urban areas were more likely to use CHM (OR=1.19; 95% CI=1.01–1.41). Individuals who went to a CHM (OR=1.17; 95% CI=1.01–1.37) were more likely to use a CHM compared with individuals who did not. Individuals who self-treated (OR=1.48; 95% CI=1.24–1.77) were likelier to use a CHM than those who did not. Individuals with poorer self-rated general health status (OR=1.52; 95% CI=1.17–1.98) were more likely to use CHM than those with good self-rated health. Additionally, individuals with asthma (OR=1.67; 95% CI=1.21–2.32), renal disease (OR=1.34; 95% CI=1.02–1.75), and emotional problems (OR=1.98; 95% CI=1.28–3.07) were more likely to use CHM than individuals without these conditions.

Table 5 presents the joint effects analysis, in which the OR (95% CI) for CHM use was 1.83 (95% CI: 1.15–2.89) for patients with CVD living in rural areas with emotional problems, 1.19 (95% CI: 1.00–1.41) for those living in urban

Table 2 Associations Between CHM Use and Health Services, by Chinese Middle-Aged and Older Adults with CVD

Health Services	CHM Use			*P*
	Total (n=4511)	No (n=3426)	Yes (N=1085)	
Insurance status				0.410
Yes	4397 (97.47)	3334 (97.31)	1063 (97.97)	
No	107 (2.37)	87 (2.54)	20 (1.84)	
General Hospital				0.013
No	4048 (89.74)	3096 (90.37)	952 (87.74)	
Yes	463 (10.26)	330 (9.63)	133 (12.26)	
Specialized Hospital				0.650
No	4464 (98.96)	3389 (98.92)	1075 (99.08)	
Yes	47 (1.04)	37 (1.08)	10 (0.92)	
Chinese Medicine Hospital				0.031
No	4422 (98.03)	3367 (98.28)	1055 (97.24)	
Yes	89 (1.97)	59 (1.72)	30 (2.76)	
Self-treatment				<0.001
No	1233 (27.33)	1012 (29.54)	221 (20.37)	
Yes	3268 (72.45)	2407 (70.26)	861 (79.35)	

Notes: Data are presented as numbers (proportion %). Missing data: Insurance status=7, Self-treatment=10.

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Table 3 Associations Between CHM Use and Health Status, Among Chinese Middle-Aged and Older Adults with CVD

Health Status	CHM Use			*P*
	Total (n=4511)	No (n=3426)	Yes (N=1085)	
General health status				<0.001
Good	451 (10.00)	375 (10.95)	76 (7.00)	
Not good	3664 (81.22)	2739 (79.95)	925 (85.25)	
Hypertension				0.800
No	3881 (86.03)	2950 (86.11)	931 (85.81)	
Yes	630 (13.97)	476 (13.89)	154 (14.19)	
Dyslipidemia				0.310
No	3803 (84.31)	2899 (84.62)	904 (83.32)	
Yes	708 (15.69)	527 (15.38)	181 (16.68)	
Diabetes				0.610
No	4128 (91.51)	3131 (91.39)	997 (91.89)	
Yes	383 (8.49)	295 (8.61)	88 (8.11)	
Cancer				0.870
No	4442 (98.47)	3373 (98.45)	1069 (98.53)	
Yes	69 (1.53)	53 (1.55)	16 (1.47)	
Chronic Lung Diseases				0.470
No	4144 (91.86)	3153 (92.03)	991 (91.34)	
Yes	367 (8.14)	273 (7.97)	94 (8.66)	
Liver Disease				0.070
No	4265 (94.55)	3251 (94.89)	1014 (93.46)	
Yes	246 (5.45)	175 (5.11)	71 (6.54)	
Kidney disease				<0.001
No	4201 (93.13)	3217 (93.90)	984 (90.69)	
Yes	310 (6.87)	209 (6.10)	101 (9.31)	
Stomach Disease				0.010
No	4059 (89.98)	3105 (90.63)	954 (87.93)	
Yes	452 (10.02)	321 (9.37)	131 (12.07)	
Emotional Problems				<0.001
No	4390 (97.32)	3351 (97.81)	1039 (95.76)	
Yes	121 (2.68)	75 (2.19)	46 (4.24)	
Memory-Related Disease				0.220
No	4234 (93.86)	3224 (94.10)	1010 (93.09)	
Yes	277 (6.14)	202 (5.90)	75 (6.91)	
Arthritis				0.009
No	4109 (91.09)	3142 (91.71)	967 (89.12)	
Yes	402 (8.91)	284 (8.29)	118 (10.88)	
Asthma				0.002
No	4320 (95.77)	3299 (96.29)	1021 (94.10)	
Yes	191 (4.23)	127 (3.71)	64 (5.90)	
Depression				0.035
No	2399 (53.18)	1843 (53.79)	556 (51.24)	
Yes	1677 (37.18)	1240 (36.19)	437 (40.28)	
Satisfaction				0.110
Satisfied	3434 (76.13)	2612 (76.24)	822 (75.76)	
Not satisfied	642 (14.23)	471 (13.75)	171 (15.76)	

Notes: Data are presented as numbers (proportion %). Missing data: general health status=396, depressive symptoms=435, satisfaction=435.

Table 4 The Stepwise Backward Logistic Regression Identifies the Statistically Significant Predictors of CHM Use by Chinese Middle-Aged and Older Adults with CVD

Predictors of CHM Use	OR (95%CI)	*P*
Age		
Middle-aged adults	Reference	
Older adults	1.21 (1.04, 1.40)	0.013
Education level		
Illiterate	Reference	
Not illiterate	1.30 (1.08, 1.57)	0.006
Area of residence		
Village	Reference	
Urban	1.19 (1.01, 1.41)	0.047
Asthma		
No	Reference	
Yes	1.67 (1.21, 2.32)	0.002
Chinese Medicine Hospital		
No	Reference	
Yes	1.17 (1.01, 1.37)	0.047
Self-treatment		
No	Reference	
Yes	1.48 (1.24, 1.77)	<0.001
General health status		
Good	Reference	
Not good	1.52 (1.17, 1.98)	0.002
Kidney disease		
No	Reference	
Yes	1.34 (1.02, 1.75)	0.035
Emotional Problems		
No	Reference	
Yes	1.98 (1.28, 3.07)	0.002

Table 5 The Joint Effect of Area of Residence and Emotional Problems on Chinese Herbal Medicine Use in Patients with CVD

Area of Residence	Emotional Problems	OR[a]	*P*
Village	No	Reference	
Village	Yes	1.83 (1.15, 2.89)	0.010
Urban	No	1.19 (1.00, 1.41)	0.050
Urban	Yes	6.93 (1.77, 27.19)	0.014

Notes: [a]Adjusted for Age, Education level, Area of residence, Chinese medicine hospital, Asthma, Self-treatment, General health status, and Kidney disease.

areas without emotional problems, and 6.93 (95% CI: 1.77–27.19) for those living in urban areas with emotional issues, compared with those living in rural areas without emotional problems. Living in a city and having emotional problems had a statistically significant additive effect on CHM use (AP=0.709, 95% CI: 0.294–1.124).

Discussion

Owing to an aging global population, CVD is increasingly prevalent. This study investigated the characteristics and factors associated with TCM use in middle-aged and older Chinese patients with CVD. Approximately 24.05% of these

patients included CHM in their treatment regimen. Factors associated with CHM use are multifaceted, spanning demographic, health services, and health status.

Older patients often face multiple health challenges, and the preference for CHM in this group may reflect dissatisfaction with conventional therapies or concerns about cumulative side effects.[36] Previous studies suggest that CHM is a natural and safe alternative to conventional treatments.[37] Similarly, patients with higher education levels were more likely to use CHM. These individuals typically have greater health literacy and can understand and accept CHM's therapeutic role. They are also more likely to be exposed to relevant medical information and have more rational and diverse treatment choices. The higher propensity to use CHM among urban residents may stem from CHM's higher accessibility and popularity, as well as abundant medical resources and higher acceptance of traditional medicine, supported by comprehensive health insurance coverage and policy promotion, TCM hospitals, pharmacies, and qualified TCM practitioners.[38] In contrast, rural residents may depend more on Western medicine because of limited CHM resources.[39,40] Contrary to the traditional view that CHM use is driven primarily by limited access to healthcare,[41,42] in China, its use is influenced more by cultural heritage, healthcare infrastructure, and strong policy support. CHM has been systematically integrated into the formal medical system as an essential component of chronic disease management and health promotion.[43,44]

The present study found no statistically significant association between insurance status and CHM use, likely due to the popularization of basic health insurance in China, which has reduced disparities in treatment choices across different insurance groups.[45,46] Regarding healthcare behavior, patients treated at TCM hospitals were more likely to use CHM. These institutions prioritize CHM as a core therapeutic modality, increasing patient exposure and acceptance compared to those seeking only Western medical care. Additionally, CHM users were more likely to engage in self-medication, reflecting greater patient initiative in health management. This behavior may be driven by improved healthcare access and heightened health awareness.[47] Patients with other chronic conditions or poor self-rated health may adopt CHM to complement and optimize existing treatments, particularly given its perceived mildness and lower risk of side effects.[48] Patients with multiple chronic diseases often choose CHM as an adjunct therapy because of its potential to alleviate symptoms, improve quality of life, and restore objective indicators.[49,50] Although conditions such as hypertension and dyslipidemia are closely linked to CVD, no significant association was observed between these comorbidities and CHM use. Notably, the lack of statistical differences does not rule out a potential impact on CHM use; this finding may be limited by sample size, observation time, or other confounding factors. Furthermore, we investigated the combined effects of place of residence and emotional problems on CHM use in patients with CVD. This study found a significant interaction between emotional problems and place of residence in relation to CHM use. Urban individuals with emotional problems were significantly more likely to use CHM (OR = 6.93, 95% CI = 1.77–27.19). However, the wide confidence interval suggests that this estimate may be somewhat unstable This synergistic effect may stem from mental health stigma, whereby middle-aged and older adults in urban areas may prefer CHM as an alternative intervention due to its high cultural acceptance and lower stigma. Additionally, urban residents often exhibit greater health awareness and easier access to health information.

This study has some limitations. First, our data relied on self-reported questionnaires from middle-aged and older participants (aged 45 years and above). CVD diagnoses relied on participants' recollection of physician assessments, which may have introduced a recall bias. This bias might lead to an overestimation or underestimation of CHM usage, especially among older individuals with poorer memory, potentially affecting the accuracy of the association between CHM use and health status. Second, the dataset did not contain information on CHM's specific types, dosage forms, or dosages, limiting further analysis into its clinical relevance and safety. Additionally, self-report bias may be related to health literacy or socioeconomic background; individuals with lower educational levels, for instance, could misreport health information, thereby exacerbating data inconsistencies. Although we controlled for multiple confounding factors, residual confounding factors from unmeasured variables, individual cognition, or preference for CHM could still exist, simultaneously influencing CHM use. Finally, as a cross-sectional study, we could not establish a causal relationship between CHM use and the identified influencing factors.

Conclusion

The decision to use CHM among middle-aged and older patients with CVD is driven by multidimensional factors, including demographic characteristics, healthcare accessibility, and health status. As an adjunctive or alternative therapy, CHM demonstrates potential value in improving symptoms, enhancing quality of life, and addressing complex health needs.

Further longitudinal studies are needed to clarify CHM's long-term effects, its specific mechanisms of action in CVD management, and to provide a scientific basis for its integration into comprehensive treatment strategies for this population.

Abbreviations

CHARLS, China Health and Aging Follow-up Survey; TCM, Traditional Chinese Medicine; CHM, Chinese Herbal Medicine; CVD, Cardiovascular Disease; LDL, Low-Density Lipoprotein; CI, Confidence Interval; OR, Odds Ratio; AP, Attributable Proportion.

Ethical Approval and Consent to Participate

The original CHARLS study received approval from the Ethical Review Committee of Peking University, and all participants provided signed informed consent before their involvement in CHARLS. The data used are de-identified public datasets that cannot be traced back to any individual and do not involve direct interaction with human subjects. All personal identifiers have been removed to ensure participant anonymity and confidentiality. According to Article 32, Item 1 of the Measures for Ethical Review of Human Life Science and Medical Research (February 18, 2023, China), this type of research meets the conditions for exemption from ethical review.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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