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The status quo and influencing factors of intrinsic capacity among community-dwelling older adults from the perspective of Ecological Systems Theory: A cross-sectional study

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Abstract

Background As intrinsic capacity (IC) declines, older adults are at a significantly increased risk of frailty, care dependency, and death. Currently, the research on IC among older adults in China was still insufficient. We aimed to identify the status quo and influencing factors among community-dwelling older adults in China and explore the relationship between IC, external environment, and social network.

Methods A convenience sampling method was used to collect 312 older people from May 2023 to February 2024 in five communities in Chengdu, Sichuan Province. Data were collected using the general information questionnaire, Integrated Care of the Elderly (ICOPE) screening tool, World Health Organization Quality of life scale (WHOQOL-100), and Social Network Scale (LSNS-6).

Results The IC score among Chinese community-dwelling older adults was 3.39 ± 1.60 , and the prevalence of IC decline was 86.9%. Marital status, age, number of chronic diseases, social network, and external environment were influencing factors of IC, which explained 35.7% of the total variance. External environment and social network were positively correlated with IC.

Conclusions Chinese community-dwelling older adults had low IC scores and a high prevalence of IC decline. The government should focus on IC for older adults, especially those who are older, not married or widowed, and suffering from multiple chronic diseases. In addition, the richer the external resources available to older adults, the more social support they received, and the better the IC. These findings could provide a theoretical basis for managing and improving IC in older adults.

Highlights

- Older adults have low intrinsic capacity scores and a high prevalence of intrinsic capacity decline.
- External environment and social networks were positively correlated with intrinsic capacity.

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- Marital status, age, number of chronic diseases, social network, and external environment influenced intrinsic capacity of older adults.

Keywords Intrinsic capacity, Community-dwelling, Older adults, Ecological systems theory, Cross-sectional study

Background

The world is experiencing rapid population aging. According to a report, the number of persons 65 years and older reached 723 million in 2020 worldwide, and this number will rise to 1.55 billion by 2050 [1]. Accordingly, the burden of disability increased with population aging [2]. In order to reduce the burden on the health-care system, it is necessary to adopt an integrated model of care for older adults that integrates nursing and medical care [3]. To this end, the World Health Organization (WHO) has proposed a new approach called Integrated Care of the Elderly (ICOPE) [4]. This approach was achieved by improving the intrinsic capacity (IC) and healthy aging of older adults [5].

The IC level of older adults is one of the important indicators of healthy aging and the key to preventing disability. IC refers to the combination of an individual's physical and mental abilities, mainly containing five key areas: cognition, locomotion, vitality, sensory (vision and hearing), and psychological, individually determined by the interaction with relevant environmental characteristics [6]. In recent years, research on the IC of older adults has gradually become a hot topic. Research confirmed that the IC of older adults was at a low level and declined with age [7–9]. Besides, studies have also shown that older adults with impaired IC have 18.8% increased incidence of frailty, a 4.9% increased risk of care dependency, and a 4.8% increased mortality rate [6, 10, 11]. However, the decline of IC was related to 75% of individual behaviors and risk exposure factors [12]. Individual behaviors include demographic factors and lifestyle habits and risk exposure factors include social networks and external resources available [12]. This suggests that the IC of older adults was influenced by multiple factors. Therefore, figuring out the status quo and influencing factors of IC among older adults is the first step in developing interventions.

Ecological Systems Theory (EST) has the view that individuals are usually influenced directly or indirectly by a series of interconnected social systems [13]. There are four layers: microsystems (individual factors), mesosystems (interpersonal factors), exosystem (organizational factors), and macrosystems (society, policy, and cultural factors) [14]. This theory has been widely used in neonatal nursing, obstetrical, gynecological medicine, as well as in COVID-19 trauma [15–17]. The advantage of EST lies in it can systematically and completely explore the influencing factors and propose relevant interventions. In recent years, EST has also been applied to research

on successful aging in older adults and social support for people with dementia [18, 19]. For the sake of studying the influencing factors of IC deeply, we used EST as the theoretical basis and introduced relevant variables to investigate. In addition to investigating microsystems for general information about older adults, our study introduces the social network to explore the influence of the mesosystems on the IC, and introduces the external environment, to explore external exosystems and macrosystems on the IC.

External environment refers to all the external factors that consist of an individual's life context, including the built environment, interpersonal relationships, hygiene, social policies, support systems, and the services they provide, etc [20]. The Quality of Live Scale (WHO-QOL-100) was the most commonly used scale to measure the external environment [21]. Studies have shown that the external environment was associated with healthy aging and real-life mobility of older adults [22, 23]. Social network explains the interactions among a group of individuals. Individuals are nodes in the network, which are called characters, and each character has social connections to some other characters, which leads to a network of interactions that describe social relationships [24]. Social network was measured by Lubben Social Network Scale (LSNS-6), which is the most used population-based scale. LSNS-6 includes two dimensions, family network and friend network [25]. Scholars have noted that social networks are associated with increased loneliness, physical functioning, and risk of death in older adults [26, 27].

To our knowledge, the status and factors influencing IC among community-dwelling older adults in China are still in the infancy stage, previous studies have not addressed the relevance of IC to the external environment and social networks using EST as a theoretical foundation. Therefore, the aims of this study were as follows: (1) to identify the level of IC among community-dwelling older adults in China, (2) to determine the influencing factors of IC, (3) to clarify the relationship between IC, external environment, and social network.

Methods

Design and data collection

This study was conducted from May 2023 to February 2024 in five communities in Chengdu, Sichuan. We contacted five communities managers and obtained permission to investigate. The researcher administered the questionnaire face-to-face to the older adults at home visit who met the enrollment criteria, explained the

purpose and importance of the study, and signed the informed consent form. After the investigator verifies the completeness of the questionnaire, it is retrieved on the spot, and if there is any omission, it is again checked with the older people and filled out with additional information. If the answers in the questionnaire show regularity, was exclude. The sample size calculation formula $N = Z_{1-\alpha/2}^2 p(1-p)/d^2$ was used, where $Z_{1-\alpha/2} = 1.96$ (at 5% type 1 error $P < 0.05$), d represented the allowable error, 0.05 was taken in this study, and P was based on a similar previous study, 73.7% [28]. According to the formula, the sample size was 296. Considering that there may be problems such as missing items in the questionnaire, the sample size was expanded by 5%, and it was concluded that at least 310 nurses need to be investigated. A STROBE checklist was used to report findings [29].

Participants

The researchers screened 325 who met the inclusion criteria older adults who met the inclusion criteria and distributed paper questionnaires were distributed, and 312 valid questionnaires were collected, with a recovery rate of 96%. Inclusion criteria were: (1) older adults over age 60, (2) no dementia, Parkinson's disease, mental illness, (3) no physical disability, (4) no communication problems, can answer questions correctly. Exclusion criteria:

(1) major acute diseases (such as acute infection, acute heart failure, endogenous myocardial infarction not occurring within 3 months, acute exacerbation of the chronic obstructive pulmonary disease, acute pulmonary infection, acute cerebrovascular disease, acute liver, and kidney failure, etc.), (2) with severe mental retardation, cognitive impairment, dyslexia, (3) has participated in other studies.

Measures

General information questionnaire

A self-designed questionnaire was used to collect participants' demographic, lifestyle, and disease-related information, including age, gender, marital status, education level, place of residence, residence status, pre-retirement career, monthly personal income, family relationships, medical insurance, physical exercise, and number of chronic diseases.

Integrated Care for older people (ICOPE) screening tool

IC was assessed by the ICOPE screening tool and has been shown to have good reliability in Chinese older adults [30]. Including the following five domains: cognition, locomotion, vitality, sensory, and psychological. A score of 0 represents a decline and a score of 1 represents normal, the IC score ranged from 0 to 6, with a higher score representative of better IC (Table 1). A decline in any one of the five dimensions is currently considered to be defined as a decline in IC [30].

World health organization quality of live scale (WHOQOL-100)

External environment was assessed by WHOQOL-100, which was developed by WHO, The Chinese version of WHOQOL-100 was used in this study, translated, and revised by Fang [21]. This scale consists of 24 items in six selected areas: housing environment (4 items), transportation conditions (4 items), medical services and social security (4 items), social security (4 items), personal relationships (4 items), and social assistance (4 items). Each item is scored from 1 to 5, with a total score of 24 to 120, with higher scores indicating a better level of external environment.

Social network scale (LSNS-6)

LSNS-6 is a short version of the original social network scale based on Lubben [25]. The scale reflects the social network status of individuals from 2 aspects: family network and friend network and consists of 6 items, each item is scored on a scale of 0 to 5, or a total of 30 points, with a total score below 12 being social isolation and a single item below 6 being family or friend isolation [25].

Table 1 ICOPE screening tool

IC	Test	Score
Cognition		
Orientation in time and space	What is the full date of today? Where are you now?	All correct (1) / Any question wrong or unknow (0)
Memory retention	Recall 3 words: folwer, door, rice	
Locomotion		
Chair rise test	Rise from chair five times without using arms within 14 s	Yes (1) / No (0)
Vitality		
Weight loss or	Have you unintentionally los more than 3 kg over the last 3 months? or	Yes (1) / No (0)
Appete loss	Have you experienced loss of appetite?	
Sensory		
Vision	Do you have any problems with your eyes: difficulties in seeing far, reading, or eye diseases?	Yes (1) / No (0)
Hearing	Do you have any problems in hearing: difficulties in hearing whisper?	Yes (1) / No (0)
Psychological		
Depressive symptoms	Over the past two weeks, have you been brothered by: feeling down, depressed or hopeless? Little interest or pleasure in during things?	Yes (1) / No (0)

IC, intrinsic capacity

ICOPE, Integrated Care for Older People

Table 2 Demographic characteristics and univariate analyses of the factors associated with IC scores among the older adults (N = 312)

Characteristics	N(%)	Mean(SD)	t/F	P
Mean Age		74.57 ± 7.10		
Age group			3.774	0.001
60–69	72(23.1)	3.73 ± 1.43		
70–79	159(51.0)	3.64 ± 1.63		
80–89	75(24.0)	2.62 ± 1.65		
> 90	6(1.9)	3.83 ± 1.83		
Gender			0.771	0.593
Male	126(40.4)	3.59 ± 1.66		
Female	186(59.6)	3.30 ± 1.64		
Education level			1.803	0.980
Tertiary level and above	46(14.7)	3.23 ± 1.71		
High school/Secondary	43(13.8)	2.83 ± 1.61		
Junior	77(24.7)	3.74 ± 1.60		
Primary and below	146(46.8)	3.48 ± 1.64		
Marital status			21.554	0.000
Married	171(54.8)	2.63 ± 1.34		
Not married or widowed	141(45.2)	4.37 ± 1.49		
Place of residence			2.710	0.014
City	179(57.4)	3.49 ± 1.76		
Countryside	133(42.6)	3.32 ± 1.49		
Residence status			1.851	0.089
Living alone	163(52.2)	3.65 ± 1.57		
Living with children	149(47.8)	3.16 ± 1.71		
Pre-retirement occupation			0.826	0.550
Brain careers	66(21.2)	3.27 ± 1.57		
Physical careers	159(51.0)	3.52 ± 1.65		
both	87(27.9)	3.35 ± 1.73		
Monthly personal income			1.390	0.218
< 1000 CNY	49(15.7)	3.34 ± 1.71		
1000–3000 CNY	115(36.9)	3.66 ± 1.50		
> 3000 CNY	148(47.4)	3.26 ± 1.73		
Family relationship			0.334	0.919
Normal	32(10.3)	3.18 ± 1.76		
Harmony	280(89.7)	3.45 ± 1.64		
Disharmony	0			
Medical insurance			0.619	0.715
No	4(1.3)	3.50 ± 1.73		
Yes	308(98.7)	3.42 ± 1.65		
Physical activity			1.102	0.361
No	161(51.6)	3.51 ± 1.71		
Yes	151(48.4)	3.33 ± 1.59		
Number of chronic diseases			4.896	0.000
0	41(13.1)	4.09 ± 1.78		
1	85(27.2)	3.85 ± 1.63		
2	84(26.9)	3.21 ± 1.48		
≥ 3	102(32.7)	2.96 ± 1.60		

IC, intrinsic capacity; CNY, Chinese yuan

Data analysis

Statistical analysis was performed with SPSS 26.0 software. Descriptive analysis was used to analyze demographic information, lifestyle information, disease-related information, IC scores, WHOQOL-100 scores, and LSNS-6 scores. One-way ANOVA and *t*-test were used to test for differences between demographic, lifestyle, and disease-related information and IC scores. In addition, Pearson correlation analysis was used to explore the correlation between IC scores and WHOQOL-100 and LSNS-6 scores. Finally, statistically significant variables from the one-way ANOVA and relevant variables from Pearson correlation and relevant were included in the multiple linear regression equation to determine the factors influencing IC. This study was statistically significant at $P < 0.05$.

Results

The demographic characteristics of the participants

The total number of participants was 312, with an average age of 74.57 ± 7.10 years old. The IC score was 3.39 ± 1.60 . IC decline was present in 271 of the participants, with an incidence of 86.9%. The percentage of decline in psychological, vision, vitality, locomotion, hearing, and cognition domains were 58.3%, 57.7%, 51.6%, 34.6%, 30.4%, and 27.2%, respectively. Participants were mostly aged 70 to 79 years (51%), female (59.6%), educated to a primary school level or below (46.8%), single (54.8%), living in the city (57.4%), living alone (53.2%), predominantly manual labor before retirement (51%), monthly income greater than 3,000 CNY (47.4%), and have a harmony family relationships (89.7%), have medical insurance (98.7%), do not have physical activity (51.6%), and have more than 3 chronic diseases (32.7%). Independent samples *t*-test and ANOVA showed that older age ($P = 0.001$), being single ($P < 0.001$), living in the countryside ($P = 0.014$), and having 3 or more chronic diseases ($P < 0.001$) were associated with lower IC scores (Table 2).

Correlation coefficient matrix of IC, WHOQOL-100, and LSNS-6

The total mean score of IC was 3.39 ± 1.60 . The mean scores for the six dimensions of IC, cognitive, locomotion, vitality, vision, hearing, and psychological were 0.73 ± 0.45 , 0.65 ± 0.48 , 0.48 ± 0.50 , 0.42 ± 0.49 , 0.69 ± 0.46 , and 0.45 ± 0.60 , respectively. The distribution of IC scores was analyzed using SPSS 26.0 software, and the IC scores were approximately normally distributed, the histogram of IC scores can be found in the Supplementary Material. The mean score of WHOQOL-100 was 88.19 ± 7.23 , and the mean score of LSNS-6 was 14.70 ± 5.37 . IC was positively correlated with WHOQOL-100 ($r = 0.148$, $P < 0.001$), and LSNS-6 ($r = 0.248$, $P < 0.001$) (Table 3). The

Table 3 Descriptive statistics and correlation coefficient matrix of ICOPE screening tool, WHOQOL-100, and LSNS-6 (N = 312)

Variable	Mean score(SD)	1	2	3	4	5	6	7	8	9
ICOPE	3.39 ± 1.60	1								
Cognition	0.73 ± 0.45	0.638**	1							
Locomotion	0.65 ± 0.48	0.4443**	0.199**	1						
Vitality	0.48 ± 0.50	0.531**	0.235**	-0.055	1					
Vision	0.42 ± 0.49	0.551**	0.220**	0.196**	0.026	1				
Hearing	0.69 ± 0.46	0.553**	0.200**	0.236**	0.079	0.323**	1			
Psychological	0.45 ± 0.60	0.578**	0.322**	-0.046	0.525**	0.094	0.063	1		
WHOQOL-100	88.19 ± 7.23	0.148**	0.104	0.103	-0.032	0.086	0.120*	0.118*	1	
LSNS-6	14.70 ± 5.37	0.248**	0.206**	0.052	0.116*	0.133*	0.179**	0.32**	0.349**	1

*P < 0.05, **P < 0.001

ICOPE, Integrated Care for Older People

WHOQOL-100, World Health Organization Quality of Live scale

LSNS-6, Lubben Social Network Scale

Table 4 Multiple linner regression analysis of IC (N = 312)

Model	B	SE	Beta	t	p
Constant	1.395	1.066	-	1.308	0.192
Age	-0.479	0.103	-0.220	-4.645	0.000
Marital status	1.556	0.158	0.482	9.862	0.000
Place of residence	-0.065	0.160	-0.020	-0.408	0.683
Number of chronic diseases	-0.188	0.074	-0.121	-2.535	0.012
External environment	0.029	0.011	0.125	2.521	0.012
Social network	0.032	0.016	0.104	2.020	0.044

F = 29.804, P = 0.000, R² = 0.377, Adjusted R² = 0.357

IC, intrinsic capacity

histogram of WHOQOL-100 and LSNS-6 score can be found in the Supplementary Material.

The factors associated with IC

The results of multiple linear regression of the factors associated with IC scores are shown in Table 4. Marital status is the most important factor in the IC score ($\beta = 1.556, P < 0.001$). In addition, age ($\beta = -0.479, P < 0.001$), number of chronic diseases ($\beta = -0.188, P = 0.012$), social network ($\beta = 0.032, P = 0.044$), and external environment ($\beta = 0.029, P = 0.012$), also had a significant effect on IC. The place of residence was not significant in the regression equation.

Discussion

According to our findings, the score of IC of older adults was 3.39 ± 1.60 , the prevalence of IC decline was 86.7%, and the percentage of decline in psychological, vision, vitality, locomotion, hearing, and cognition domains was 58.3%, 57.7%, 51.6%, 34.6%, 30.4%, and 27.2%, respectively. Compared with a previous study of 376 middle-aged and older adults in a community in Beijing, our study had a lower IC score, a higher prevalence of IC decline, and a higher incidence of decline in each dimension [30]. But compared to the prevalence of IC decline was lower in our study compared with investigative studies in Mexico, Cuba, and India older adults [7, 10]. This

discrepancy may be explained by different study areas, social security systems, and the lifestyles of older adults. Researchers have noted that the decline of IC is strongly associated with the onset of debility, care dependency, and death [6, 10, 11]. Therefore, based on the results of our survey on the level of IC of community-dwelling older adults in China, it is necessary to pay attention to the dynamic changes in IC levels in older adults and take targeted, scientific, and systematic measures to improve their IC to achieve healthy aging.

The influencing factors of IC

The research pointed out that marital status, age, number of chronic diseases, social network, and external environment were significantly influenced IC among community-dwelling older adults in China.

Marital status

Our study found that marital status was an important influencing factor of IC for older adults. Single older adults have poor IC scores. A survey pointed out that social support has a significant moderating effect on depression in older adults, while single older adults have lower social support scores [31]. Furthermore, studies have shown that intimate partners are the most direct providers of social support [32, 33]. Marriage creates a sense of love and responsibility, is an important way of providing social support, and can promote a sense of fulfillment and peace of mind. While love and responsibility are relatively lacking among singles [31]. Therefore, according to the EST, from a mesosystem stand, we should focus on single older adults, encourage relatives, friends, and neighbors to strengthen contact and communication with them, maintain harmonious relationships, and provide them with psychological comfort. Besides, based on the macrosystems level, the government should pay attention to the IC of older adults, especially single, widowed, and empty-nest older adults, and

introduce relevant policies to improve their physical and mental health.

Age

This study indicated that age significantly influenced IC, the older the age, the worse the IC. This was in line with the findings of Ma, Leung, and Gutiérrez-Robledo. [7, 34, 35]. From a physiological point of view, age-related biological changes occur as age goes, and degenerative changes in the body organs of older adults are inevitable, such as reduced mobility, impaired vision, and hearing, cognitive decline, etc [36]. From the perspective of social interactions, the older adults has a reduced workforce capacity, a reduced social scope after retirement, and a deterioration of social roles and functions, all of which lead to a decrease in participation of family and social activities, which has increased their psychological disparity and led to negative emotions [37]. Previous studies have pointed out that strengthening diet nutrition and regular physical exercise can slow down the aging of body functions in older adults and treat some aging-related diseases [38, 39]. Hence, from the microsystems, it is recommended that older adults develop a scientific exercise and diet program. From the mesosystems, the community should pay attention to older people's physical and mental health, and utilize social service functions, such as organizing visits to older adults, community care, and sympathy activities. From the exosystems, medical staff in hospitals need to focus on older adults' physical and mental condition during hospitalization and provide high quality care. From the macrosystems, the government should focus on the IC status of older adults, improve the social security medical insurance system, and formulate relevant policies to improve the IC of older adults to achieve healthy aging.

Number of chronic diseases

Our result showed that the more the number of chronic diseases in older adults, the worse the IC. Previous studies showed that older adults with chronic diseases have a high rate of loss of daily life function [40, 41]. Moreover, chronic diseases can not only affect the physical activity of older adults but also affect their mental health status and reduce their quality of life [40, 42]. Which creates a situation where IC decline is more severe in older adults with more number of chronic conditions. Based on EST, chronic disease management in older adults can be strengthened to cope with the decline of their IC at the following four levels. In terms of microsystems, older people themselves should enhance their knowledge and self-management of chronic diseases. In terms of mesosystems, the community should conduct regular follow-up visits to older adults with chronic diseases to understand their disease control and progression for

timely health intervention. In terms of exosystems, medical departments should manage the health of different types of older patients with chronic diseases and guide them to develop healthy behaviors of reasonable exercise. In terms of macrosystems, the government should formulate relevant policies to improve the accessibility of medical services for older people with chronic diseases in response to the decline of IC.

Social network and external environment

Correlation analysis and regression analysis concluded that the social network was positively associated with IC among older adults. This is consistent with the findings of Su [31]. Social networks, as an important psychological factor, significantly influence the health promotion behavior of older adults [31]. The larger a person's social network is, the more connected older adults are to members of the community, and the more likely older adults are to obtain some health-related information [43]. Accordingly, older adults can regulate their behavior better to promote health. Thus, from the microsystems, family members should give more companionship to older people to help them overcome their psychological difficulties; from the mesosystems, community should also actively carry out mental health assessments of older people, strengthen the psychological and social support for older adults, and formulate personalized psychological intervention programmes to guide the elderly to adopt methods such as confabulation and positive thinking therapy to overcome their pessimistic mentality and regain a positive state of life.

External environment was positively associated with IC among older adults by Person analysis. A survey by de Andrade [44] and others concluded that exposure to poorer environments increases the burden of disease in individuals and populations, resulting in differences in individual health levels. Older adults in good external environments not only enjoy abundant medical resources and have access to richer health information, but also receive multiple avenues of social support, have healthy lifestyles, and thus maintain good levels of IC [45]. Studies have pointed out [46, 47] that having sarcopenia and low grip strength are both one of the important influences on intrinsic ability. Studies by Chinese scholar Liang [48] and Korean scholar Seo [49] have both pointed out that community factors (e.g., public transportation, recreational facilities, public amenities, and traffic safety) are important causes of sarcopenia in the elderly. What's more, Okuyama [50] conducted a 3-year follow-up study in Japan, and the results also confirmed that the community environment had a significant impact on skeletal muscle mass indicators and grip strength in the older people. Consequently, in terms of macrosystems, the government and the relevant departments should

improve the construction of the relevant infrastructure and provide older people with good transportation conditions, medical and health care environments, and leisure and recreational facilities, so as to create a good external environment for the older adults and increase their quality of life.

Limitation

There are some limitations in this study. First, this study used a convenience sample to collect data, thus limiting the generalizability of the findings. Future studies should consider using randomized sampling methods to improve representativeness. Second, our study used a cross-sectional study design, which does not reflect the dynamic changes in the IC of community-dwelling older adults over time. Suggesting a longitudinal study design in future research could provide insights into how IC changes over time and the long-term impact of influencing factors. Third, the uneven distribution of sample size among the two influencing factors, family relationships, and medical insurance, may lead to biased results.

Conclusion

According to our study, the prevalence of IC decline among Chinese community-dwelling older adults was at a high level. There are five influencing factors for IC among older adults including marital status, age, chronic illness, social network, and external environment. Based on the EST, we put forward relevant suggestions from the four aspects of microsystems, mesosystems, exosystems, and macrosystems, respectively, to improve the IC of older adults. These conclusions can be used as a theoretical basis for managing and preventing IC decline.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12877-024-05499-9>.

Supplementary Material 1

Supplementary Material 2

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Author contributions

Study concept and design: YSY and WJL. Search literature: YSY and XY. Study selection: YSY, XY, and TQ. Quality assessments: YSY, XT, and TQ. Data extraction: YSY, XY, and TQ. Analysis of data: YSY. Drafting of the manuscript: YSY. Critical revision of the manuscript for important intellectual content: WJL. All authors reviewed the manuscript.

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Data availability

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Written informed consent was obtained from all participants. The study was approved by Medical Ethics Committee of Affiliated Hospital of Chengdu University of Traditional Chinese Medicine (2022KL-033). All the participants were given detailed information about the goals, purpose and reasons for the research. All methods were carried out in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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