Influencing Factors and Importance Ranking of Primary-Level Traditional Chinese Medicine Preventive Healthcare Services Utilization Among Older Adults: Post-Print

Authors: Chen Yan, Shen Dequan, Sheng Renlei, Chang Yujie, Yang Jiaqi, Ding Jie, Sun Zhifang, Wang Dahui, Chen Yan

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Abstract

Background: Traditional Chinese Medicine (TCM) possesses unique advantages in preventive healthcare, holding significant value for chronic disease prevention and active aging. Primary care settings constitute a crucial front for the implementation and promotion of TCM preventive healthcare services; however, the utilization of these services by older adults remains suboptimal.

Objective: To identify the factors influencing older adults' utilization of primary care TCM preventive healthcare services and to rank these factors by importance.

Methods: From July to September 2022, a multi-stage stratified random sampling method was employed to select 12 community health centers across 6 cities in Zhejiang Province and Guangxi Zhuang Autonomous Region. Face-to-face questionnaire surveys were conducted via intercept approach among 2,206 visiting older adults. The questionnaire was designed based on an integrated framework combining Andersen' s model and Social Cognitive Theory (SCT) to comprehensively collect data on service utilization and its influencing factors. Binary Logistic regression models were used to analyze factors influencing older adults' utilization of primary care TCM preventive healthcare services (behavior), and Logistic dominance analysis was applied to determine the importance of these factors.

Results: A total of 2,081 valid questionnaires were collected (94.33%). Three hundred sixty-nine (17.73%) older adults had received primary care TCM preventive healthcare services in the past year, with the majority utilizing services 1–2 times [196 (53.11%)]. Binary Logistic regression analysis revealed that education level (predisposing characteristic), chronic disease status and

pain/discomfort (need factors), perceived service environment score (enabling resource), and cognition score and self-control score (individual factors) were influencing factors for service utilization ($P<0.05$). Further Logistic dominance analysis indicated the following ranking of factor importance weights: individual factors (cognition, self-control) > enabling resources (perceived service environment) > predisposing characteristics (education level) > need factors (chronic disease status, pain/discomfort).

Conclusion: Individual factors play a pivotal role in older adults'decision-making regarding the utilization of primary care TCM preventive healthcare services. Enhancing older adults' cognitive levels and self-control capabilities, alongside improving the primary care TCM service environment, is expected to promote the widespread adoption of TCM preventive healthcare services among the elderly population.

Full Text

Influencing Factors and Importance Ranking of the Utilization of Primary-Level Traditional Chinese Medicine Preventive and Health Care Services for the Elderly

CHEN Yan[1],[2*], **SHEN Dequan**[1], **SHENG Renlei**[3], **CHANG Yujie**[1], **YANG Jiaqi**[4], **DING Jie**[1], **SUN Zhifang**[1], **WANG Dahui**[1]

[1]School of Public Health, Hangzhou Normal University, Hangzhou 311121, China
[2]Engineering Research Center of Mobile Health Management System, Ministry of Education, Hangzhou 311121, China
[3]Zhejiang Economic & Information Center, Hangzhou 310006, China
[4]Zhejiang Province Community Traditional Chinese Medicine Service Research Center, Hangzhou 310007, China

Corresponding author: CHEN Yan, Lecturer/Attending physician; E-mail: chenyan20130601@163.com

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Abstract

Background: Traditional Chinese Medicine (TCM) possesses unique advantages in preventive health care and holds significant value for chronic disease management and active aging. Community health service centers represent crucial venues for implementing and promoting TCM preventive care, yet utilization among elderly populations remains suboptimal.

Objective: To identify factors influencing elderly utilization of primary-level TCM preventive and health care services and to rank the importance of these factors.

Methods: From July to September 2022, a multi-stage stratified random sampling method was employed to select 12 community health service centers across six cities in Zhejiang Province and Guangxi Zhuang Autonomous Region. A total of 2,206 elderly visitors were recruited through on-site interception and completed face-to-face questionnaire surveys. The questionnaire was designed based on an integrated framework combining Andersen' s model and Social Cognitive Theory (SCT) to comprehensively collect data on service utilization and influencing factors. Binary logistic regression was used to analyze factors affecting utilization behavior, while logistic dominance analysis determined the relative importance of these factors.

Results: Among 2,081 valid questionnaires (94.33% response rate), only 369 elderly individuals (17.73%) had utilized primary-level TCM preventive care services in the past year, with most using services 1–2 times annually [196 cases (53.11%)]. Binary logistic regression revealed that education level (predisposing characteristic), chronic disease status and pain/discomfort (need factors), perceived service environment score (enabling resource), and cognitive status and self-control scores (individual factors) significantly influenced service utilization ($P<0.05$). Logistic dominance analysis further showed the importance ranking as: individual factors (cognitive status, self-control) > enabling resources (perceived service environment) > predisposing characteristics (education level) > need factors (chronic disease status, pain/discomfort).

Conclusion: Individual factors play a pivotal role in elderly decision-making regarding primary-level TCM preventive care utilization. Enhancing cognitive levels and self-control abilities among the elderly, while improving the TCM service environment at the community level, may promote broader adoption of TCM preventive health services among elderly populations.

Keywords: Health services for the aged; Traditional Chinese medicine; Services utilization; Community health services; Andersen model; Social cognitive theory; Root cause analysis

Introduction

TCM preventive care methods, including acupuncture, massage, cupping, gua sha, and qigong exercises, are characterized by their simplicity, low cost, and proven efficacy. These approaches have become important complementary components of healthcare systems in many countries beyond China [**?**, **?**]. With population aging and increasing numbers of chronic disease patients, China faces dual challenges of rapidly growing medical demands and shortages in elderly healthcare resources [**?**]. In response, China implemented policies in 2006 to integrate TCM into its basic medical insurance system and establish TCM preventive care service networks at the primary level, aiming to develop a low-cost, wide-coverage, high-efficiency, and convenient healthcare policy framework [**?**]. Researchers have recognized that TCM' s strengths in health preservation and

preventive care can facilitate elderly self-care and chronic disease management [?, ?]. In 2013, China first included TCM constitution identification services for elderly populations in its national basic public health service package, and has since made extensive efforts to incorporate TCM preventive care into family doctor contract services and chronic disease management programs [?, ?]. In 2023, ten national departments jointly issued the "Fourteenth Five-Year Action Plan for Enhancing Primary-Level TCM Service Capacity," which aims to achieve full coverage of primary-level TCM services while improving service quality [?].

Despite substantial government efforts to develop and promote primary-level TCM preventive care, previous studies indicate that elderly utilization remains unsatisfactory [?, ?]. Current model-based research on health service utilization determinants is limited, with existing models such as Andersen' s model and the Chi-squared Automatic Interaction Detector model primarily focusing on structural factors while paying insufficient attention to behavioral and psychological factors among the elderly [?]. Social Cognitive Theory (SCT), rooted in behavioral psychology, emphasizes the dynamic and continuous interaction among personal factors, environment, and individual behavior. This framework helps understand how elderly individuals' choices regarding primary-level TCM preventive care are jointly influenced by cognitive, self-control, self-efficacy, and environmental factors, thereby informing more effective communication strategies and educational programs [?]. Andersen' s model has been preliminarily applied to examine determinants of acupuncture utilization [?] and factors influencing demand for TCM treatment services [?]. Additionally, scholars have used SCT to explore correlations between TCM popularization environments and residents' TCM utilization behavior [?]. However, research on factors influencing primary-level TCM preventive care utilization based on theoretical models remains insufficient, and mainstream TCM health service utilization studies lack effective integration of different theoretical perspectives. This study employs a dual-model framework combining Andersen' s model and SCT to comprehensively analyze and explore factors influencing elderly utilization of primary-level TCM preventive care services, using dominance analysis to evaluate the importance of these factors and provide evidence for targeted policy development.

Methods

Study Population

From July to September 2022, a multi-stage sampling method was used to select study participants. The specific sampling procedure was as follows: (1) Based on economic development and TCM service development status, Zhejiang Province and Guangxi Zhuang Autonomous Region were selected as sample provinces; (2) According to 2021 economic development levels, cities in the sample provinces were stratified into high, medium, and low tiers, with one city selected from each tier (Hangzhou, Huzhou, and Lishui from Zhejiang; Nanning, Liuzhou,

and Guilin from Guangxi); (3) Within each selected city, one urban district and one suburban district were randomly chosen; (4) One community health service center was randomly selected from each district, totaling 12 centers; (5) Following Pearmain' s empirical rule, 100–200 elderly visitors were recruited from each center through on-site interception.

Inclusion criteria were: (1) age $\geq$ 60 years; (2) local permanent residents (living in the community for $\geq$ 1 year); (3) clear consciousness with communication ability and no barriers to interacting with investigators. Exclusion criteria included: (1) cognitive impairment, severe psychological disorders, or mental illness; (2) unwillingness to participate; (3) current participation in or participation within the last 30 days in other research projects. This study was approved by the Ethics Committee of the School of Public Health, Hangzhou Normal University (No. 2019016), and all participants provided informed consent.

Variable Setting

Andersen' s model categorizes factors influencing health service utilization into three dimensions: predisposing characteristics, enabling resources, and need factors. Predisposing characteristics include background factors such as gender, age, marital status, education level, and residence [**?**]. Enabling resources involve individuals' ability to access services and healthcare resource availability, including income level [**?**, **?**], medical insurance type [**?**, **?**], service environment (healthcare resource accessibility) [**?**], and social support [**?**]. Need factors represent perceived healthcare needs [**?**], including chronic disease status [**?**, **?**] and physical condition [**?**]. SCT emphasizes behavioral psychology theory, positing that health service utilization is constrained not only by structural factors like service environment and social support but also by individual agency factors such as cognition, self-control, and self-efficacy [**?**].

Based on the integrated Andersen-SCT framework, influencing factors were categorized as: (1) Predisposing characteristics: gender, age, marital status, education level, and local residence duration; (2) Enabling resources: monthly personal income and medical insurance type; (3) Need factors: chronic disease status, pain/discomfort, perceived service environment, and social support; (4) Individual factors: cognition, self-efficacy, outcome expectations, and self-control.

Survey Instrument

The questionnaire comprised three sections: (1) Basic demographic information including gender, age, marital status, education level, local residence duration, monthly personal income, medical insurance status, chronic disease status, and pain/discomfort; (2) Primary-level TCM preventive care utilization, examining actual use of TCM health education activities, appropriate TCM techniques, chronic disease TCM care guidance, TCM constitution identification, and TCM family doctor contract services in the past year. Having received at least one of

these services was coded as "utilized," while no service use was coded as "not utilized"; (3) The Social Cognitive Factors Scale [?], which includes six dimensions: perceived service environment (3 items assessing accessibility, equipment, and service content), social support (3 items measuring expected help from family and friends), cognitive status (3 items reflecting awareness of preventive care and knowledge of TCM preventive services, community programs, and policies), self-efficacy (4 items assessing confidence in utilizing TCM preventive care), outcome expectations (4 items measuring perceived health outcomes after service use), and self-control (5 items examining intentions and action plans for service participation). All items used a 5-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree"), with higher scores indicating higher levels of social cognition. The scale demonstrated good reliability and validity in previous research [?]. In this study, the overall Cronbach's α coefficient was 0.95, with subscale coefficients ranging from 0.891 to 0.963, indicating good internal consistency. Validity indices (CMIN/DF = 4.15, AGFI = 0.915, GFI = 0.936, TLI = 0.970, CFI = 0.975, RMSEA = 0.059) met statistical requirements, confirming the scale's applicability.

Survey and Quality Control

During fieldwork, six survey teams were established, each comprising 3-4 uniformly trained investigators with at least one member fluent in local dialects to ensure smooth communication. Two survey modes were employed: self-administered questionnaires for capable participants and investigator-administered questionnaires based on oral responses for those unable to complete independently. Questionnaires were distributed and collected on-site, with investigators carefully reviewing responses and immediately correcting or supplementing any errors or omissions to ensure data accuracy and completeness. A total of 2,206 questionnaires were distributed, yielding 2,081 valid responses (94.33% valid response rate).

Statistical Analysis

Data were double-entered using EpiData 3.1 software and analyzed with SPSS 26.0. Categorical data were presented as frequencies and percentages, with between-group comparisons using ^{2} tests. Normally distributed continuous data were expressed as (x-±s), with t-tests for homogeneous variance and Mann-Whitney U tests for heterogeneous variance. Binary logistic regression analyzed factors influencing elderly utilization of primary-level TCM preventive care, and logistic dominance analysis calculated relative importance weights for four dimensions: predisposing characteristics, enabling resources, need factors, and individual factors. Weight values indicated the degree of influence each dimension exerted on elderly decision-making regarding service utilization. Statistical significance was set at $P<0.05$.

The specific calculation process for dimension weights was as follows: (1) Model selection: Independent variables were screened and identified through binary

logistic regression, with only statistically significant variables included in the final dominance analysis model to establish the optimal predictive model; (2) Based on the Andersen-SCT dual model, the full model contained four predictor variables (X1 = predisposing characteristics, X2 = need factors, X3 = enabling resources, X4 = individual factors); (3) The number of sub-models was calculated using the formula "2^P - 1," where P = 4; (4) Incremental contributions (ΔR^2) were computed for each predictor, representing the change in R^2 when each predictor was added to sub-models excluding that variable (obtained through hierarchical regression in SPSS); (5) The final model' s coefficient of determination was calculated as the sum of total average contributions of all four predictors; (6) Each predictor' s weight was calculated using the formula "ΔR^2 ÷ final model' s R^2 × 100%," representing the percentage of explained variance attributable to each variable [**?**, **?**].

Results

Basic Characteristics of the Elderly

Among 2,081 elderly participants, 860 (41.33%) were male and 1,221 (58.67%) were female. The mean age was (70.7$±$7.6) years, with most aged 60–69 years [967 (46.47%)]. The majority were married [1,682 (80.83%)], and 951 (45.70%) had primary school education or below. Most had lived locally for $ $5 years [1,974 (94.86%)], and 1,327 (63.77%) had monthly incomes of 2,000–3,999 yuan. Medical insurance coverage was high [2,015 (96.83%)], and 1,385 (66.55%) self-reported chronic diseases. Regarding pain/discomfort, 1,056 (50.74%) reported none, 692 (33.26%) reported mild pain, and 333 (16.00%) reported moderate to severe pain (Table 1).

Mean scores for social cognitive factors were: perceived service environment (3.4$±0.8), $social support(3.7±0.8), cognitive status(2.5±1.0), self-efficacy(3.4±1.0), outcome expectations(3.1±1.0), and self-control(3.2±$1.0).

Utilization of Primary-Level TCM Preventive Care Services

Among 2,081 elderly participants, 369 (17.73%) had utilized primary-level TCM preventive care services in the past year. Utilization frequency was predominantly 1–2 times annually [196 (53.11%)], followed by 3–4 times [98 (26.56%)], 5–6 times [39 (10.57%)], and $ $7 times [36 (9.76%)]. Service-specific utilization rates from highest to lowest were: TCM health education [259 (70.18%)], appropriate TCM techniques [235 (63.69%)], chronic disease TCM care guidance [223 (60.43%)], TCM constitution identification [173 (46.88%)], and TCM family doctor contract services [89 (24.12%)].

Univariate Analysis of Influencing Factors

Significant differences (P<0.05) in utilization were observed for gender, education level, monthly personal income, chronic disease status, pain/discomfort, and scores for perceived service environment, social support, cognitive status, self-efficacy, outcome expectations, and self-control. No significant differences were found for age, marital status, local residence duration, or medical insurance status (P>0.05) (Table 2).

Binary Logistic Regression Analysis

Using past-year service utilization as the dependent variable (0 = not utilized, 1 = utilized) and variables showing significant differences in univariate analysis as independent variables, multivariate logistic regression revealed that education level (predisposing characteristic), chronic disease status and pain/discomfort (need factors), perceived service environment score (enabling resource), and cognitive status and self-control scores (individual factors) significantly influenced utilization (P<0.05) (Table 3).

Specifically, elderly individuals with junior high school education (OR=1.967) and high school education or above (OR=1.506) showed higher utilization probabilities than those with primary school education or below (P<0.05). Those with chronic diseases (OR=1.599) had higher utilization probabilities than those without (P<0.05). Elderly with moderate to severe pain/discomfort (OR=2.025) showed higher utilization probabilities than those without pain (P<0.05). Among social cognitive factors, higher scores in perceived service environment (OR=1.515), cognitive status (OR=2.197), and self-control (OR=1.637) were associated with higher utilization probabilities (P<0.05).

Relative Importance Analysis of Influencing Factors

Logistic dominance analysis revealed that the final model' s coefficient of determination was 0.045 + 0.044 + 0.066 + 0.232 = 0.387. The results showed that: X1 (predisposing characteristics, i.e., education level) explained 11.55% of the variance (0.045/0.387); X2 (need factors, including chronic disease status and pain/discomfort) explained 11.37% (0.044/0.387); X3 (enabling resources, i.e., perceived service environment score) explained 16.98% (0.066/0.387); and X4 (individual factors, including cognitive status and self-control scores) explained 59.78% (0.232/0.387). Thus, individual factors (cognitive status, self-control) were most important in predicting elderly utilization of primary-level TCM preventive care, followed by enabling resources (perceived service environment), then predisposing characteristics (education level) and need factors (chronic disease status, pain/discomfort) (Table 4).

Discussion

Enhancing elderly health literacy and skills in TCM preventive care can strengthen health maintenance awareness, improve health status, and promote proactive health management, representing a crucial strategy for addressing population aging and accelerating Healthy China initiatives. Primary-level healthcare institutions serve as vital platforms for implementing and promoting TCM preventive care. Although previous studies indicate high perceived need for community TCM preventive care services among the elderly (61%–75%) [**?**, **?**, **?**], actual utilization remains relatively low (38%–45%) [**?**, **?**, **?**], revealing a "utilization gap."

This study found that only 17.73% of elderly participants had utilized primary-level TCM preventive care services in the past year, with most using services only 1–2 times annually. This finding differs from previous studies, possibly due to variations in service types examined and sampling locations, warranting further investigation. Nevertheless, the low utilization rate suggests that current services fail to effectively attract elderly users, supply does not meet demand, and service functions remain underdeveloped, necessitating further exploration of underlying causes.

Andersen's model helps examine influencing factors from predisposing characteristics, need factors, and enabling resources [**?**]. First, education level, an important predisposing characteristic [**?**], was found to be positively associated with service utilization. This may be because better-educated elderly individuals typically possess higher health literacy regarding TCM wellness culture, enabling them to better understand the benefits and mechanisms of TCM preventive care and make more informed healthcare decisions [**?**]. Second, regarding need factors, elderly with chronic diseases and moderate to severe pain/discomfort were more likely to utilize services. According to the Health Belief Model, health service utilization is influenced by perceived disease severity and expected service effectiveness [**?**]. Since elderly with chronic diseases and significant pain can better perceive health problems' severity, they are more inclined to seek effective treatments. TCM' s proven efficacy and unique advantages in managing chronic diseases and pain may explain this preference [**?**]. Third, regarding enabling resources, perceived service environment (including service accessibility, variety, technical level, and waiting time) was a key factor influencing elderly choices. This suggests that current capacity, quality, and reputation of primary-level TCM preventive care may be important constraints on development. Therefore, improving facilities, technical capabilities, and service processes to reduce waiting times may be critical for enhancing service attractiveness and utilization [**?**, **?**].

SCT helps deepen understanding of behavioral and psychological factors influencing elderly choices regarding primary-level TCM preventive care [**?**, **?**, **?**]. This study found that individual factors (cognitive status and self-control) were the most important determinants, accounting for 59.78% of explained variance.

Current implementation and promotion of primary-level TCM services in China rely heavily on national strategies and provider perspectives, with insufficient attention to users' preferences and individual cognitive-psychological characteristics. Limited health literacy regarding TCM wellness culture and inadequate knowledge of primary-level TCM preventive care policies and services constrain utilization [**?**, **?**, **?**]. Furthermore, self-control abilities influence service utilization and other health behaviors through multiple mechanisms [**?**, **?**]. Insufficient motivation, unclear goal-setting, lack of social support systems, and declining cognitive abilities constitute important barriers to health service utilization [**?**, **?**]. Specifically, elderly lacking "preventive care" awareness or difficulty setting clear preventive health goals often demonstrate insufficient continuity and motivation when choosing TCM preventive care services. Inadequate social support systems (such as family support, peer support, and community interaction) may limit elderly abilities to seek TCM preventive care when facing health challenges, while declining cognitive abilities may affect health information comprehension and decision-making capacity [**?**].

Elderly choices regarding primary-level TCM preventive care are associated with predisposing characteristics (education level), need factors (chronic disease status, pain/discomfort severity), enabling resources (perceived service environment), and individual factors (cognitive status and self-control abilities). Therefore, primary healthcare institutions should promote TCM preventive care by addressing elderly intrinsic health needs, establishing services targeting elderly-prevalent conditions (such as chronic diseases and pain) where TCM has advantages, and enhancing precise service capabilities. Simultaneously, service quality and capacity should be improved to strengthen professional reputation and attract more elderly users. Additionally, attention must be paid to elderly social-cognitive and behavioral-psychological characteristics, enhancing their cognitive levels and self-control abilities regarding TCM preventive care. Efforts should intensify promotion of TCM advantages, service content, and preferential policies through health education and proactive services to build elderly awareness of primary-level TCM care. Behavioral change techniques (such as goal-setting, action planning, and reward mechanisms) can help elderly establish and maintain TCM preventive care behaviors [**?**, **?**], while building social support systems (including family supervision, peer education, and interactive exchanges) and enhancing social participation can improve elderly self-control abilities. Through these measures, elderly populations can fully accept, recognize, and trust TCM preventive care services, thereby promoting utilization and maximizing TCM' s value and advantages in elderly self-care and chronic disease management.

This study has several limitations. First, the questionnaire survey method may be subject to recall bias, potentially leading to inaccurate or incomplete reporting of past service utilization. Second, the sample was limited to urban communities in two provinces, restricting geographic representativeness and generalizability to other regions. Future research should expand sample coverage to include more diverse geographic areas and socioeconomic groups to enhance external validity.

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ORCID iDs:
CHEN Yan: https://orcid.org/0000-0001-8746-4235
WANG Dahui: https://orcid.org/0000-0001-6435-5132

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