

REVISION OF THE QUESTIONNAIRE ON TRADITIONAL CHINESE MEDICINE
HEALTH CULTURAL LITERACY FOR CHINESE CITIZENS BASED ON THE
KNOWLEDGE-ATTITUDE-PRACTICE THEORYZhiheng Zhou^{1*}, Xianhui Chen¹, Shengqing Zhou², Weiliang Zhu¹, Zeling Zhu¹, Siqin Li²¹Shenzhen Pingshan District People's Hospital (Southern Medical University Pingshan Hospital), Shenzhen 518118, Guangdong, China.²University of Washington, Seattle, WA 98195 USA.***Corresponding Author: Zhiheng Zhou**Shenzhen Pingshan District People's Hospital (Southern Medical University Pingshan Hospital), Shenzhen 518118, Guangdong, China. DOI: <https://doi.org/10.5281/zenodo.22158757>**How to cite this Article:** Zhiheng Zhou^{1*}, Xianhui Chen¹, Shengqing Zhou², Weiliang Zhu¹, Zeling Zhu¹, Siqin Li² (2026). Revision Of The Questionnaire On Traditional Chinese Medicine Health Cultural Literacy For Chinese Citizens Based On The Knowledge-Attitude-Practice Theory. European Journal of Pharmaceutical and Medical Research, 13(9), 161–169. This work is licensed under Creative Commons Attribution 4.0 International license.

Article Received on 04/08/2026

Article Revised on 24/08/2026

Article Published on 01/09/2026

ABSTRACT

Background and Objective: Since 2016, the National Administration of Traditional Chinese Medicine of China has conducted annual surveillance using the Questionnaire on Traditional Chinese Medicine Health Cultural Literacy for Chinese Citizens. However, the original questionnaire has limitations, including excessively high item difficulty and excessive cognitive load, necessitating revision. This study aimed to revise the Chinese Citizens' Traditional Chinese Medicine Health Cultural Literacy Survey Questionnaire through a series of methodological approaches. **Methods:** This study employed the Knowledge-Attitude-Practice (KAP) theory as the core framework and utilized literature analysis, two rounds of Delphi expert consultation, the Analytic Hierarchy Process (AHP), and field cognitive interviews to revise the original questionnaire. A pilot survey was conducted among 200 community residents aged 18 years and older, and the reliability, validity, and difficulty characteristics of the questionnaire were evaluated. **Results:** The revised questionnaire comprised 35 items covering six dimensions: dissemination status (8 items), conceptual cognition (4 items), lifestyle (4 items), appropriate techniques (4 items), cultural knowledge (4 items), and information comprehension (4 items), with a total score of 35 points. The criterion for possessing basic TCM health cultural literacy was set at a 60% correct response rate. The positive coefficients for the two rounds of Delphi expert consultation were 95.2% and 100.0%, respectively; the authority coefficient was 0.93, and the Kendall's coordination coefficients were 0.168 and 0.248 ($P < 0.05$), respectively. Pilot survey results showed that the overall Cronbach's alpha coefficient of the questionnaire was 0.912, and the Cronbach's alpha coefficients for each dimension ranged from 0.784 to 0.901. Item Response Theory (IRT) analysis revealed that the discrimination parameters of all items ranged from 1.58 to 3.30, and the difficulty parameters demonstrated a reasonable gradient distribution. Compared with the original questionnaire, the average completion time of the revised version was reduced from 18.6 minutes to 8.4 minutes. **Conclusion:** The TCM health cultural literacy survey questionnaire revised based on the KAP theory demonstrates good reliability, validity, and feasibility, with moderate item difficulty and effective discrimination among populations with different literacy levels. It can serve as a standardized assessment tool for large-scale population surveillance and targeted health education interventions.

KEYWORDS: Traditional Chinese medicine health cultural literacy, Knowledge-Attitude-Practice theory, Questionnaire, Delphi method.

1 INTRODUCTION

Health literacy, defined as an individual's capacity to obtain, understand, evaluate, and apply health information to make health decisions, has become one of

the core indicators of concern in global public health. In recent years, the conceptual framework of health literacy has evolved from functional literacy to a multidimensional competency model. The integrative

definition currently widely adopted in the international academic community emphasizes that health literacy involves not only basic literacy skills but also encompasses three core elements: knowledge, motivation, and competence, spanning the complete process of accessing, understanding, evaluating, and applying health information.^[1] Building upon this foundation, the three-tier model of functional, interactive, and critical health literacy provides an important theoretical basis for the development of health literacy assessment tools.^[2] This model indicates that functional literacy focuses on basic information acquisition capacity, interactive literacy emphasizes active communication and information exchange capacity, while critical literacy concentrates on information analysis and critical application capacity.

Currently, widely used international health literacy assessment tools include the Rapid Estimate of Adult Literacy in Medicine, the Test of Functional Health Literacy in Adults, the eHealth Literacy Scale, and the European Health Literacy Survey Questionnaire.^[3,4] These tools have demonstrated favorable psychometric properties in their respective application scenarios, yet they also have limitations, such as an overemphasis on functional literacy and insufficient assessment of digital health literacy.^[5] In China, the National Health Commission has established a resident health literacy surveillance system; the national health literacy level reached 29.7% in 2023,^[6] but significant urban-rural disparities and low literacy among key populations remain. In recent years, scholars have developed health literacy scales for specific populations, such as the Health Literacy Scale for family caregivers of preschool children, the Health Literacy Scale for community-dwelling older adults, and the Fall Health Literacy Scale^[7-9], providing methodological references for the development of indigenous health literacy assessment tools.

Traditional Chinese Medicine (TCM) health cultural literacy, as an important component of health literacy, possesses distinctive characteristics of traditional Chinese culture. Since 2016, the National Administration of Traditional Chinese Medicine, in conjunction with the National Health Commission, has organized the Chinese Citizens' TCM Health Cultural Literacy Survey. Surveillance data indicate that the TCM health cultural literacy level of Chinese citizens has gradually increased from 12.85% to 24.62% in 2023.^[10] However, the current survey questionnaire has not undergone systematic revision since its implementation and presents numerous methodological problems in practical application: first, the item difficulty is excessively high, including classical Chinese reading comprehension and acupoint image recognition items, which are extremely unfriendly to respondents with low educational attainment; second, there are too many multiple-choice items, resulting in high cognitive load and high surveyor explanation costs; third, the "don't know" and "wrong" options in true/false

items are easily confused, leading to measurement error; fourth, the table-based items have repetitive structures and are time-consuming to complete; fifth, there is a lack of explicit behavioral change theoretical support, with an overemphasis on knowledge and insufficient attention to behavior, making it difficult to predict actual health behaviors.^[11]

The Knowledge-Attitude-Practice (KAP) theory is a behavioral change theory widely applied in the field of health education. This theory posits that knowledge is the foundation, beliefs and attitudes are the driving force, and behavioral change is the ultimate goal.^[12] In recent years, the KAP theory has been widely applied in chronic disease self-management, occupational health, and oral health.^[13-15] However, existing studies have mostly focused on specific diseases or specific populations, and there is a lack of standardized TCM health literacy assessment tools for the general adult population that are based on the KAP theory and integrate modern health literacy models. Furthermore, the first TCM health literacy survey conducted in Hong Kong also revealed that the general public had obvious deficiencies in understanding TCM treatment knowledge and basic concepts; approximately 40% of respondents had difficulty distinguishing between Chinese patent medicines and health supplements, suggesting that existing assessment tools need further optimization to accurately reflect the true literacy levels of the population.^[16]

In view of this, this study employed the KAP theory as the core framework, integrated Nutbeam's health literacy stratification model and the fusion model of the Health Belief Model and the Theory of Planned Behavior, and used the Delphi expert consultation method, the Analytic Hierarchy Process, and field surveys to systematically revise the Revision of the Questionnaire on Traditional Chinese Medicine Health Cultural Literacy for Chinese Citizens. The aim was to construct a TCM health cultural literacy assessment tool with sufficient theoretical grounding, moderate item difficulty, good behavioral predictive validity, and applicability to large-scale population surveillance.

2 METHODS

2.1 Theoretical Framework Construction

This study employed the KAP theory as the core skeleton, mapping the questionnaire structure onto three continuous dimensions: knowledge, attitude/belief, and behavior. The knowledge dimension corresponded to TCM basic concepts, lifestyle, appropriate techniques, and cultural knowledge; the attitude dimension corresponded to residents' cognition of the value of TCM health culture and their understanding of the "preventive treatment of disease" concept, the behavior dimension corresponded to the TCM health preservation methods actually adopted by residents, recommendation behaviors, and preferred coping methods for minor discomfort. To further enhance the cognitive depth and

behavioral predictive validity of the questionnaire, this study integrated the functional, interactive, and critical health literacy dimensions of the health literacy stratification model into the questionnaire analysis. Simultaneously, combining the perceived susceptibility/severity of the Health Belief Model and the behavioral intention theory of the Theory of Planned Behavior,^[17] the questionnaire embedded a complete chain of “perceived TCM effectiveness → behavioral intention → actual action,” enabling the questionnaire to predict real health behaviors rather than merely measuring knowledge reserves.

2.2 Study Design

This study adopted a mixed-methods design divided into four phases: literature analysis and problem identification, expert consultation and indicator revision, pilot survey and psychometric evaluation, and field application validation.

2.2.1 Literature Analysis and Problem Identification

A systematic search was conducted in PubMed, Web of Science, CNKI, and Wanfang databases for literature on health literacy assessment tools, TCM health literacy, and the KAP theory to analyze the advantages and disadvantages of existing questionnaires. Simultaneously, semi-structured interviews were conducted with 10 administrators and 20 primary healthcare workers who had participated in the TCM health cultural literacy surveys from 2020 to 2023. Interview topics included whether the current questionnaire difficulty was appropriate, whether the assessment dimensions were comprehensive, and suggestions for questionnaire modification. In addition, 200 residents from the community (covering young, middle-aged, and elderly individuals; educational attainment covering bachelor's degree and above, high school/technical secondary school, and junior high school and below) were selected to complete the original questionnaire, and their evaluations of item difficulty, suggestions for deletion, and training needs were collected.

2.2.2 Expert Consultation and Indicator Revision

Based on the results of literature analysis and interviews, an initial item pool for the revised questionnaire was constructed. Twenty experts (in the fields of TCM, health education, public health, health literacy, and health management; with associate senior professional titles or above, or master's degrees or above; with working experience of ≥ 5 years) were invited to participate in two rounds of Delphi expert consultation. Experts scored each item on three dimensions—importance, feasibility, and sensitivity—using a scale of 1–10 points, and the Analytic Hierarchy Process was used to calculate the weight of each indicator. Item screening criteria: importance score ≥ 7.0 , coefficient of variation < 0.25 , and expert opinions tending toward consistency (Kendall's coordination coefficient approaching 0.5 and $P < 0.05$).

2.2.3 Pilot Survey Evaluation

Using multistage stratified sampling, 200 community residents aged 18 years and older were selected for the pilot survey. Inclusion criteria: local residence for ≥ 6 months, basic literacy capacity, and informed consent. Exclusion criteria: severe cognitive impairment or mental illness. Reliability was evaluated using Cronbach's alpha coefficient and split-half reliability. Validity evaluation included: content validity (item-level content validity index ≥ 0.78 , scale-level content validity index ≥ 0.90)^[18]; structural validity was evaluated using exploratory factor analysis and confirmatory factor analysis, with evaluation indices including the Comparative Fit Index (CFI > 0.90), Tucker-Lewis Index (TLI > 0.90), Root Mean Square Error of Approximation (RMSEA < 0.08), and Standardized Root Mean Square Residual (SRMR < 0.08)^[19]; simultaneously, the Graded Response Model (GRM) of Item Response Theory was used to estimate the discrimination (α) and difficulty (β) parameters of each item.^[20]

2.2.4 Field Application Validation

The revised questionnaire was applied in paper form at two community health service centers for field application validation. Uniformly trained community healthcare workers served as surveyors and administered the questionnaire face-to-face to 100 community residents. Feasibility indicators such as average completion time, frequency of surveyor explanations, and incidence of respondent comprehension difficulties were recorded and compared with historical data from the original questionnaire.

2.3 Statistical Analysis

SPSS 26.0 and AMOS 24.0 were used for Classical Test Theory (CTT) analysis, and R 4.3.1 was used for IRT analysis. Measurement data were expressed as mean $\pm$ standard deviation, and count data were expressed as frequency (percentage). The significance level was set at $\alpha = 0.05$.

2.4 Ethical Review

This study was approved by the Ethics Committee of Shenzhen Pingshan District People's Hospital. All subjects signed informed consent forms. All resident survey data were kept confidential and were used solely for this study; no data were disclosed individually.

3 RESULTS

3.1 Main Problems of the Original Questionnaire

Literature analysis and interview results revealed the following core problems with the original questionnaire: (1) poor cultural fairness: classical Chinese material analysis items (Su Shi's “Four Flavors of Longevity Medicine”) and image recognition items (Yongquan acupoint localization) were extremely unfriendly to respondents with low educational attainment and the elderly, and had limited relevance to core literacy. (2) unreasonable item design: 12 multiple-choice items required memorizing multiple correct options, resulting

in excessively high cognitive load; the “don’t know” and “wrong” options in true/false items were easily confused, leading to measurement error. (3) structural redundancy: the five large tables from A01 to A05 had repetitive structures and were time-consuming to complete. (4) insufficient theoretical support: there was a lack of explicit behavioral change theoretical framework, with weak measurement of the behavioral dimension and difficulty in predicting actual health behaviors.

3.2 Questionnaire Revision Process

3.2.1 Item Screening and Optimization

The initial item pool comprised 48 items. In the first round of Delphi consultation, 21 questionnaires were distributed and 20 were returned (positive coefficient 95.2%). Eight items with importance scores <7.0 or coefficients of variation ≥ 0.25 were deleted, and 12 items with unclear wording were modified. In the second round, 17 questionnaires were distributed (three experts who indicated they were not very familiar with the study or lacked the energy to complete the full assessment were excluded from the first round), and 17 were returned (positive coefficient 100.0%). The second-round expert authority coefficient was 0.91 ± 0.02 , and the Kendall’s coordination coefficient W was 0.268 ($P < 0.05$), indicating that expert opinions were tending toward consistency.

3.2.2 Weight Determination

The Analytic Hierarchy Process was used to construct judgment matrices and calculate the weight of each dimension. The weight of the knowledge dimension (B1-B16) was 0.421, the attitude dimension (A6, A7) was 0.198, the behavior dimension (A4, A5, A8) was 0.245, and the information capacity dimension (B17-B19) was 0.136. The consistency ratios of the weights for all dimensions were <0.10 , passing the consistency test.

3.2.3 Structure and Scoring Algorithm of the Revised Questionnaire

(1) Structure of the revised questionnaire

The final questionnaire comprised 35 items divided into two parts: Part A, the dissemination status and behavior survey (8 items), and Part B, the core literacy assessment (20 items), with an additional 7 items on basic information (Part F). The core literacy section covered five dimensions: conceptual cognition (B1-B4), lifestyle (B5-B8), appropriate techniques (B9-B12), cultural knowledge (B13-B16), and information comprehension (B17-B20). All items were single-choice items (including a “don’t know” option); true/false items, multiple-choice items, material analysis items, and image items were eliminated. The specific content of the revised questionnaire is detailed in Table 1.

Table 1. Overview of the Revised Chinese Citizens' Traditional Chinese Medicine Health Cultural Literacy Survey Questionnaire Part					
	Dimension	Item No.	Key Content	Item Type	Scoring Method
Part A	Dissemination status	A1	Methods of TCM health knowledge publicity in community/village	Multiple choice	Not scored
		A2	TCM health preservation knowledge explanation in medical institutions	Single choice	Not scored
		A3	Channels for learning TCM knowledge in the past year	Multiple choice	Not scored
		A4	TCM health preservation methods tried	Multiple choice	0.5/1 point
	Attitude	A5	Recommending TCM health preservation methods to family or friends	Single choice	0/0.25/0.5/1 point
		A6	Perceived helpfulness of learning TCM health knowledge for improving health	Single choice	0/0.5/1 point
	Knowledge	A7	Understanding of the meaning of “preventive treatment of disease” (<i>Zhi Wei Bing</i>)	Single choice	0/0.5/1 point
	Behavior	A8	Preferred coping method for minor discomfort	Single choice	0/1 point
Part B	Conceptual cognition	B1	Correct practice of conforming to natural health preservation	Single choice	0/1 point
		B2	Key to human health	Single choice	0/1 point
		B3	Main function of hot water foot soaking	Single choice	0/1 point

		B4	Meaning of “health preservation tailored to individual differences”	Single choice	0/1 point
	Lifestyle	B5	TCM perspective on three meals a day	Single choice	0/1 point
		B6	Function of midday napping in summer	Single choice	0/1 point
		B7	TCM-recommended exercise for health preservation	Single choice	0/1 point
		B8	TCM perspective on emotion and health	Single choice	0/1 point
	Appropriate techniques	B9	Situations unsuitable for self-administered moxibustion	Single choice	0/1 point
		B10	Function of massaging the Zusanli acupoint	Single choice	0/1 point
		B11	Cookware unsuitable for decocting Chinese herbal medicine	Single choice	0/1 point
		B12	Differences to consider when taking Chinese herbal medicine	Single choice	0/1 point
	Cultural knowledge	B13	Meaning of “Shennong tasting hundred herbs”	Single choice	0/1 point
		B14	Identification of TCM classic works	Single choice	0/1 point
		B15	Main function of hanging mugwort on Dragon Boat Festival	Single choice	0/1 point
		B16	Meaning of “preventing disease before it occurs”	Single choice	0/1 point
	Information comprehension	B17	Judgment of online information claiming “Chinese herbal medicine cures all diseases”	Single choice	0/1 point
		B18	Judgment of advertisements claiming “pure Chinese herbal medicine has no side effects”	Single choice	0/1 point
		B19	Preferred channel for querying reliable TCM knowledge	Single choice	0/1 point
		B20	Meaning of “harmony between human and nature”	Single choice	0/1 point
Part F	Basic information	F1–F7	Gender, age, educational attainment, occupation, health status, chronic diseases, household income	—	Not scored

Note: A1–A3 are background survey items and are not included in the literacy total score; A4–A8 are attitude and behavior items scored by gradient; B1–B20 are core literacy items, with 1 point for a correct answer and 0 points for a wrong answer or “don’t know.”

(2) Scoring algorithm and meaning of the total score

The revised questionnaire adopted a composite scoring model of “core literacy score + attitude and behavior score,” with a total score of 35 points. The specific scoring rules are as follows:

① **Core literacy dimension (B1–B20):** 20 items, 1 point each, with a full score of 20 points. Each item has four options, of which only one is the correct answer and the others are distractors or a “don’t know” option.

Respondents receive 1 point for selecting the correct answer and 0 points for selecting a wrong answer or “don’t know.” This dimension primarily measures respondents’ mastery of TCM basic concepts, lifestyle, appropriate techniques, cultural knowledge, and information evaluation capacity.

② **Attitude and behavior dimension (A4–A8):** 5 items, with a full score of 8 points, using gradient scoring to reflect the continuity of attitude strength and behavioral intention. A4 (methods tried): 0.5 points for selecting any one of options ①–⑤, 1 point for selecting multiple options, and 0 points for selecting ⑥ “none of the above”; A5 (recommendation behavior): 1 point for ① often, 0.5 points for ② occasionally, 0 points for ③

never, and 0.25 points for ④ want to but don't know how to explain (intentional behavior); A6 (perceived helpfulness): 1 point for ① very helpful, 0.5 points for ② somewhat helpful, and 0 points for ③ not very helpful / ④ not helpful at all / ⑤ unclear; A7 (understanding of preventive treatment): 1 point for ① know, 0.5 points for ② have heard of it but don't understand clearly, and 0 points for ③ don't know; A8 (preferred behavior): 1 point for ① or ⑤ (inclined toward TCM conditioning), and 0 points for ②③④.

③ Dissemination status dimension (A1–A3): 3 items, serving as background variables not included in the literacy total score, used only to describe the degree of TCM health cultural dissemination in the respondent's environment.

④ Literacy criterion: A total score ≥ 21 points (i.e., 60% of 35 points) is classified as "possessing basic TCM health cultural literacy." Simultaneously, a dimension pass system is established: knowledge dimension ≥ 12 points (60%), attitude and behavior dimension ≥ 4.8 points (60%), and information comprehension dimension ≥ 2.4 points (60%). If any dimension fails to meet the passing threshold, the respondent is not classified as possessing literacy even if the total score meets the criterion, to prevent the "lopsided" phenomenon and ensure that what is measured is integrative literacy rather than single-dimension cognition.

3.3 Pilot Survey Results

3.3.1 General Characteristics

A total of 200 questionnaires were distributed, and 186 valid questionnaires were returned, with an effective response rate of 93.0%. Among them, 87 were male (46.8%) and 99 were female (53.2%); 52 were aged 18–34 years (28.0%), 78 were aged 35–59 years (41.9%), and 56 were aged ≥ 60 years (30.1%); educational attainment: 48 had junior high school education or below (25.8%), 62 had high school/technical secondary school education (33.3%), and 76 had college/undergraduate education or above (40.9%).

3.3.2 Item Analysis

The critical ratio (CR) method and item-total correlation method were used for item analysis. The CR values of all items were > 3.0 ($P < 0.01$), and the item-total correlation coefficients ranged from 0.312 to 0.684 ($P < 0.01$), indicating that all items had good discriminatory power.

3.3.3 Reliability Analysis

The overall Cronbach's alpha coefficient of the questionnaire was 0.912. The Cronbach's alpha coefficients for each dimension were: dissemination status 0.801, conceptual cognition 0.784, lifestyle 0.823, appropriate techniques 0.856, cultural knowledge 0.879, and information comprehension 0.901. The split-half reliability was 0.891, and the split-half reliability for each dimension ranged from 0.761 to 0.884. Fifty individuals were randomly selected for retesting two

weeks later, and the intraclass correlation coefficient (ICC) for test-retest reliability was 0.889 (95% CI: 0.812–0.936).

3.3.4 Validity Analysis

Content validity: Eight experts were invited to evaluate content validity. The item-level content validity index (I-CVI) ranged from 0.875 to 1.000, the scale-level content validity index based on the average (S-CVI/Ave) was 0.947, and the S-CVI based on universal agreement (S-CVI/UA) was 0.886, all meeting the recommended standards.^[18] **Structural validity:** Exploratory factor analysis extracted six common factors, with a cumulative variance contribution rate of 73.84%, and the factor loadings of each item ranged from 0.512 to 0.893.

3.3.5 IRT Analysis

The Graded Response Model was used to estimate the parameters of each item. The discrimination parameters (α) ranged from 1.58 to 3.30, all > 1.5 , indicating that all items had good discriminatory capacity. The difficulty parameters (β) demonstrated a reasonable gradient distribution, ranging from -2.14 (relatively easy) to 1.86 (relatively difficult), capable of covering respondents with different ability levels. The information function curve showed that the questionnaire provided maximum measurement information in the ability range of -1.5 to 1.0, which corresponds precisely to the distribution range of literacy levels among ordinary community residents.

3.4 Comparison with the Original Questionnaire

The average completion time of the revised questionnaire was 8.4 ± 2.1 minutes, significantly shorter than the 18.6 ± 4.1 minutes of the original questionnaire ($t = 28.4$, $P < 0.001$). The selection rate for the "don't know" option decreased from 23.4% to 11.2%; particularly among those with junior high school education or below, this proportion decreased from 34.6% to 15.8%, indicating that the readability and answerability of the revised questionnaire were significantly improved. Among the 100 respondents' evaluations of the difficulty of the new questionnaire, 96 indicated that the questionnaire was "easy to understand" or "relatively easy to understand," 4 indicated "moderate," and none indicated "difficult to understand."

4 DISCUSSION

The main contribution of this study lies in the systematic introduction of the KAP theory into the development of TCM health cultural literacy assessment tools. This study used the KAP theory as the core skeleton to organically integrate the three dimensions of knowledge, attitude, and behavior, enabling the questionnaire to assess not only "whether one knows" but also "whether one believes" and "whether one acts," thereby avoiding the generation of a false literacy population with "high knowledge but low behavior." This design concept is consistent with recent KAP studies conducted among gout patients,^[13] hand eczema patients,^[14] and head-and-neck cancer radiotherapy patients,^[15] all of which have

confirmed the unique value of the three KAP dimensions in explaining health behaviors.

Simultaneously, this study integrated Nutbeam's^[2] health literacy stratification model, embedding the three cognitive levels of functional, interactive, and critical health literacy into the questionnaire. Part A (dissemination status) primarily measures functional literacy, i.e., basic information acquisition capacity; A5 (recommendation behavior) and A2–A3 (information channels) measure interactive literacy, i.e., active communication and information exchange capacity; and B17–B19 (information discrimination) measure critical literacy, i.e., the capacity to analyze and evaluate false medical advertisements and health supplement promotions. This design ensures that the questionnaire can comprehensively cover the cognitive depth of health literacy, consistent with the current international trend in health literacy research of transitioning from single functional measurement to multidimensional competency assessment.^[1,5]

Furthermore, this study integrated the Health Belief Model and the Theory of Planned Behavior,^[17] constructing a complete predictive chain of “perceived TCM effectiveness → behavioral intention → actual action” in item A8. Research has confirmed the effectiveness of the KAP chain in predicting health behaviors.^[20] This study applied this model to the prediction of TCM health behaviors, endowing the questionnaire with behavioral predictive validity and enabling precise identification of target populations for subsequent health education and behavioral interventions. At the methodological level, this study employed a combination of the Delphi expert consultation method and the Analytic Hierarchy Process to determine indicator weights, ensuring the scientific rigor and authority of the questionnaire content. The two rounds of Delphi consultation indicated that expert opinions were highly consistent and reliable, and evaluation revealed that the revised questionnaire had good reliability and validity.

This study comprehensively revised the original questionnaire to address its specific problems. First, classical Chinese material analysis items and image recognition items were deleted. The original questionnaire's material analysis item on Su Shi's “Four Flavors of Longevity Medicine” required respondents to read a long passage of classical Chinese and answer three questions, which was extremely unfriendly to respondents with low educational attainment. Zhang et al.^[11] found in their survey of TCM health literacy among rural older adults that educational attainment was one of the main influencing factors of literacy level, and excessively complex items would exacerbate measurement bias between urban and rural areas and across educational levels. Deleting these items significantly improved the cultural fairness of the questionnaire. Second, the 12 multiple-choice items were

reduced to 4, and true/false items were changed to single-choice items. The original questionnaire's multiple-choice items required respondents to identify multiple correct options, resulting in excessively high cognitive load, and surveyors had to repeatedly explain the answering rules, increasing survey costs. After changing to single-choice items, the average completion time was nearly halved, and by setting a “don't know” option, “erroneous cognition” and “knowledge deficiency” were effectively distinguished, reducing measurement error. Third, repetitive table-based item structures were merged. The original questionnaire's A01–A05 separately investigated publicity in streets, medical institutions, cities, workplaces, and schools, with highly repetitive structures. The revised version merged these into 2–3 comprehensive items using a “multiple choice” format, preserving information integrity while substantially improving completion efficiency.

The annual surveillance work currently implemented by the National Administration of Traditional Chinese Medicine urgently requires a standardized tool that balances scientific rigor with operability. The revised questionnaire controls completion time to within 10 minutes, with a uniform single-choice item format, significantly reducing the workload of primary surveyors and making it suitable for routine surveillance work at community health service centers, township health centers, and village clinics. At the health education intervention level, the dimension pass system design of the revised questionnaire can provide a basis for precise interventions. Research shows that classification-based intervention strategies based on assessment results are consistent with the current development trend of health literacy research extending from “measurement” to “intervention.”^[16,24]

This study has the following limitations. First, although the pilot survey sample covered different age groups and educational attainment levels, it was only from southern China, limiting geographical representativeness; future validation of the cross-cultural applicability of the questionnaire in multi-regional, large-scale populations is needed. Second, the cross-sectional design of this study cannot evaluate the predictive validity of the questionnaire for long-term health behavior change; longitudinal follow-up studies should be conducted subsequently. Third, although the analysis showed that the item parameters of this questionnaire were favorable, a national norm has not yet been established; future development of graded evaluation standards based on national surveillance data is needed. Therefore, we will further integrate the revised questionnaire with community health management systems and develop specialized TCM health literacy assessment tools for specific populations (such as primary and secondary school students, chronic disease patients, and pregnant women) to form a full life-cycle assessment system.

CONCLUSION

This study successfully revised the Chinese Citizens' Traditional Chinese Medicine Health Cultural Literacy Survey Questionnaire. The revised questionnaire has good reliability, validity, and feasibility, with moderate item difficulty and effective discrimination among populations with different literacy levels. It can provide a scientific basis for the surveillance and evaluation of TCM health literacy among Chinese residents and is of great significance for promoting the popularization of TCM health culture and improving residents' health behaviors.

Funding

This research was funded by Shenzhen Science and Technology Planning Project, grant number JCYJ20240813115129039, and National Administration of Traditional Chinese Medicine 2025 Research Project on TCM Monitoring and Statistical Studies, grant number 2025JCTJB40.

Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

1. Sørensen K, Van den Broucke S, Fullam J, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health*, 2012; 12: 80.
2. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int.*, 2000; 15(3): 259-267.
3. Petrič G, Atanasova S. Validation of the extended e-health literacy scale: structural validity, construct validity and measurement invariance. *BMC Public Health*. 2024; 24: 1991.
4. Shu-Hsin Kuo, Ming-Hao Liang. Development and validation of the Health Literacy Scale for community-dwelling older adults in Taiwan. *Health Promot Int.*, 2023; 38: daad112.
5. Diviani N, Putte BD, Giani U, Zanaboni P. Low health literacy: the need for an action plan in the European region. *Int J Environ Res Public Health*, 2023; 20(5): 4066.
6. National Health Commission of the People's Republic of China. 2023 China health literacy monitoring report. Beijing: People's Health Publishing House, 2024.
7. Yitong Jia, Xinqi Zhuang, Yanzi Zhao, et al. Development and psychometric validation of a novel health literacy scale for family caregivers of preschool children. *Health Qual Life Outcomes*, 2025; 23: 349.
8. Wang X, Zhang C, Qi Y, et al. Digital health literacy questionnaire for older adults: instrument development and validation study. In: *14th Hong Kong International Nursing Forum cum 2024 Sino US Nursing Forum cum 2nd Greater Bay Area Nursing Conference*. Hong Kong, 2024.
9. Sun Y, Sun J, Zhao Y, et al. Development and validation of a fall health literacy scale for Chinese hospitals from the perspective of older adults. *Front Public Health*, 2025; 13: 1675579.
10. National Administration of Traditional Chinese Medicine. 2023 Chinese citizens traditional Chinese medicine health cultural literacy survey report. Beijing: National Administration of Traditional Chinese Medicine; 2024.
11. Zhang H, Zhang Y, Yan Y, et al. Traditional Chinese medicine health literacy among rural older adults: a cross-sectional study. *Front Public Health*, 2024; 12: 1361572.
12. Kishore J, Kohli C, Sharma B. Knowledge, attitude and practices about reproductive health and family planning among rural population: a cross-sectional study. *Indian J Community Med.*, 2023; 48(2): 214-218.
13. Yonglong Yan, Yonglong Yan, Yashuang Su, Wenhui Li, et al. Knowledge, attitudes, and practices regarding gout management among patients in Xiamen, China: a cross-sectional study. *Front Public Health*. 2026; 14: 1786934.
14. Huang L, Liu M, Chen X, et al. Knowledge, attitudes, and practices of hand eczema patients in Guangdong, China. *Front Public Health*, 2025; 13: 1706796.
15. Yajun Chen, Shuang Yang, et al. Knowledge, attitude, and practice of oral nutritional supplements in patients undergoing radiotherapy for head-and-neck cancer. *Front Nutr.*, 2025; 12: 1633423.
16. Our Hong Kong Foundation. Elevating Chinese medicine through health literacy. Hong Kong: Our Hong Kong Foundation; 2026. <https://www.ourhkfoundation.org.hk/en/media/reports>
17. Rosenstock IM. The health belief model and preventive health behavior. *Health Educ Monogr*, 1974; 2(4): 354-386. <https://doi.org/10.1177/109019817400200405>
18. Polit DF, Beck CT, Owen SV. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health*, 2007; 30(4): 459-467.
19. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling*, 1999; 6(1): 1-55.
20. Daidi Wang, Xiaoyan Wang, Zhongqing Li, Xue Wei & Biaoxin Zhang. Knowledge, attitudes, and practices (KAP) regarding physical activity among patients aged 20–60 with coronary heart disease. *Sci Rep.*, 2026; 16: 37839.
21. Fitzner K, Wolf A, Kramer A, et al. Developing a measurement instrument for physical activity-related health literacy (PA-HL): results from an eDelphi and cognitive interviews. *J Public Health*, 2026; 34: 1-12.
22. Lin Y, Tong Y, Zhang C, et al. Chinese version of the 16-item of European Health Literacy Survey

Questionnaire and its reliability and validity test. *Nurs Res.*, 2024; 38(10): 3586-3591.

23. Zhao S, Zou S, Li X, et al. Evaluation of reliability and validity of Chinese version of a short-form of Health Literacy Dental scale (HeLD-14) in the application among parents of preschool children. *J Peking Univ Health Sci.*, 2024; 56(5): 828-832.
24. C Zhenzhen, R Jiabao, D Tingyu, C Ke, H Ruy, et al. Development and validation of a short form of the medication literacy scale for Chinese college students. *ArXiv*, 2024.