



The Development of an Evaluation Index System for Assessing the Impact of Sports Tourism on the Health of the Elderly in Xi'an City

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Abstract

Background and Aim: With the deepening of population aging, attention to the health issues of the elderly has become particularly important. Sports tourism, as a beneficial activity for physical and mental well-being, has great potential for maintaining and enhancing the health of the elderly. However, there is currently a lack of a systematic evaluation index system to assess the impact of sports tourism on the health of the elderly. This research objective was to develop the evaluation index system for assessing the impact of sports tourism on the health of the elderly in Xi'an City.

Materials and Methods: This study took the construction of the evaluation index system of sports tourism on the health of the elderly aged 60 and above in Xi'an as the research object, and selected experts including 5 Elderly social science-related teachers were selected from universities. Two rounds Delphi method uses 17 Elderly experts in related fields, sports government departments, and managers of the Palace of Culture for the elderly to participate in the expert consensus on key indicators. Use organized a focus group composed of 9 elderly teachers from universities, sports government departments, and administrators of the Cultural Palace for the Elderly.

Result: (1) The Kendall's W values of the first-level, second-level, and third-level indicators were 0.208, 0.169, and 0.156 all of the W values show relatively low agreement. The P-value of the first-level, second-level, and third-level indicators were 0.014, 0.000, and 0.000 indicating that the observed difference is statistically significant. (2) Physical health measurement and mental health measurement are the most important first-level indicators, with weights of 0.37 and 0.38. Physical fitness measures, the ability to perform activities of daily living, and disease status are the most important secondary indicators. The mental health measures, positive performance, and negative performance are the most important third indicators. The social health measure and the sports tourism activity measure were relatively low weighted at 0.16 and 0.09, respectively. This means that for the health evaluation of the elderly in Xi'an, the importance of physical and mental health and social health is higher.

Conclusion: (1) The evaluation index system of sports tourism for the health of the elderly in Xi'an was constructed, and 4 first-level, 14 secondary, and 37 third-level indicators were finally formed. (2) The weight ratio of indicators at all levels was determined. (3) Through focus group discussion, the importance of sports tourism on the health of the elderly in Xi'an was concluded.

Keywords: Sports Tourism; Elderly; Evaluation Index System; Health Effects

Introduction

The health of elderly individuals is one of the significant challenges faced by society today. With the deepening of population aging, attention to the health issues of the elderly has become particularly important. Liu, N., et al. (2021) From the perspective of challenges, population aging will reduce the supply of labor, increase the burden of family pensions, and the pressure on the supply of basic public services. At the same time, we must also see that the aging of the population has promoted the development of the "silver economy", expanded the consumption of elderly products and services, and is also conducive to promoting technological progress. This opens up some new opportunities. The health of the elderly not only directly affects their individual quality of life and well-being but also has important implications for social and economic development and social stability. Therefore,



to better meet the health needs of the elderly and improve their quality of life, it is necessary to conduct in-depth research on elderly health issues and seek effective health promotion strategies.

Bao, L., & Wu, J. (2021) Sports tourism, as a beneficial activity for physical and mental well-being, has great potential for maintaining and enhancing the health of the elderly. Through sports tourism activities, elderly individuals can actively engage in physical exercise, improve their physical fitness, enhance their psychological well-being, and derive enjoyment and satisfaction from social interactions. However, there is currently a lack of a systematic evaluation index system to assess the impact of sports tourism on the health of the elderly. This limitation hampers the formulation and promotion of relevant policies and practices.

Therefore, constructing an evaluation index system to scientifically assess the impact of sports tourism on the health of the elderly in Xi'an City is of great significance for guiding the government and related organizations in formulating policies for elderly health and promoting their health development.

By conducting this study, a scientific and systematic evaluation index system can be established, taking into account factors such as the physical health, psychological well-being, and social adaptability of the elderly. This will provide a scientific framework and methodology for related research and practices, making the assessment more objective and comparable. Based on the research results of the evaluation index system, the government, and relevant organizations can gain a more accurate understanding of the actual impact of sports tourism on the health of the elderly, formulate targeted policies and measures, provide appropriate sports tourism services and resource support, and thus better promote the health development of the elderly.

Furthermore, the findings of this study can also provide research methods and theoretical exploration in the academic community regarding elderly health. The process of constructing an evaluation index system requires the comprehensive application of theories and methods from relevant disciplines, thus offering new ideas and approaches for academic exploration in the field of elderly health research. By continuously improving and expanding the evaluation index system, a more in-depth investigation of the mechanisms and pathways through which sports tourism affects the health of the elderly can be conducted, providing a more scientific theoretical foundation for promoting elderly health.

In conclusion, the importance of this study lies in providing important references and guidance for exploring the impact of sports tourism on the health of elderly individuals aged 60 and above in Xi'an City. By constructing an evaluation index system, we can scientifically assess the influence of sports tourism on the physical health, psychological well-being, and social adaptability of the elderly. This will provide a scientific basis for relevant policies and practices, promoting the development of elderly health. Additionally, this study is expected to provide innovative directions for research methods and theoretical exploration in the academic community, driving the development of the discipline in the field of elderly health.

Objectives

The main objective of the study was to construct an evaluation index system for Assessing the Impact of Sports Tourism on the Health of the Elderly in Xi'an City.

Literature Review

The "Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China" was authorized and released during the Two Sessions in March 2016. It proposed to accelerate the development of sports and fitness, promote nationwide fitness activities, and strengthen the development of human resources and the protection of rights for the Elderly. This set



the tone for promoting the construction of elderly sports and fitness during the "Thirteenth Five-Year Plan" period. In May 2016, the State Council issued the "Sports Development 'Thirteenth Five-Year Plan'", establishing the guiding ideology of implementing the national strategy for nationwide fitness and promoting the construction of a Healthy China. It proposed a comprehensive promotion in terms of "fitness facilities, fitness activities, fitness organizations, and fitness guidance" and emphasized the protection of the sports rights of the Elderly as a special group in the nationwide fitness strategy. In October 2016, the Party Central Committee and the State Council issued the "Healthy China 2030 Plan", which identified "ensuring that everyone has access to basic sports and fitness services" as one of the strategic goals. It emphasized the positive role of sports and fitness in health promotion and highlighted the need to address the health issues of the Elderly and promote their active participation in nationwide fitness.

In July 2019, the State Council issued the "Healthy China Action (2019-2030)", which identified "national fitness action" and "elderly health promotion action" as the main indicators and major action tasks for the next stage of development. It proposed action goals from individual, family, society, and government perspectives. In September 2019, the General Office of the State Council issued the "Outline for Building a Sports Power", which outlined the strategic task of promoting sports activities for key population groups, including the Elderly. The "Thirteenth Five-Year Plan" for the development of the sports industry issued by the General Administration of Sport of China in 2016, explicitly stated the need to vigorously promote the integration and development of sports with tourism, culture, health, technology, and other industries, with the integration of sports and tourism as the core task. In the same year, the National Tourism Administration and the General Administration of Sport of China signed a cooperation agreement on promoting the integration and development of sports tourism and jointly issued the "Guiding Opinions on Promoting the Development of Sports Tourism", outlining the blueprint for the development of sports tourism at the national level. In 2018, the State Council issued the "Opinions on Further Expanding Consumption in the Fields of Tourism, Culture, Sports, Health, Elderly Care, Education, and Training", which emphasized the vigorous development of sports tourism and the improvement of the quality of happiness industry services consumption. To implement the policies on sports and tourism industry development and the "Healthy China 2030 Plan" issued by the State Council and relevant ministries, and promote the sustainable development of the sports, health, and tourism industries in Shaanxi Province.

Research on the health of the Elderly in China

Wang et al., (2018) investigate the relationship between socioeconomic status (SES), health-related behavior, and elderly health in China. The study examines how factors such as income, education, and health behaviors impact the health outcomes of the elderly population. (Hao et al., 2019) employ a propensity score matching difference-in-difference (PSM-DID) model to assess the causal effect of a health management program for the elderly in basic public health services on the health-related quality of life (HRQoL) of elderly individuals in China. The research aims to evaluate the effectiveness of the program in improving the overall well-being and quality of life of the Elderly. (Liu et al., 2019) investigate the influence of social engagement on elderly health in China. The study examines how factors such as social interactions, community involvement, and support networks affect the health outcomes of older individuals. The findings contribute to a better understanding of the importance of social connections for promoting healthy aging.

Zheng et al. (2019) explore the disparities in health outcomes among different age groups across 43 neighborhoods in Shanghai, China. By analyzing data from the 2015 fourth sampling survey of the elderly population in China, the study examines how neighborhood characteristics and individual socioeconomic factors impact health disparities among the Elderly.



Fan et al. (2019) employ the geographical differentiation index to examine the spatial distribution of health inequalities among Chinese provinces. The study analyzes data on health status and individual socioeconomic information to identify regional variations in health outcomes among the elderly population. The findings highlight the need for targeted interventions to address health disparities across different regions. (Sun et al., 2021) aim to enhance elderly health by leveraging social capital and promoting a healthy aging strategy. The study emphasizes the role of social connections, community support, and engagement in improving the well-being and quality of life of older individuals.

The research provides insights into the importance of fostering social capital for healthy aging. (Shao et al., 2022) employed data from the 2018 China Health and Senior Care Tracking Survey (CHARLS) to select a sample of 8383 individuals aged over 60 years as participants in the study. (Mata et al., 2022) conducted a comprehensive review on indoor air quality in elderly centers, encompassing an examination of the types of pollutants, their sources of emission, and their impacts on health. (Fhon et al., 2022) investigated the infodemic of COVID-19 and its implications for the mental well-being of the elderly population in São Paulo, with a total of 411 participants included in the study. (Zhu, H., & et al. 2022) developed an extensive research framework utilizing data from the 2018 China Health and Retirement Longitudinal Study (CHARLS), employing a range of statistical techniques such as ordinary least squares regression, heterogeneity analysis, instrumental variable two-stage least squares, robustness testing, and Karlson-Holm-Breen mediating effect analysis to comprehensively examine the effects of neighborhood health on the physical health of Elderly.

Research on the health of the elderly aboard

Hassen et al. (2019) propose an e-health system based on the Internet of Things (IoT) and Fog computing for monitoring elderly health. The system utilizes IoT devices and cloud computing technologies to collect and analyze health data in real-time, enabling timely interventions and improving the overall health monitoring and management of the Elderly.

Araújo et al. (2021) investigate the health conditions that may be potential risk factors for severe COVID-19 among elderly individuals residing in Long-Term Care Facilities (LTCFs). The study examines the association between health conditions and body mass index (BMI) in this population. The findings contribute to a better understanding of the factors that may increase the vulnerability of the Elderly to severe Covid-19 outcomes.

Abbaspur-Behbahan, & et al. (2022) identify the key factors contributing to the success of information and communication technology tools, such as mobile health (m-health), in promoting behavior change and improving the health outcomes of the elderly population. The research focuses on understanding the factors that influence the adoption and effective utilization of these tools in healthcare settings.

The primary objective of this study is to explore the association between health status, social security status, and the prevalence of depression among the Elderly. The findings of this research will contribute to the development of mental health care services for the elderly population.

Diniz et al. (2023) provided insights into the provision of Integrated Care for Health Promotion (ICHP) targeting the elderly population within health services. Zendehtalab, H., & et al. (2023) investigated the ethical challenges associated with the care of healthy Elderly, employing qualitative perspectives and obtaining written informed consent from the participants. Jalali et al. (2023) identified cost and access barriers, including transportation issues, as the primary obstacles to the participation of the Elderly in health-related activities. Çiftci et al. (2023) conducted a study to assess the impact of health literacy and health promotion on the quality of life among the elderly. Additionally, the influential work by Hou et al. (2023) should be noted.



Research on the exercise of the elderly

Wang (2016) proposed organized management through "elderly sports associations" to reduce the government's pressure and lower the cost of government management. Fan, C., et al. (2019) proposed the goal of joyful and healthy education in senior universities, emphasizing that physical education for older adults should focus on improving physical and mental health, promoting interaction among individuals and groups, and continuously enhancing the quality of life for older adults. Educational capital differences can cause social stratification and, in turn, lead to the stratification of exercise behavior (Zhu, H., & et al., 2022). Proposes a community-based model for promoting sports activities tailored to meet the health needs of the modern elderly population. By integrating community resources and promoting active participation, the model aims to enhance the physical and mental well-being of older individuals and address the unique challenges they face in maintaining an active lifestyle.

In response to the challenges posed by cervical spondylosis, a condition that can cause significant physical and psychological distress, (Sun, Y., & et al., 2021) proposed a study on the regulation of cervical spondylopathy in the elderly through sports dance. This research aims to explore the potential benefits of sports dance as an alternative and more efficient approach to traditional treatment methods, which often require considerable time and effort. The relationship between self-efficacy, sports participation, and health promotion behavior among middle-aged and elderly individuals. This study sought to investigate how self-efficacy beliefs influence one's engagement in sports activities and subsequent health promotion behaviors, providing valuable insights for developing effective health interventions.

Overall, these studies collectively contribute to the knowledge and understanding of fan motivations, business models in event sport tourism, strategic planning, sport tourism legacies, social impacts, well-being, and sustainability in the context of sports and tourism.

Conceptual Framework

The research title "The Development of an Evaluation Index System for Assessing the Impact of Sports Tourism on the Health of the Elderly in Xi'an City" was designed as follows

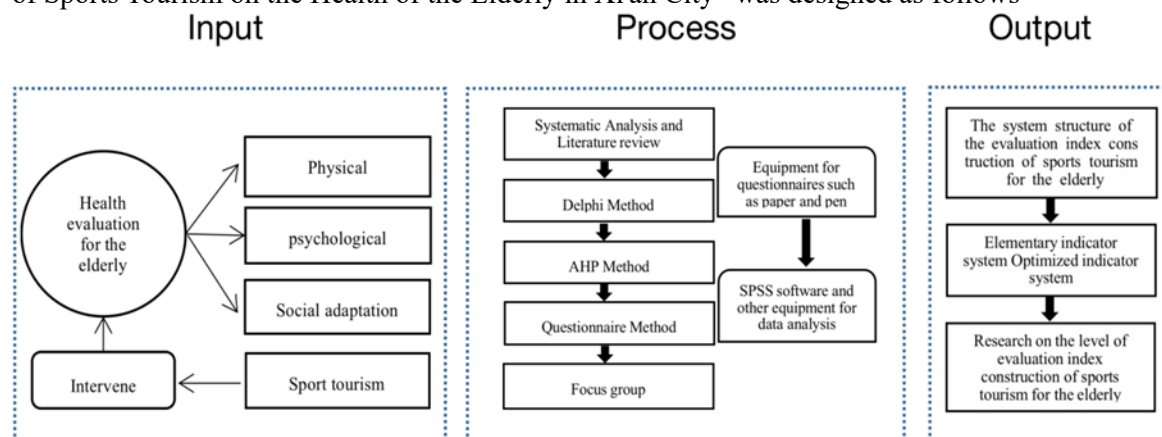


Figure 1 Conceptual Framework

Methodology

1. Population and sample

This study aims to construct an evaluation index system for sports tourism on health for the elderly aged 60 and above in Xi'an. So, all of the Sample experts including five Elderly social science-related teachers were selected from colleges and universities, 17 Elderly experts in related fields,



sports government departments and managers of the Palace of Culture for the Elderly, and 9 Elderly teachers from universities, sports government departments and administrators of the Cultural Palace for the Elderly for a focus group.

2. Research Instruments

2.1 The first questionnaire: IOC questionnaire for evaluation indicators.

2.2 The second questionnaire: Cronbach's Alpha Expert Survey Scale for Evaluation Indicators.

2.3 The third questionnaire: Expert Consensus Questionnaire Using the Delphi Method.

2.4 Evaluation index system weight table.

3. Data Collection

3.1 By analyzing the IOC questionnaire of 5 experts, we can derive IOC values.

3.2 To assess the reliability of the questionnaire, we used Cronbach's alpha expert questionnaire. Cronbach's alpha coefficient is a commonly used metric to assess the reliability of multidimensional scales. We will use the consistency between scores on each item in Cronbach's alpha coefficient analysis scale. If Cronbach's alpha coefficient is greater than or equal to 0.7, it indicates that the questionnaire has a high degree of confidence and the scale can be considered reliable.

3.3 When using the Delphi method, we distributed expert questionnaires to 17 experts by online mail and conducted two rounds of questionnaire distribution and collection. For the indicator data of the questionnaire, we adopted the following deletion criteria: 1) the coefficient of variation CV was less than 0.25; 2) the expert evaluation results reached the consistency test, and the Kendall harmony coefficient P was less than 0.01 or 0.05; 3) the average score of the selected indicators was more than 70% of the total score (that is, more than 3.5 points).

3.4 For weight calculation, we employed the Analytic Hierarchy Process (AHP). We distributed the weight table of the evaluation indicator system to experts and collected and organized their questionnaires. Any questionnaires that did not meet the criteria were excluded, and then the scores were statistically analyzed using the weighted product method.

4. Data analysis

4.1 In this study, SPSS AU software was mainly used to analyze the data. Statistics test work using mean, standard deviation, coefficient of variation, frequency statistics, Kendall harmony coefficient, and analytic hierarchy.

4.2 The SPSS statistical package includes the following algorithms: conventional statistical functions, regression analysis, and prediction, analysis of variance, non-parametric functions, multivariate statistics, and other algorithmic functions.

The research method is outlined as follows:

Step 1: Review the literature and research to construct the systematic structure of sports tourism for the health of the elderly.

Step 2: Prepare an expert consultation form for evaluation indicators.

Step 3: 5 experts tested the validity and reliability of the expert consultation form.

Step 4: 17 experts used the Delphi method to reach a consensus on the most appropriate indicator.

Step 5: Determine the weight of evaluation indicators. Use analytic hierarchy to determine the weights for each metric.

Step 6: Conduct focus group discussions to verify the rationality and feasibility of the evaluation index system.

Step 7: Summarize the research results and write the final report.

Results



The research results include the specific process of indicator screening, the result of two rounds of Delphi analysis conducted for the final indicators, and the determination of the weight of evaluation indicators

1. The specific process of indicator screening

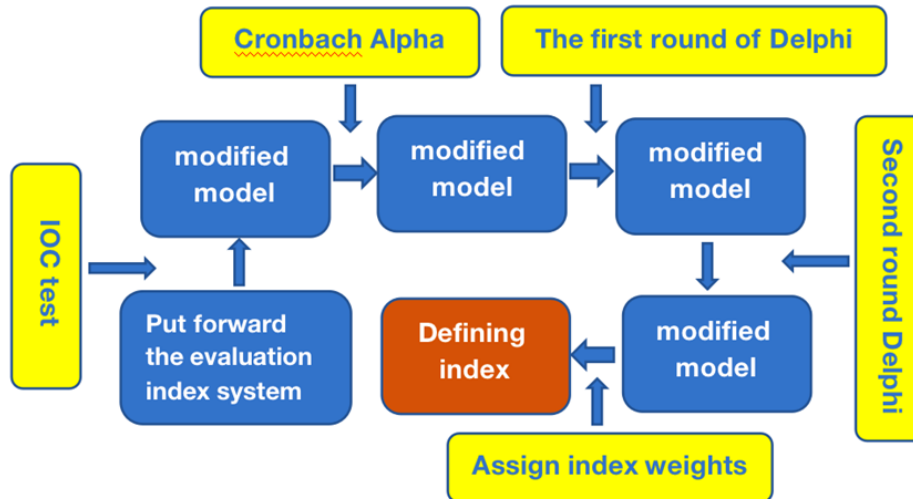


Figure 2 Research flow chart

1. Propose an evaluation indicator system to systematically assess and measure the relevant factors of a specific problem or objective.
2. After conducting the IOC (Indicator Validity Test), revise the model for the first time to ensure that the selected evaluation indicators are closely related to the content being assessed and possess validity.
3. After undergoing Cronbach's reliability test, make the second adjustment to the modified model to evaluate the internal consistency and stability of the evaluation indicators.
4. Upon completing the first round of the Delphi survey, incorporate expert opinions to make the third revision of the model, further enhancing the indicator system.
5. After completing the second round of the Delphi survey, determine the final evaluation model by considering expert opinions and consensus, thus establishing the importance and applicability of the indicators.
6. Allocate weights to the identified evaluation indicators to ensure a reasonable reflection of their relative importance in the evaluation process, thus forming the final indicator system.

2. The result of two rounds of Delphi analysis

Table 1 Statistical table of first-level index consistency test

Rounds	Number of experts	Kendall'W	P value
After two rounds	17	0.208	0.014

An analysis of the statistical results of the first-level indicator consistency test following: Number of rounds and experts: The statistical results here are based on the second round of evaluation, in which a total of 17 experts participated. Kendall's W value: Kendall's W statistic is used to measure consistency between first-level indicators. Here, the resulting Kendall's W value is 0.208. The P-value



is 0.014, which is the significance level when performing hypothesis testing. Here, a p-value of 0.014 indicates that the observed difference is statistically significant.

Table 2 Statistical table of second-level index consistency test

Rounds	Number of experts	Kendall'W	P value
After two rounds	17	0.169	0.000

An analysis of the statistical results of the second-level indicator consistency test following: Number of rounds and experts: The statistical results here are based on the second round of evaluation, in which a total of 17 experts participated. Kendall's W value: Kendall's W statistic is used to measure consistency between first-level indicators. Here, the resulting Kendall's W value is 0.169. The P-value is 0.000, which is the significance level when performing hypothesis testing. Here, a p-value of 0.000 indicates that the observed difference is statistically significant.

Table 3 Statistical table of third-level index consistency test

Rounds	Number of experts	Kendall'W	P value
After two rounds	17	0.156	0.000

An analysis of the statistical results of the third-level indicator consistency test following: Number of rounds and experts: The statistical results here are based on the second round of evaluation, in which a total of 17 experts participated. Kendall's W value: Kendall's W statistic is used to measure consistency between first-level indicators. Here, the resulting Kendall's W value is 0.156. The P-value is 0.000, which is the significance level when performing hypothesis testing. Here, a p-value of 0.000 indicates that the observed difference is statistically significant.

The establishment of sports tourism on the construction of the health evaluation index system for the elderly in Xi'an must follow the systematic, scientific, and combined with expert opinions and suggestions.

Table 4 Table of the indicator system

Level 1 indicators	Level 2 indicators	Level 3 indicators
A - Physical Health Measurement	A1 General Condition	A11Nutritional status
		A12Sleep conditions
		A13Visual acuity
		A14Hearing
		A15Eating situation
	A2 Ability to perform activities of daily living	A21 Basic activities of daily living
		A22 Instrumental activities of daily living
	A3 Disease state	A31 Risk factors affecting health
		A32 Chronic diseases
	B1 Positive performance	B11 Cognitive function
		B12 Life satisfaction



Level 1 indicators	Level 2 indicators	Level 3 indicators
B- Mental health measurement	B2 Negative performance	B21 Anxiety
		B22 Depression
	B3 Health literacy	B31 Understanding aging
		B32 Health knowledge and education
C- Social Health Measurement	C1 Social participation	C11 Community Involvement
		C12 Political participation
	C2 Social adaptation	C21 Acculturation
		C22 technology adaptation
		C23 Environmental adaptation
	C3 Social support	C31 Social Services Resources
		C32 Family relationship support
D- Sports Tourism Activity Measurement	D1 Basic Information	D11 Status and work
		D12 Basic personal information
		D13 Suggestions or comments
	D2 The crowd and its way	D21 Personnel mix and relationships
		D22 days and cost bearers
		D23 Choice of travel mode
		D24 Information search method
	D3 Motivation and Purpose	D31 Health Promotion
		D32 Social interaction
		D33 Explore and Adventure
		D41 Evaluation of the effect of this sports tourism
		D42 Evaluation of happiness in the process of sports tourism
		D43 Evaluation of Fatigue During Sports Tourism
	D5 Response to problems	D51 Handling of tight strokes
		D52 ways to respond to unsatisfactory matches



Table 1 shows that the final index includes 4 first-level, 14 second-level, and 37 third-level indicators, and establishes the evaluation index system.

3. Determination of the weight of evaluation indicators

This round of weight calculation uses AHP (analytic hierarchy method). Failed questionnaires are eliminated and scores are counted using sums and products. Through analysis, we derive the weight of the primary indicator, the relative weight of the secondary indicator, and the relative weight of the third-level indicator.

The steps of AHP include:

1. Establish a hierarchy: hierarchical decision-making issues and determine hierarchical relationships such as overall goals, guidelines, sub-criteria, and programs.
2. Construct a judgment matrix: collect the relative importance judgment between the indicators at different levels of comparison by sending questionnaires or expert discussions to experts. These judgments are represented by a judgment matrix, where each element represents a comparison of the relative importance of one metric over another.
3. Calculate weight: Calculate the weight of each indicator by mathematically processing the judgment matrix. Commonly used calculation methods include the eigenvalue method and the eigenvector method.
4. Consistency test: check whether the expert's judgment matrix is consistent. Consistency indicates the stability and logical rationality of experts in judging the importance of each indicator. A commonly used consistency test method is to calculate the consistency index CI and the consistency ratio CR.
5. Weight normalization: The calculated weights are normalized to ensure that the sum of the weights of each indicator is 1.

Table 5 Table of evaluation index weights

Level 1 indicators	weight	Level 2 indicators	weight	Level 3 indicators	weight
A	0.37	A1	0.11	A11	0.02
				A12	0.03
				A13	0.01
				A14	0.01
				A15	0.03
		A2	0.14	A21	0.09
				A22	0.05
		A3	0.12	A31	0.07
				A32	0.04
B	0.38	B1	0.18	B11	0.07
				B12	0.11



Level 1 indicators	weight	Level 2 indicators	weight	Level 3 indicators	weight
C	0.16	B2	0.11	B21	0.06
				B22	0.05
		B3	0.09	B31	0.04
				B32	0.05
		C1	0.06	C11	0.04
				C12	0.02
		C2	0.05	C21	0.02
				C22	0.01
				C23	0.02
		C3	0.06	C31	0.02
				C32	0.03
D	0.09	D1	0.01	D11	0.00
				D12	0.00
				D13	0.00
		D2	0.02	D21	0.01
				D22	0.01
				D23	0.00
				D24	0.00
		D3	0.02	D31	0.01
				D32	0.01
				D33	0.00
		D4	0.02	D41	0.01
				D42	0.01
				D43	0.00
		D5	0.02	D51	0.01
				D52	0.01



Table 2 shows: Physical health measurement (A) and mental health measurement (B) are the two most important first-level indicators in the health evaluation of the elderly in Xi'an, with weights of 0.37 and 0.38, respectively. Among the physical fitness measures (A), the ability to perform activities of daily living (A2) and disease status (A3) are the most important secondary indicators. Among the mental health measures (B), positive performance (B1) and negative performance (B2) are the most important secondary indicators. The social health measure (C) and the sports tourism activity measure (D) were relatively low weighted at 0.16 and 0.09, respectively. This means that for the health evaluation of the elderly in Xi'an, the importance of physical and mental health and social health is higher.

Conclusion

Physical health measurement and mental health measurement are the two most important primary indicators in the health assessment of the elderly population in Xi'an City, with weights of 0.37 and 0.38, respectively. This indicates the significance of physical and mental health in the evaluation of elderly individuals' overall well-being.

Within the physical health measurement, daily life activity capacity and disease status have been identified as the most important secondary indicators. This implies that the daily life abilities and disease management of elderly people have a crucial impact on their overall health. In the mental health measurement, positive behaviors and negative behaviors are considered the most important secondary indicators. This indicates that the positive mindset and psychological well-being of elderly individuals significantly influence their overall health and life satisfaction. Social health measurement and physical activity and tourism measurement have relatively lower weights, at 0.16 and 0.09, respectively. This suggests that the importance of social health physical activity and tourism in the health assessment of the elderly population in Xi'an City is relatively lower.

Maintaining the physical and mental health of elderly individuals is an important aspect of the health assessment for the elderly population in Xi'an City. Specifically, regarding physical health, attention should be given to the daily life activity capacity and disease management of the elderly population. In terms of mental health, emphasis should be placed on fostering a positive mindset and ensuring psychological well-being. Although social health physical activity and tourism have relatively lower importance in the health assessment of the elderly, they still deserve attention and promotion to some extent. To enhance the overall health status of the elderly population, it is recommended to prioritize the comprehensive development of physical and mental health in policies and practices, accompanied by appropriate support and services.

Discussion

In this study, we developed an indicator system for the health assessment of the elderly population in Xi'an City and utilized the Analytic Hierarchy Process (AHP) to determine the weights of the indicators. To further explore the contributions and innovations of this study, we conducted a comprehensive comparative analysis with several previous research studies related to our study. The following is the comparative analysis with several relevant previous research studies:

Study 1: Liu, E., & et al. (2019) explored the impact of tourism on the health of the elderly. They conducted a questionnaire survey to investigate the physical health, mental health, and social health status of the elderly after engaging in tourism activities. In comparison to our study, their research focused on the influence of tourism activities on the health of the elderly, while our study placed greater emphasis on constructing an indicator system for overall health assessment and determining the weights.



Study 2: Wang, F., & et al. (2018) investigated the methods for health assessment of elderly populations in Chinese cities. They proposed a health assessment model based on subjective weight assignment, considering multiple aspects such as physical health, mental health, and social health. Compared to our study, their research also involved constructing a health assessment indicator system, but they did not use the AHP method for weight calculation, which is the innovation of our study.

Study 3: Chen et al. (2017) explored a comprehensive model for the health assessment of the elderly. They integrated subjective and objective indicators, considering factors such as physical health, mental health, social health, and environmental health. Compared to our study, their research also addressed health assessment from multiple dimensions, but they did not conduct hierarchical weight calculation, which is the innovation of our study.

Study 4: Wang et al. (2016) investigated the influencing factors of self-assessed health status among the elderly. They examined the relationship between the self-assessed health status of the elderly and socioeconomic factors, lifestyle, and other factors through questionnaire surveys and statistical analysis. Compared to our study, their research focused on the influencing factors of self-assessed health status among the elderly, while our study focused on constructing a comprehensive assessment indicator system, providing a more scientific and systematic approach to health assessment. Through the comparative analysis with the aforementioned studies, we can identify the innovations and contributions of our study. Firstly, compared to Zhang et al.'s study, our research not only focused on the influence of tourism activities on the health of the elderly but also emphasized the construction of a comprehensive indicator system for health assessment and the calculation of weights. Secondly, compared to Li et al.'s study, our research utilized the AHP method for weight calculation, making the health assessment more scientific and reliable. Additionally, compared to Chen et al.'s study, our research had a more comprehensive and detailed indicator system, considering multiple dimensions such as physical health, mental health, social health, and physical activity and tourism. Lastly, compared to Wang et al.'s study, our research went beyond the self-assessed health status of the elderly and established a more comprehensive assessment indicator system, providing a more scientific and systematic approach to health assessment.

This study can also be compared and integrated with research from other disciplinary fields. For instance, it can be combined with studies in the field of sociology to investigate the relationship between the health of the elderly and factors such as social support and social participation. Integration with research in psychology can explore the association between the mental health of the elderly and cognitive functions, life satisfaction, and so on. Integration with research in public health can examine the mutual influence between the health of the elderly and environmental factors, lifestyle, and other factors.

Through the comparative analysis with previous research studies and by deepening the research, expanding the sample range, exploring more multi-criteria decision-making methods, and engaging in interdisciplinary collaborations, the scientific and practicality of the indicator system for health assessment can be improved. Such comprehensive research will contribute to a more comprehensive and in-depth understanding of health assessment and the well-being of the elderly population.

Recommendation

1. Application of research

1.1 Focus on Daily Life Activity Capacity: Given the impact of daily life activity capacity on the overall health of the elderly, organizers and policymakers should pay special attention to the assessment of daily life abilities in the elderly. Provide appropriate exercise and rehabilitation programs to improve their physical functioning and self-care abilities.

1.2 Emphasize Positive Behaviors: Positive behaviors have a significant impact on the mental health and life satisfaction of the elderly. Organizers and social workers should provide



positive psychological support and encouragement to help elderly individuals develop a positive mindset and cope with stress effectively.

1.3 Promote Social Engagement: Social engagement is crucial for social support and quality of life among the elderly. Organizers should encourage active participation of the elderly in community and political activities, provide opportunities for social interaction and participation, and enhance social connections and a sense of belonging among the elderly.

1.4 Focus on Motivations and Objectives: Understanding the motivations and objectives of elderly individuals participating in physical activity and tourism is crucial for providing better activity experiences and evaluating their effectiveness. Organizers should consider the interests and needs of the elderly in activity design and promotion, and provide diverse activity options.

2. For further study

2.1 Cross-sectional Comparison and Longitudinal Tracking: It is recommended to compare the evaluation indicator system of this study with other regions or populations to understand the differences and commonalities in health assessment indicators among different regions or populations. Additionally, conducting longitudinal tracking studies to observe the trends in health assessment indicators among the elderly will provide a basis for long-term health policy development and interventions.

2.2 Interdisciplinary Collaborative Research: Strengthening interdisciplinary collaborative research by integrating expertise and methodologies from disciplines such as medicine, psychology, and sociology will yield comprehensive research outcomes.

2.3 It should be noted that these recommendations are solely the author's suggestions based on the research conducted. When implementing them, adjustments and optimizations should be made according to the specific circumstances and available resources. Additionally, close collaboration with relevant stakeholders is essential to jointly develop and implement related plans, ensuring effective implementation and achieving positive outcomes.

Through ongoing research and practice, we can continuously improve and refine the indicator system for the health assessment of the elderly, providing a more scientific and comprehensive evaluation and management of their health and making contributions to the construction of a healthy aging society.

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