

# THE CONSTRUCTION OF PUBLIC SPORTS SERVICE GUARANTEE SYSTEM IN A HEALTHY COMMUNITY IN THE BACKGROUND OF PUBLIC HEALTH



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A CONSTRUÇÃO DE UM SISTEMA DE GARANTIA DE SERVIÇO DESPORTIVO PÚBLICO EM UMA COMUNIDADE SAUDÁVEL NO CONTEXTO DA SAÚDE PÚBLICA

CONSTRUCCIÓN DE UN SISTEMA DE GARANTÍA DE SERVICIOS DEPORTIVOS PÚBLICOS EN COMUNIDADES URBANAS SALUDABLES EN EL CONTEXTO DE LA SALUD PÚBLICA

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## ABSTRACT

Community sports are a very important part of urban public service. It directly affects the quality of life of residents and plays an important role in improving the health level of the masses. However, there are still many problems in the current public sports service system, which hinders the provision of public health. In order to ensure the effectiveness of the indicators of community sports service guarantee system, this study uses the fuzzy analytic hierarchy process to construct the community public sports service guarantee system, and verifies the effectiveness of the system constructed by this method through an example application. The results show that the weight of each index from large to small is service effectiveness > residents' demand > service capacity > service content; the weight of service effectiveness is 48.46%, which is an important indicator of service guarantee system. In addition, the effectiveness of the community sports service system was verified, and the CR value of the evaluation index system was greater than 0.1, which showed that the consistency of the evaluation index system met the requirements. The public sports service guarantee system constructed by the research institute has good applicability and high practical value. I hope that the research results can provide some reference for the improvement of grass-roots sports service construction, and provide some theoretical support for the construction of grass-roots service evaluation system.

**Keywords:** Community sports; public health; service system; fuzzy analytic hierarchy process.

## RESUMO

O desporto comunitário é uma parte muito importante do serviço público urbano. Afeta diretamente a qualidade de vida da população e desempenha um papel importante na melhoria do nível de saúde das massas. No entanto, ainda há muitos problemas no atual sistema de serviço público de desporto comunitário, o que dificulta a prestação da saúde pública. A fim de garantir a eficácia dos indicadores do sistema de garantia do serviço desportivo, este estudo utiliza o processo hierárquico analítico difuso para construir o sistema de garantia do serviço desportivo público e verifica a eficácia do sistema construído por este método através de uma aplicação dada como exemplo. Os resultados mostram que o peso de cada índice, de alto para baixo, é a eficácia do serviço > demanda da população > capacidade de serviço > conteúdo de serviço; o peso da eficácia do serviço é 48,46%, que é um importante indicador do sistema de garantia do serviço. Além disso, a eficácia do sistema de serviços desportivos foi verificada, e o valor CR do índice de avaliação do sistema foi superior a 0,1, o que mostrou que a consistência do sistema de índice de avaliação satisfazia os requisitos. O sistema público de garantia do serviço desportivo construído pelo instituto de pesquisa tem boa aplicabilidade e elevado valor prático. Espero que os resultados da investigação possam servir de referência para a melhoria da construção de serviços desportivos de base e proporcionar algum apoio teórico à construção de um sistema de avaliação de serviços de base.

**Descritores:** Desporto comunitário; saúde pública; sistema de serviços; processo hierárquico analítico difuso.

## RESUMEN

Los deportes comunitarios son una parte muy importante del servicio público urbano. Afecta directamente la calidad de vida de los residentes y juega un papel importante en la mejora del nivel de salud de las masas. Sin embargo, todavía existen muchos problemas en el actual sistema público de servicios deportivos, lo que dificulta la prestación de servicios de salud pública. Con el fin de asegurar la efectividad de los indicadores del sistema de garantía del servicio deportivo comunitario, este estudio utiliza el proceso de jerarquía analítica difusa para construir el sistema de garantía del servicio público deportivo comunitario, y verifica la efectividad del sistema construido por este método a través de una aplicación de ejemplo. Los resultados muestran que el peso de cada índice, de mayor a menor, es la eficacia del servicio > la demanda de los residentes > la capacidad del servicio > el contenido del servicio; el peso de la efectividad del servicio es del 48,46%, lo que es un indicador importante del sistema de garantía del servicio. Además, se verificó la efectividad del sistema de servicios



deportivos comunitarios y el valor de RC del sistema de índice de evaluación fue mayor a 0.1, lo que mostró que la consistencia del sistema de índice de evaluación cumplió con los requisitos. El sistema de garantía del servicio público de deportes construido por el instituto de investigación tiene una buena aplicabilidad y un alto valor práctico. Espero que los resultados de la investigación puedan proporcionar alguna referencia para la mejora de la construcción de servicios deportivos de base y proporcionar algún apoyo teórico para la construcción de un sistema de evaluación de servicios de base.

**Descriptor:** Deportes comunitarios; salud pública; sistemas de servicios; análisis de niveles vagos.

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## INTRODUCTION

With the construction and development of China's urbanization, urban public service gradually presents the characteristics of high quality and systematization. Public service has the nature of public welfare. It is a way for the government to provide social welfare to the people through public policy. Under the upsurge of "national fitness", community sports service has become a focus of public service in the city. The quality guarantee mechanism of community sports service reflects the development of urban cultural and sports industry. In the current construction of community sports service, we should not only clarify the service orientation and improve the service policy, but also carry out effective quality evaluation and management of community sports service from the needs of the masses, so as to realize the multi-level and diversified development of public sports service. José Álvarez García A and others used the sports organization Perception Scale (epod) as a measurement tool to conduct a descriptive analysis of sports center users, so as to confirm the relationship between perceived quality and sports service satisfaction, and established improvement plans to continuously improve the quality of sports service.<sup>1</sup> Robertson J et al. Extended the concept of social responsibility from the field of corporate sports, and discussed the relative importance of social responsibility to community sports clubs. Through three rounds of Delphi research, it was found that only by focusing on meaningful actions for the community and using scarce resources for activities beyond its direct ability, can the social responsibility of community sports clubs be improved.<sup>2</sup> Under the guidance of socialism with Chinese characteristics, learning from the experience of public sports service construction in developed countries can provide some reference for improving the guarantee system of community public sports service in China. However, the complexity of public sports service system is high, the lack of scientific basis for quantitative or qualitative analysis alone, and the consistency of system indicators is difficult to guarantee. Therefore, it is very important to determine the consistency of evaluation indicators of public sports service security system.

Letn et al. Applied fuzzy analytic hierarchy process (FAHP) to the selection of power load level. Through the control decision-making selection of different load levels and load shedding experiment, the decision-making effect of fuzzy analytic hierarchy process (FAHP) and traditional analytic hierarchy process (AHP) were compared, and the effectiveness of Fuzzy AHP was verified.<sup>3</sup> Ashtiani et al. combined multi criteria decision making and fuzzy analytic hierarchy process (FAHP) to establish trust relationship. Through experimental evaluation and case application, it is proved that this method can make better trust decision by considering the truster's subjective preference for existing trust standards.<sup>4</sup> Azadeh et al. Applied fuzzy analytic hierarchy process (FAHP) to the comprehensive decision-making and selection of electric power maintenance. Through experimental comparison and case application, it is found that four maintenance strategies based on state, time, fault and opportunism can integrate different forms of data into the evaluation process, and they are suitable for different fault maintenance situations.

In order to improve the control effect of radiotherapy, Azadeh et al. Proposed a fuzzy multi control method, and established the control index of patient's condition on this basis, and verified the reliability of this decision-making model through practical cases.<sup>5</sup> Matloub Hus-sain et al. carried out multi-level decomposition research on complex and unstructured problems by using analytic hierarchy process (AHP).<sup>6</sup> Through the AHP framework and continuous data measurement improvement analysis, the lean concept was successfully applied to the medical waste management, and the medical waste management system was optimized.<sup>5</sup> From the perspective of key nutrients, Saini s et al. used analytic hierarchy process (AHP) to evaluate different dietary schemes, and verified the evaluation results with fuzzy analytic hierarchy process. The evaluation results play an important role in improving people's diet and nutrition structure and improving the effect of drug treatment.<sup>6</sup>

To sum up, community sports service has both positive and negative effects on public health. Improving the quality of community sports service is an important way to improve the physical and mental health of community residents. This study will use the fuzzy analytic hierarchy process (FAHP) to study the multi-level and multi-component decomposition of community sports service quality, in order to provide a new theoretical basis for improving the quality of community sports service.

## Weight distribution and validity verification of sports service guarantee system based on Fuzzy Analytic Hierarchy Process

This study combines fuzzy theory with analytic hierarchy process (AHP) to construct the service guarantee system of community public sports. Table 1 shows the statistical results of weight distribution of evaluation indexes. From the weight distribution, we can see that in the first level indicators, the weight of each index from large to small is

**Table 1.** Statistical results of weight distribution of indicators at all levels.

First level indicators	Secondary indicators	Weight	CR
Service capacity-A (0.1501)	Site facilities service-A1	0.3105	0.0729<0.1
	Organizational management services-A2	0.1869	
	Staffing service-A3	0.1124	
	Fund input index-A4	0.3902	
Service content-B (0.0867)	Physical fitness service-B1	0.4476	0.0214<0.1
	Sports information publicity service-B2	0.1497	
	National health monitoring service-B3	0.4027	
Resident demand-C (0.2786)	Utility demand-C1	0.3045	0.0423<0.1
	Fitness program needs-C2	0.2917	
	Sports guidance service demand-C3	0.1869	
	Health monitoring service demand-C4	0.2169	
Service effectiveness-D (0.4846)	Service efficiency-D1	0.2242	0.0331<0.1
	Physical health promotion index-D2	0.2196	
	Community resident satisfaction-D3	0.5562	

service effect > residents' demand condition > service capacity > service content; the weight of service effect is 48.46%, the weight of residents' demand is 27.86%, and the weight of service ability and content is 15.01% and 8.67% respectively. The statistical results show that the service effect plays an important role in the community sports service security system; the service ability and content have little influence on the effectiveness of the service security system.<sup>5</sup>

According to the analysis of the statistical results, the service ability of community sports is determined by the condition of facilities and the capital investment of community sports; the physical fitness monitoring service and fitness service of community sports are the main sports service contents of community residents. For community residents, their demand for public facilities is the most, followed by fitness activities, which is because the community residents have higher requirements for the autonomy and flexibility of public sports; relatively speaking, community residents have less demand for sports guidance services and physical monitoring services. In terms of service effectiveness, the weight of community residents' satisfaction is the largest, which also reflects the main characteristics of grass-roots work; the use efficiency of public sports facilities and residents' physical health promotion indicators are relatively small, but these two are the direct feedback of residents to community sports services. Therefore, the service guarantee system is a service evaluation system oriented by residents' demand and service effect, which has great practical value.<sup>4</sup>

Table 2 shows the results of fuzzy comprehensive evaluation of secondary indexes. After the weight distribution of each index in the evaluation system, it is necessary to judge the effectiveness of each index, that is, to test the consistency of fuzzy judgment matrix. Here, we will randomly select four community grassroots sports service cadres to score and evaluate the effectiveness of the public sports service system constructed by the Research Institute. The basis of scoring evaluation is the importance correspondence of fuzzy numbers, and the scoring object is the secondary evaluation index of the evaluation system. According to the evaluation result and membership degree of the index, the fuzzy relation matrix of the index can be obtained.

$$R = \begin{bmatrix} 0.1687 & 0.3558 & 0.4406 & 0.0137 & 0.0212 \\ 0.2468 & 0.2887 & 0.3003 & 0 & 0.1696 \\ 0.3224 & 0.3355 & 0.2513 & 0 & 0.0920 \\ 0.3062 & 0.2094 & 0.3282 & 0 & 0.1562 \end{bmatrix}$$

$$\times (0.1501 \quad 0.0867 \quad 0.2786 \quad 0.4846)$$

$$= (0.2851 \quad 0.2734 \quad 0.3212 \quad 0.0021 \quad 0.1192)$$

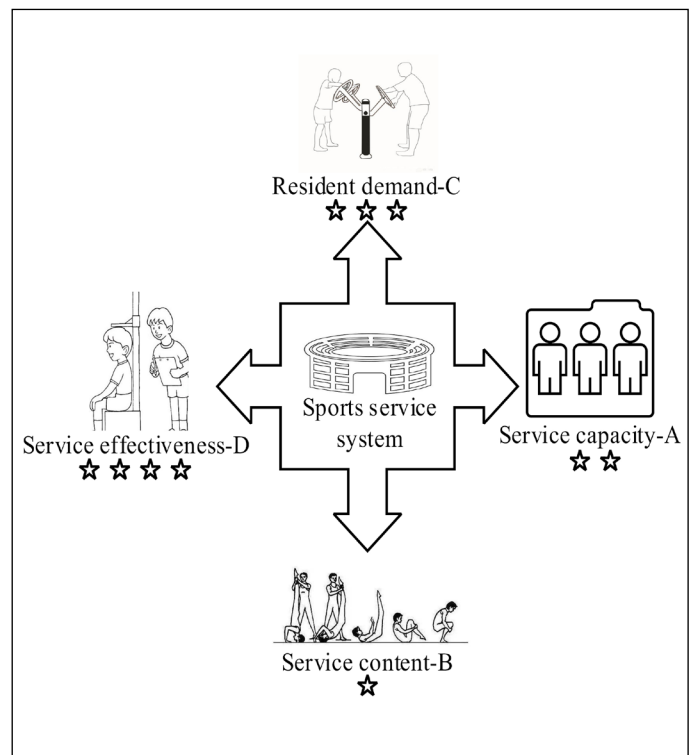
According to formula (2), the corresponding fractional vector can be obtained by multiplying the fuzzy relation matrix with the weight vector, which is the basis of fuzzy comprehensive evaluation. The above calculation results are the fuzzy comprehensive evaluation results of the first grade index. Based on the analysis of the results in Table 1 and Table 2, the consistency ratio CR of the evaluation index system is greater than 0.1, so the evaluation index has high consistency, and the weight distribution of the first and second level indicators is reasonable. According to the principle of maximum

**Table 2.** Fuzzy comprehensive evaluation results of secondary indexes.

Index	Results of fuzzy comprehensive evaluation
Service capacity-A	[0.1687 0.3558 0.4406 0.0137 0.0212]
Service content-B	[0.2468 0.2887 0.3003 0 0.1696]
Resident demand-C	[0.3224 0.3355 0.2513 0 0.0920]
Service effectiveness-D	[0.3062 0.2094 0.3282 0 0.1562]

membership degree, the effectiveness of community sports public service security system is higher.<sup>6</sup>

Figure 1 shows the guarantee system of community sports service. In the construction of community sports service, the first thing to bear the brunt is to take the residents' satisfaction as the guidance and pursue the service quality and effect; at the same time, we should combine the actual situation of grass-roots sports construction, go deep into the masses, and really understand the real needs of residents. Due to the continuous improvement of China's sports construction, the residents' demand for sports facilities and venues is the most urgent, and the sports guidance service is still too early in the construction of public sports service at this stage. On the basis of demand orientation, if we want to improve the service ability of community sports, we must increase capital investment and improve the quality of hardware such as sports venues and facilities; if we want to optimize the service content of community sports, we can start from the public sports fitness service and physique monitoring. Through expert evaluation and case application, the community sports service security system constructed by this research has higher practical value, and is more scientific and effective than traditional methods in index evaluation.



**Figure 1.** Community sports service guarantee system.

## CONCLUSIONS

With the improvement of people's living standards, people's sense of participation in social public services is also rising. As an important part of grass-roots public service, the service quality of community public sports has been paid more and more attention. In this study, fuzzy analytic hierarchy process is used to study the security system of community sports service. On the basis of traditional analytic hierarchy process, the evaluation index system of community sports service is constructed by using fuzzy theory. The results show that the weight of service effectiveness is 48.46%, the weight of residents' demand is 27.86%, the weight of service capacity and content is 15.01% and 8.67% respectively; the evaluation indexes are evaluated by fuzzy comprehensive evaluation and consistency

test, the CR value is greater than 0.1, the consistency test of evaluation system meets the requirements, and has high effectiveness. The community sports service security system constructed by the Research Institute shows good applicability and practical value. This method improves the objectivity of the construction of the service system, and solves the problem of basic level service with mathematical methods, which provides a new working idea for

grass-roots service. However, there are still some deficiencies in this study, such as the failure to apply and optimize the community sports service security system in the grass-roots service, which will be improved in the future research work.

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