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The Impact of Rural Sports and Leisure Public Services on Residents' Participation and Life Satisfaction

Jun Lei

Sports Management Department, Guangxi College of Sports Education, Nanning, China
Email: jun.lei@stu.nida.ac.th

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Abstract

This study surveyed 424 rural residents in Guangxi to investigate their participation in sports and leisure activities. An evaluation system was developed encompassing six dimensions—facilities, activities, organization, information, guidance, and health management—and Importance-Performance Analysis (IPA) together with regression models were employed to examine public service needs, satisfaction, and their effects on residents' participation and life satisfaction. The results show that residents consistently perceive public services as more important than the satisfaction they actually experience, with a pronounced "high demand - low satisfaction" gap in facility services. Logistic regression analysis indicates that gender, household income, activity guidance, and health management significantly influence participation. Meanwhile, multiple linear regression reveals that post-exercise experience, satisfaction with facilities, and satisfaction with information services are key determinants of life satisfaction. These findings suggest that rural sports public services should transition from "extensive supply" to "targeted provision," with greater emphasis on facility maintenance, professional guidance, and health management to enhance both service quality and residents' overall life satisfaction.

Keywords

Rural Residents, Sports and Leisure Activities, Participation Behavior, Importance-Performance Analysis (IPA), Life Satisfaction

1. Introduction

The report of the 19th National Congress of the Communist Party of China explicitly proposed the "Healthy China Strategy," elevating public health to a strate-

gic priority in national development. This marked a shift in health issues from being primarily a matter of livelihood security to becoming a key dimension of the national governance system. To advance this strategy, China has gradually established a health governance framework under the guidance of the Healthy China 2030 Plan, with a strong emphasis on promoting healthy lifestyles, optimizing medical and health services, and building a nationwide public fitness service system (Central Committee of the Communist Party of China & State Council, 2016). In recent years, the government has introduced a series of policies aimed at developing a higher-level public fitness service system and promoting high-quality rural sports development. This underscores the fact that rural sports and leisure public services have become a crucial pillar of both national strategy and rural revitalization. With socioeconomic development, the needs of rural residents are shifting from "material and cultural needs" to the "pursuit of a better life" (Diener & Seligman, 2004), with growing attention to the quality of social relationships (Zheng, 2018). Consequently, health demands are expanding beyond basic medical security to include the pursuit of a high-quality, healthy lifestyle. Against this backdrop, public sports and leisure services not only serve as an essential vehicle for residents to achieve "active health" but also play a vital role in enhancing life satisfaction and overall well-being.

Existing research consistently shows that rural leisure, cultural, and sports public services suffer from a pronounced supply-demand mismatch, making this area a critical weakness in the broader public service system. This mismatch is reflected in the persistent shortage of sports facilities, the limited promotion of cultural and sports activities, and inadequate management and service provision. In addition, some sports programs continue to be organized primarily to "fulfill administrative tasks" rather than to genuinely serve residents' needs. Collectively, these shortcomings further exacerbate the supply-demand imbalance, thereby constraining residents' participation in and satisfaction with sports and leisure activities (Xu & Zhang, 2024; Wang, Li, & Xing, 2016; Kong & Li, 2023).

Against this backdrop, this study focuses on the expectations, needs, and current conditions of rural residents regarding sports and leisure. By integrating Importance-Performance Analysis (IPA) with regression models, it examines the relationships among public service provision, residents' participation in recreational sports, and their life satisfaction. The goal is to identify the key factors influencing participation and satisfaction, thereby providing empirical evidence to support the more targeted delivery of rural public sports services.

2. Variable Selection

As a government-led, multi-actor collaborative public welfare service system, public service performance has been evaluated using a wide range of methods. Traditional assessments have typically focused on economy, efficiency, effectiveness, and equity (the "4E" framework) (Liu, 2011). More recent academic discus-

sions, however, emphasize that performance evaluation should align with the principles of New Public Management (NPM), incorporating multi-stakeholder collaboration, outcome orientation, and user perspectives (Ren & Li, 2011). Currently, the evaluation of public sports services primarily employs three dominant models: "government responsibility - resource input - value orientation," "facilities - activities - organization - outcomes," and "input - function implementation - output - performance" (Liu, 2011; Duan, 2024; Wang, 2013). In contemporary China, residents' sports needs have shifted from a singular focus on physical fitness to leisure- and enjoyment-oriented expectations. As a result, the goals of sports activities now extend beyond fitness to encompass social interaction, psychological well-being, and cultural experience across multiple dimensions (Ren & Li, 2011).

Therefore, drawing on the above models and demand characteristics, this study constructs an evaluation system for rural public sports and leisure services. Building on the "facilities - activities - organization - outcomes" framework and integrating the IPA method, the system is developed with reference to prior studies (Liu, 2011; Ma et al., 2021; Wang, Li, & Xing, 2016). It consists of six dimensions—sports infrastructure, sports organizations, sports activities, sports information, sports guidance, and health management—covering a total of 22 measurement indicators. This framework not only reflects the traditional supply logic of public sports services but also responds to the diversified needs of residents in the new era.

The concept of post-exercise experience is defined as the overall perception of rural residents' subjective feelings and positive outcomes following their participation in public sports and leisure activities. Drawing on the work of Cui et al. (2021), the effects of such activities are considered to span multiple dimensions, including physical relief from fatigue, psychological stress reduction, attainment of inner calmness, and the elicitation of emotional pleasure. In this study, residents' post-exercise experience is operationalized through nine measurement items.

3. Data Acquisition and Preprocessing

3.1. Sampling and Data Collection

The survey was conducted between January 2024 and February 2025 through both offline and online channels. 1) Offline survey: the research team distributed questionnaires and conducted interviews in 13 villages across four cities in Guangxi—Nanning, Guigang, Qinzhou, and Wuzhou—collecting 137 responses. 2) Online survey: electronic questionnaires were disseminated via targeted postings in WeChat community groups, inviting eligible rural residents in Guangxi to participate, and yielding 352 responses. Due to constraints in research resources and conditions, the sample was obtained using convenience and judgmental sampling, both of which fall under the category of non-probability sampling. In total, 489 valid questionnaires were collected.

3.2. Data Quality Control

To ensure data quality, a minimum response time threshold of 90 seconds was applied to exclude speeded responses. In addition, a set of reverse-worded items was used to test logical consistency. After dual verification, 424 valid questionnaires were retained, yielding an effective response rate of 86.7%.

3.3. Reliability and Validity Tests

The reliability analysis showed that the overall scale achieved a Cronbach's α of 0.982, with all sub-dimensions exceeding the recommended threshold of 0.7, indicating high internal consistency. The validity analysis revealed a KMO value of 0.959 for the overall scale, while the values for the sub-dimensions ranged from 0.779 to 0.897. Bartlett's test of sphericity was significant at the 1% level for all dimensions, confirming that the survey scale demonstrates strong validity. Detailed results are reported in Table 1.

Table 1. Reliability and validity analysis of the overall scale and subscales.

Dimension	Items	Cronbach's α	KMO value	Chi-square test	df	Sig.
Overall scale	24	0.982	0.959	19635.178	378	0.000
Facility management	5	0.973	0.897	3072.592	10	0.000
Activity content service	4	0.951	0.872	1720.653	6	0.000
Information service	4	0.978	0.884	2616.415	6	0.000
Activity guidance	3	0.985	0.789	2187.202	3	0.000
Organizational management	3	0.976	0.788	1826.440	3	0.000
Health management	3	0.972	0.786	1762.669	3	0.000
Life satisfaction	3	0.967	0.779	1575.457	3	0.000

4. Results and Analysis

4.1. Demographic Variables

Among the respondents, 201 were male (47.4%) and 223 were female (52.6%), indicating an approximately balanced gender distribution. Most participants reported a monthly per capita household income below 4,000 RMB, suggesting generally modest economic conditions, as shown in Table 2.

Table 2. Demographic characteristics of the sample (N = 424).

Attribute	Category	Frequency	Percentage (%)
Gender	Male	201	47.4
	Female	223	52.6
Age	≤18 years	54	12.7
	19 - 29 years	209	49.3
	30 - 39 years	80	18.9

Continued

	40 - 49 years	52	12.3
	50 - 59 years	23	5.4
	≥60 years	6	1.4
Education	Junior high school or below	90	21.2
	High school/vocational school	84	19.8
	Associate degree	164	38.7
	Bachelor's degree	76	17.9
	Master's degree or above	10	2.4
Residence	Township in Guangxi	213	50.2
	Rural area in Guangxi	211	49.8
Monthly per capita household income	≤3,000 RMB	165	38.9
	3,001 - 4,000 RMB	116	27.4
	4,001 - 5,000 RMB	61	14.4
	5,001 - 6,000 RMB	33	7.8
	≥6,001 RMB	49	11.6

Note: RMB = Renminbi (Chinese Yuan). Household income refers to monthly per capita household income.

4.2. Analysis of Residents' Participation in Sports and Leisure Activities

1) Residents' Participation in Sports and Leisure Activities

Time and resource constraints emerged as the primary barriers to participation, as shown in Table 3. Specifically, 19.08% of residents reported that work, family responsibilities, or a fast-paced lifestyle reduced their available time, thereby limiting leisure opportunities. In addition, 17.17% indicated that inadequate community sports facilities hindered accessibility and convenience. Weak exercise motivation, insufficient sports skills, and the absence of organizational guidance accounted for 13%, representing moderate influencing factors. Moreover, some residents lacked intrinsic motivation to engage in sports and demonstrated limited awareness of the health benefits of physical activity. A persistent stereotype that "exercise equals hardship" also remains prevalent, with a considerable proportion of residents (29.9%) believing that manual labor can substitute for sports participation (Li, Wang, & Yan, 2022).

Table 3. Main factors affecting residents' participation in sports and leisure activities.

Factor	Frequency (n)	Percentage (%)
No interest	97	7.71%
Lack of time	240	19.08%
Weak exercise awareness	166	13.20%
Lack of sports skills	167	13.28%

Continued

No organizational guidance	163	12.96%
Insufficient facilities/Equipment	216	17.17%
High cost of exercise	101	8.03%
Others	108	8.59%

Note: As the question allowed multiple responses, the total frequency (1248) exceeds the sample size (N = 424). Percentages are calculated as frequency/total frequency.

2) Current Status and Intentions of Residents' Participation in Sports and Leisure Activities

Among the 424 survey respondents, 205 (48.3%) reported engaging in regular physical exercise, indicating that nearly half of the population has already developed exercise habits. Another 124 respondents (29.2%) expressed an intention to begin exercising within the next six months, while 95 (22.4%) reported no such intention during the same period. These findings suggest that the surveyed regions have established a relatively solid foundation of sports participation, while also demonstrating considerable potential for further growth.

3) Preferences for Sports Activity Venues

A multiple-choice survey of the 205 residents with stable exercise habits revealed their preferences for exercise venues, as shown in Table 4. Specifically, 113 responses (25.51%) indicated a preference for open spaces near sports facilities, while 111 responses (25.06%) favored squares or parks. This indicates that residents generally prefer open and natural environments, consistent with the choice of "open surrounding areas." Overall, residents' preferences for exercise venues display a diversified pattern.

Table 4. Residents' preferences for sports activity venues.

Venue for physical activity	Frequency (n)	Percentage (%)
Squares or parks	111	25.06%
Open surrounding areas	113	25.51%
Household courtyard/indoors	81	18.28%
Nearby schools	72	17.38%
Village committee fitness sites	66	14.90%

Note: As the question allowed multiple responses, the total frequency (443) exceeds the sample size (N = 205). Percentages are calculated as frequency/total frequency.

4) Analysis of Sports Items Participated in by Residents

Regarding participation in sports and leisure activities, activities with low infrastructure dependency, such as walking, dominate the mainstream. The survey revealed that group activities requiring collective coordination, such as basketball, suffer from low participation due to inadequate organizational management. Similarly, activities like square dancing and martial arts also exhibit low participation rates due to the absence of organizers. This indicates a lack of social organization,

stable sports communities, and event systems, which ultimately results in fewer participants in these activities (Xu, 2025).

4.3. Results and Analysis of Importance and Satisfaction

The survey assessed rural residents' ratings of importance and satisfaction regarding six dimensions of public sports and leisure services. Each indicator was scored on a five-point scale, ranging from 1 (lowest) to 5 (highest). The detailed results for each indicator are presented in Table 5.

Table 5. Mean scores and significance analysis of measurement indicators.

Dimension	Measurement indicator	No.	Mean satisfaction	Mean importance	Difference	t-value	Sig. (2-tailed)
A. Facility services	A1. Diversity of leisure sports venues and facilities	1	3.52	4.24	−0.72	−12.504	0.000
	A2. Modernity of leisure sports facilities	2	3.43	4.20	−0.77	−13.095	0.000
	A3. Proximity of sports and leisure venues to residential areas	3	3.52	4.23	−0.71	−12.211	0.000
	A4. Maintenance and management of sports facilities	4	3.40	4.29	−0.89	−15.059	0.000
	A5. Cleanliness of leisure sports venues and facilities	5	3.50	4.28	−0.78	−13.124	0.000
B. Activity organization	B1. Organization of recreational sports activities (e.g., fun ball games, ring toss, blindfold gong striking)	6	3.87	4.09	−0.22	−5.357	0.000
	B2. Organization of folk sports activities (e.g., wooden shoe races, embroidered ball throwing, dragon & lion dances)	7	3.92	4.15	−0.23	−5.861	0.000
	B3. Organization of cultural and leisure activities (e.g., hiking, square dancing, cultural evenings)	8	3.90	4.11	−0.21	−5.200	0.000
	B4. Organization of various ball games (e.g., basketball, table tennis)	9	3.99	4.19	−0.20	−5.322	0.000
C. Information services	C1. Provision of leisure sports culture promotion	10	3.78	4.17	−0.39	−9.068	0.000
	C2. Provision of facility information services	11	3.78	4.17	−0.39	−9.130	0.000
	C3. Provision of competition rule explanations	12	3.77	4.17	−0.40	−9.053	0.000
	C4. Provision of event information services	13	3.81	4.20	−0.39	−9.394	0.000
D. Activity guidance	D1. Guidance on scientific fitness methods	14	3.82	4.20	−0.38	−8.854	0.000
	D2. Guidance on technical and professional skills	15	3.80	4.17	−0.37	−8.241	0.000
	D3. Guidance on sports rehabilitation	16	3.81	4.21	−0.40	−8.878	0.000
E. Organizational management	E1. Township/village-level official sports organizations (teams)	17	3.84	4.17	−0.33	−7.921	0.000
	E2. Informal/leisure sports organizations (teams)	18	3.83	4.12	−0.29	−7.284	0.000
	E3. Management of sports event organizations	19	3.84	4.17	−0.33	−7.823	0.000
F. Health management	F1. Regular free physical fitness testing	20	3.85	4.25	−0.40	−8.853	0.000
	F2. Exercise prescription design (personalized programs based on health status)	21	3.83	4.23	−0.40	−8.663	0.000
	F3. Establishment of personal health records	22	3.83	4.24	−0.41	−8.820	0.000
Overall mean	–	–	3.756	4.193	–	–	–

Table 5 shows that, across all 22 indicators, the mean importance scores exceed the mean satisfaction scores. The overall mean importance score (4.193) is higher than the overall mean satisfaction score (3.756), indicating a gap between residents' perceived importance and satisfaction within the rural sports and leisure public service system. Results of the paired t-tests further reveal consistently large absolute t-values, and at the 95% confidence level, significant differences exist between perceived importance and satisfaction across all service indicators. It indicates that rural residents generally have low satisfaction with sports and leisure public services in rural areas, and there is a mismatch between the supply and demand of such services (Chinese People's Political Consultative Conference Jiangsu Provincial Committee, 2023).

Using the overall mean satisfaction score (3.756) as the x-axis and the overall mean importance score (4.193) as the y-axis, an IPA four-quadrant matrix was constructed. The 22 indicators were mapped to the corresponding quadrants, resulting in the Importance - Performance Analysis (IPA) diagram of rural residents' sports and leisure public services (Figure 1).

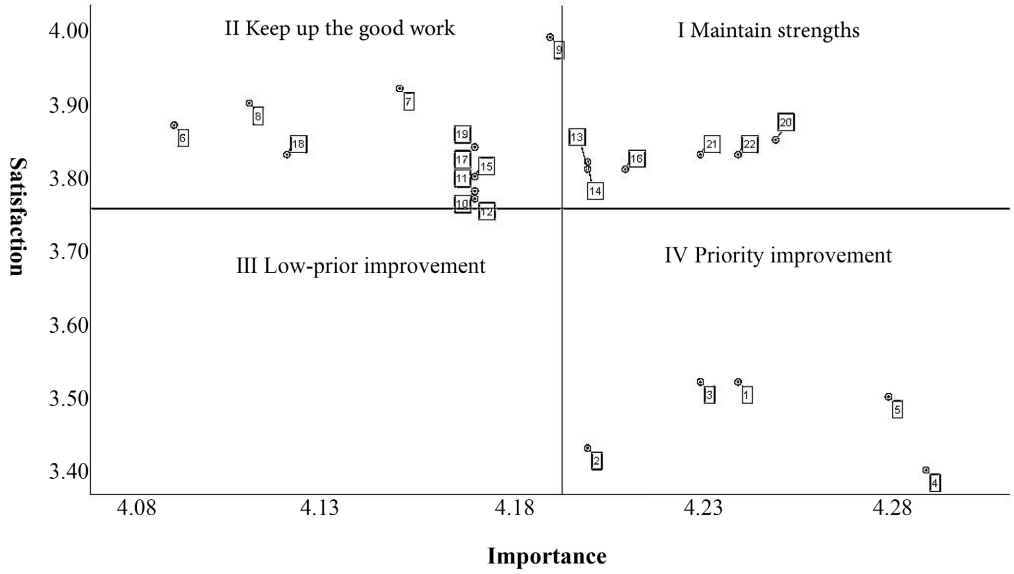

Figure 1. IPA four-quadrant analysis of rural residents' sports and leisure public services.

The I quadrant, characterized as "High Importance - High Satisfaction," indicates that rural residents' demand for and satisfaction with sports and leisure public services are well aligned. This quadrant is commonly referred to as the "Maintain Strengths" quadrant. Factors in this category include: 20 (F1) regular free physical fitness testing, 21 (F2) exercise prescription design (tailored exercise guidance based on individual health conditions), 22 (F3) establishment of personal health records, 13 (C4) provision of event information services, 14 (D1) guidance on scientific fitness methods, and 16 (D3) guidance on sports rehabilitation.

On the demand side, the strong preference for health monitoring 20 (F1), exer-

cise prescription 21 (F2), and health records 22 (F3) reflects an upgraded demand for disease prevention, sports rehabilitation, and personalized health interventions. The consistently high satisfaction with these services suggests that current measures are effectively addressing residents' health concerns. Likewise, the high level of alignment for event information services 13 (C4) underscores residents' growing interest in cultural and sports participation, challenging the stereotype that rural populations are concerned solely with productive labor.

However, cross-group comparisons by age reveal lower satisfaction among residents aged 50 and above with 16 (D3) sports rehabilitation guidance and 14 (D1) scientific fitness guidance. In particular, the mean satisfaction score for 16 (D3) among those aged 60 and above drops to 3.1, suggesting that the overall high satisfaction in this quadrant may obscure subgroup disparities.

The II quadrant, defined as "Low Importance - High Satisfaction," reflects a mismatch between demand and satisfaction: public services that rural residents consider less urgent are nevertheless well delivered. The general strategic orientation for factors in this quadrant is to "let it be." Factors located here include: 6 (B1) organization of recreational sports activities, 7 (B2) organization of folk sports activities (e.g., wooden shoe races, embroidered ball throwing), 8 (B3) organization of cultural and leisure activities (e.g., hiking, square dancing), 9 (B4) organization of ball games (e.g., basketball, table tennis), 15 (D2) provision of technical and professional guidance, 17 (E1) township- or village-level official sports organizations (teams), 19 (E3) management of sports event organizations, 10 (C1) provision of leisure sports culture promotion, 11 (C2) provision of cultural information on leisure sports, and 12 (C3) provision of facility information services.

Compared with other event-related items, the high score of 9 (B4) suggests that residents particularly favor common rural sports events such as basketball and table tennis, accompanied by correspondingly high levels of satisfaction. Moreover, residents appear to value participation in events more than the content itself, indicating that event-related activities play a greater role in fostering their engagement. In contrast, information-provision services (C1 - C3) show both low demand and relatively weak performance. This may reflect a misalignment between publicity content and villagers' cognitive habits, or a lack of information quality, leading residents to perceive such services as "routine formalities" rather than genuine "demand-responsive tools."

The III quadrant, defined as "Low Importance - Low Satisfaction," suggests that when both perceived demand and actual satisfaction are low, service optimization may be deferred. In this study, however, no indicators fall into this quadrant, reflecting rural residents' generally high level of attention to public sports services.

The IV quadrant, defined as "High Importance - Low Satisfaction," indicates a mismatch between demand and satisfaction: the public services most urgently needed by rural residents are not being effectively delivered. Consequently, the strategic orientation for factors in this quadrant is "Priority for Improvement."

Indicators located in this quadrant include: 1 (A1) diversity of leisure sports venues and facilities, 2 (A2) modernity of leisure sports facilities, 3 (A3) proximity of sports and leisure venues to residential areas, 4 (A4) maintenance and management of sports facilities, and 5 (A5) cleanliness of leisure sports venues and facilities.

These results demonstrate that rural residents place particular emphasis on the hardware configuration and maintenance of sports facilities. Their demand for sports and leisure services has shifted from the basic question of "whether facilities exist" to the higher-level concern of "quality of facilities," such as diversity and cleanliness. The relatively low satisfaction also suggests that some rural facilities remain trapped in a "facilities without services" dilemma, where hardware investment has not been successfully translated into sustainable use value (Liu, Liu, & Nie, 2021).

4.4. Binary Logistic Regression Analysis of Residents' Participation in Sports and Leisure Activities

Drawing on the age-specific characteristics of rural residents' sports participation behaviors (Li, Yang, & Chen, 2011), respondents were divided into two groups: those under 40 years old (young and middle-aged group) and those aged 40 and above (middle-aged and older group). Educational attainment was categorized according to the Chinese education system, with junior college and above defined as the high-education group (higher education) and high school and below defined as the low-education group.

A binary logistic regression model was employed to examine the effects of gender, age, educational attainment, place of residence, monthly per capita household income, and residents' perceived importance of sports and leisure services on their participation in sports and leisure activities. The Hosmer-Lemeshow test indicated a good model fit ($p > 0.05$), and the Nagelkerke R^2 was 0.651, suggesting that the independent variables explained 64.4% of the variance in the dependent variable.

Table 6. Binary logistic regression results.

Variable	β	S.E.	Wald	Sig.	Exp (B)	Exp (B) lower	Exp (B) upper
Gender (Male)	0.522***	0.141	13.698	0.000	1.685	1.278	2.221
Age (≤40 years)	−0.437	0.250	3.039	0.081	0.646	0.396	1.056
Education (Below college)	−0.175	0.186	0.881	0.348	0.839	0.582	1.210
Residence (Rural)	0.027	0.145	0.036	0.850	1.028	0.774	1.365
Monthly household income			34.123	0.000			
Income group 1 (3001 - 4000 RMB)	−1.352***	0.276	24.075	0.000	0.259	0.151	0.444
Income group 2 (4001 - 5000 RMB)	−1.527***	0.283	29.122	0.000	0.217	0.125	0.378
Income group 3 (5001 - 6000 RMB)	−0.816**	0.302	7.291	0.007	0.442	0.244	0.799
Income group 4 (≥6001 RMB)	−1.125***	0.350	10.351	0.001	0.325	0.164	0.644

Continued

Importance of facility services	0.150	0.138	1.190	0.275	1.162	0.887	1.522
Importance of activity organization	−0.136	0.161	0.722	0.396	0.872	0.637	1.195
Importance of information services	−0.127	0.186	0.465	0.495	0.881	0.612	1.268
Importance of activity guidance	0.439*	0.182	5.830	0.016	1.551	1.086	2.216
Importance of organizational management	−0.424*	0.186	5.173	0.023	0.654	0.454	0.943
Importance of health management	0.487**	0.171	8.061	0.005	1.627	1.163	2.277
Constant	0.106	0.526	0.040	0.841	1.111		

*Note: *$p < 0.05$; **$p < 0.01$; **$p < 0.001$.

The results of the binary logistic regression analysis (Table 6) show that gender, household per capita monthly income, and residents' perceived importance of activity guidance and health management significantly influence participation in sports and leisure activities.

With respect to demographic characteristics, gender exerts a significant effect (β = 0.522***). Males are 1.685 times more likely than females to participate, indicating a stronger propensity for men to engage in sports activities. Household income groups (1 - 4) all report Exp (B) values less than 1 (0.259 - 0.442), with statistical significance ($p \leq 0.007$). This suggests that residents from households with a monthly per capita income of 3000 RMB or below are more likely to participate in sports and leisure activities than those with incomes of 3001 - 4000 RMB, 4001 - 5000 RMB, 5001 - 6000 RMB, or above 6001 RMB. Low-income groups, such as adolescents, often demonstrate a stronger reliance on labor. In rural areas, farmers' income growth primarily depends on the increase of labor input, with wage-based working hours being the most critical factor affecting household income growth (Yuan, 2020). Thus, higher income generally implies longer working hours. Age and educational attainment do not show significant effects.

Regarding service perceptions, residents' perceived importance of activity guidance positively influences participation (β = 0.439*). Specifically, when residents consider professional guidance essential for participation, their likelihood of engaging in activities increases by 55.1%. For example, rural square dance teams with professional instructors may achieve higher participation rates than spontaneous, self-organized groups. Similarly, residents' perceived importance of health management also exerts a significant positive effect (β = 0.487**), with those valuing health management being 62.7% more likely to participate in sports and leisure activities.

By contrast, the perceived importance of organizational management has a significant negative effect on participation (β = −0.424*). This may be due to the limited variety of rural sports events, insufficient technical and professional guidance, and the long-standing lag in service provision, which have collectively contributed to the ineffectiveness of sports and leisure public management (Li, Yu, &

Wang et al., 2021). Interviews conducted in this study further confirm that rural residents often express dissatisfaction with the organizational and technical services provided by public sports departments.

Characterized by monotonous forms that dampen willingness to participate. Perceptions of the importance of facility services, information services, and activity content exert no significant influence. Likewise, residents' satisfaction with rural sports and leisure services does not affect residents' participation.

4.5. Multiple Linear Regression Analysis of Residents' Life Satisfaction

Life satisfaction was specified as the dependent variable, with gender, age, educational attainment, place of residence, and household per capita monthly income included as control variables. Regression analysis was conducted using SPSS 26.0, and the results for Model M1 are presented below. When additional independent variables—including perceived post-exercise experience, satisfaction with facility services, satisfaction with activity organization, satisfaction with information services, satisfaction with activity guidance, satisfaction with organizational management, and satisfaction with health management—were incorporated, the results for Model M2 were obtained. The adjusted R^2 of Model M2 was 0.565, representing a substantial improvement in explanatory power compared with Model M1 (R^2 = 0.046; ΔR^2 = 0.519). The Durbin-Watson statistics for both models ranged between 1.6 and 2.2, and all variance inflation factors (VIFs) were below 6 (maximum = 5.454), indicating no serious multicollinearity.

Table 7. Multiple linear regression analysis of residents' life satisfaction.

Variable	Life satisfaction	
	M1 (β)	M2 (β)
Gender	−0.128**	−0.012
Age	0.065	0.055
Education	0.002	0.088
Place of residence	−0.027	0.076
Household per capita monthly income	0.133**	0.025
Post-exercise experience	–	0.388***
Satisfaction with facility services	–	0.217**
Satisfaction with activity organization	–	0.040
Satisfaction with information services	–	0.223*
Satisfaction with activity guidance	–	0.164
Satisfaction with organizational management	–	0.148
Satisfaction with health management	–	0.110
R^2	0.046	0.565
ΔR^2	0.046	0.519
F	4.354***	20.792***

*Note: *$p < 0.05$; **$p < 0.01$; **$p < 0.001$.

As shown in Table 7, prior to the inclusion of additional variables, household per capita monthly income had a significant positive effect on residents' life satisfaction (β = 0.133**), while gender also exerted a significant effect (β = −0.128**), with females reporting higher levels of life satisfaction than males (Model M1). After incorporating the additional independent variables—post-exercise experience, satisfaction with facility services, satisfaction with activity organization, satisfaction with information services, satisfaction with activity guidance, satisfaction with organizational management, and satisfaction with health management—the explanatory power of the model improved substantially ($\Delta R^2 = 0.519$; F = 20.792***). This indicates that the newly introduced variables collectively explained 51.9% of the variance in life satisfaction.

Furthermore, these variables significantly enhanced the model's explanatory strength and mediated the effects of gender and household income, which were no longer significant in Model M2. Among the newly added predictors, post-exercise experience (β = 0.388***) had the largest standardized coefficient, suggesting that improvements in physical and psychological experiences after exercise are the most critical pathway to enhancing life satisfaction. This was followed by satisfaction with facility services (β = 0.217**) and satisfaction with information services (β = 0.223*), highlighting the importance of both the physical environment and informational support.

5. Conclusion and Recommendations

1) Residents' Participation in Sports and Leisure Activities

Time constraints constitute the primary barrier to participation, a challenge also widely documented in studies of urban residents' engagement in fitness activities (Wang, Li, & Xing, 2016). Nevertheless, residents in the surveyed regions demonstrate a relatively solid foundation and considerable potential for growth in sports participation. Walking and other low-infrastructure-dependent activities dominate, whereas participation in group-based sports such as basketball and in traditional folk sports remains limited. These findings are consistent with prior evidence that rural residents prefer activities requiring minimal infrastructure (Kong & Li, 2023). Venue preferences are diversified, with residents favoring open, nearby, and aesthetically pleasing environments. Accordingly, policies should prioritize the development of accessible, open, and community-oriented spaces, while encouraging participation in interactive and culturally embedded activities.

2) Residents' Perceptions of Importance and Satisfaction

The findings reveal a persistent gap between the perceived importance and actual satisfaction with rural sports and leisure public services. Residents consistently attach high importance to facilities, activity organization, information services, activity guidance, organizational management, and health management, yet their satisfaction levels remain comparatively low. This suggests that the demand for sports services has shifted from concerns of basic provision to higher-level ex-

pectations of professionalization, personalization, and quality—a trend also observed in tourism, cultural, and sports public services, as well as in non-public service sectors (Ma et al., 2021; Wang, Li, & Xing, 2016; Wang, Han, & An, 2025). Satisfaction with facilities is the lowest, particularly in terms of diversity, maintenance, and cleanliness. Similar problems have been documented in existing studies on rural sports public services (Li, Wang, & Yan, 2022), reflecting the dilemma of "facilities without services," in which infrastructure investments fail to translate into sustainable use value. Greater emphasis should therefore be placed on responsiveness to residents' needs, promoting a transition of rural sports public services from extensive supply to more precise, demand-driven provision.

3) Determinants of Participation and Life Satisfaction

Binary logistic regression analysis shows that gender, household income, and residents' perceptions of activity guidance, organizational management, and health management significantly affect participation. Male residents are more likely to participate, while paradoxically, lower-income groups demonstrate higher participation rates—an outcome that diverges from patterns observed among urban residents (Dai & Li, 2023). Overemphasis on organizational management has a negative effect, possibly reflecting dissatisfaction with task-oriented and monotonous organizational practices, whereas health management exerts a positive influence. Multiple regression further indicates that once service-related factors are included, the effects of demographic variables such as gender and income become nonsignificant. This finding is consistent with prior research suggesting that demographic characteristics offer relatively weak explanatory power for life satisfaction and well-being (Dai & Li, 2023). By contrast, post-exercise experience emerges as the strongest predictor of life satisfaction, followed by satisfaction with facility services and information services, underscoring the critical role of exercise experiences, physical environments, and informational support.

Based on these findings, policymakers should: i) strengthen facility maintenance and cleanliness to improve infrastructure quality; ii) expand professional guidance and health management services; iii) reform organizational management to enhance effectiveness and flexibility; and iv) design more female-oriented programs (e.g., fitness exercises, square dancing) while raising awareness to increase women's participation. Collectively, these measures can more effectively foster rural residents' engagement in sports and leisure activities and substantially improve their overall life satisfaction.

6. Limitations and Future Research Directions

This study has several limitations that should be acknowledged. First, for questions related to participation in sports programs and factors influencing exercise, an "other" option was provided. A proportion of residents selected this option, suggesting that the preset choices did not fully capture all possible needs. Future research should therefore consider adopting open-ended questionnaires to supplement and improve the coverage of survey items. Second, the findings indicate

substantial differences in demand and satisfaction across different groups for certain indicators. To address this issue, future studies should expand the sample size to include a wider range of age groups and conduct stratified analyses to capture group-specific patterns more accurately. Third, the results show that the perceived importance of activity guidance and organizational management significantly affects residents' participation. Future research should further investigate the relationship between residents' emphasis on these services and their actual experiences, thereby providing both theoretical and practical support for enhancing organizational management and activity guidance to improve participation. Finally, the study relied on a non-probability sampling method. While the sample provides some degree of representativeness, its generalizability to all rural residents in Guangxi remains limited. Future studies should adopt probability sampling techniques where feasible to strengthen external validity.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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