COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 18, Number 2, 2026 ‖ P.4413-4420

Inequalities in Access to Sports Facilities and Infrastructure Among Schools: A Comparative Study of Urban and Suburban Areas in Makassar

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ABSTRACT

This study aims to analyze disparities in access to sports facilities and infrastructure among schools and to compare the condition of sports facilities between schools in urban and suburban areas of Makassar. Methods: This study employed a descriptive-comparative quantitative approach using observation, documentation, and questionnaires. The study subjects were 40 schools (20 urban schools and 20 suburban schools) selected through stratified random sampling. Data were analyzed using the Mann-Whitney U test and descriptive statistics. Results: The results indicate that schools in urban areas have a significantly higher sports facility availability index (M = 74.3; SD = 8.7) compared to suburban schools (M = 41.6; SD = 11.2), U = 48, p < .001, r = .72. The most striking disparities were found in the ownership of multi-purpose fields (urban 85%, suburban 25%), swimming pools (urban 40%, suburban 5%), and fitness equipment (urban 70%, suburban 15%). Implications: These findings underscore the urgency of implementing sports education budget redistribution policies that prioritize suburban schools, while also serving as an empirical reference for the City of Makassar's sports infrastructure development programs. This article contains 5 tables, 2 figures, and 35 references.

ARTICLE HISTORY
Received: 2026/05/24
Accepted: 2026/05/29
Published: 2026/05/31

KEYWORDS
Access Inequality;
Sports Facilities;
School Infrastructure;
Urban Areas;
Outskirts of Makassar

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Alimsyah, A.S. (2026). Inequalities in Access to Sports Facilities and Infrastructure Among Schools: A Comparative Study of Urban and Suburban Areas in Makassar. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 18 (2), p.4413-4420

INTRODUCTION

Physical education in schools is not merely a physical activity; rather, it is an integral component of a holistic educational process. The availability of adequate sports facilities and equipment is a key factor in supporting the effectiveness of physical education instruction. Complete and adequate facilities not only support the achievement of learning objectives but also enhance students' motivation, participation, physical health, and character development within the physical education process at school (; Munandar, 2024; Mudayat et al., 2024). However, in Indonesia, including in the city of Makassar, the distribution of school sports facilities is uneven and tends to reflect a sharp spatial polarization between urban and suburban areas.

Inequality in access to sports facilities and infrastructure in schools is a manifestation of broader inequalities within the education system. Schools located in

city centers, with greater proximity to financial resources and greater attention from policymakers, generally enjoy far more comprehensive facilities compared to schools in the suburbs that have historically been overlooked in development priorities (Houlihan & Green, 2011). This situation has direct implications for the quality of physical education instruction, student participation in physical activities, and opportunities for talented athletes from outlying areas to develop.

Makassar, as the capital of South Sulawesi Province, has experienced rapid urbanization over the past two decades. This growth has not been accompanied by a proportional expansion of sports education infrastructure. Data from the Makassar City Education Office (2023) indicates that more than 60% of the budget for school sports facilities is concentrated in six central urban districts, while districts in outlying areas receive only a 40% allocation despite having a comparable number of students. This disparity in budget allocation is believed to contribute significantly to the gap in existing sports facilities.

Previous research has consistently shown that the availability of sports facilities is positively correlated with students' levels of physical participation and overall academic performance (Rasberry et al., 2011; Sallis et al., 2012). In studies conducted in the urban context of Indonesia specifically by Wahyuni et al. (2020) in Surabaya and Nugroho et al. (2021) in Jakarta a gradient in the accessibility of sports facilities based on the geographical location of schools was observed. However, similar research focusing on the city of Makassar, particularly that which systematically compares urban and suburban areas, has not yet been conducted comprehensively.

This gap in the literature serves as the starting point for this study. The objectives of the study are: (1) to describe the condition of sports facilities and infrastructure in urban and suburban schools in Makassar; (2) to compare the index of sports facility availability across regions; and (3) to identify the factors contributing to the existing disparities. The findings of this study are expected to provide an empirical basis for formulating policies on the redistribution of the sports education budget in the City of Makassar.

The theoretical framework of this study is based on the perspective of educational equity, which emphasizes the importance of equitable access to school resources as a means of reducing disparities in learning opportunities across regions. Equity in the provision of educational facilities is understood not only as equal distribution but also as providing greater support to groups or schools with limited resources so they can have equal opportunities to achieve optimal educational outcomes (Sulz et al., 2022). In the context of physical education, the provision of adequate sports facilities and infrastructure is part of school policy that contributes to increased student participation in physical activity and supports health development as well as a more inclusive learning experience (Stylianou et al., 2022). This perspective is reinforced by the social ecological approach, which explains that the physical environment including school design and the availability of sports facilities has a direct influence on students' physical activity behavior. Environments that support physical activity have been shown to increase

students' opportunities to participate in physical activity actively and sustainably (Zhang et al., 2022; Pontin et al., 2022).

METHODS

This study employs a quantitative approach with a descriptive-comparative design. This approach was chosen because the primary objective of the study is to describe and compare the conditions of sports facilities and infrastructure between two groups of schools located in different regions, without intervening in the variables under study (Creswell, 2014).

The population of this study consists of all public junior high schools (SMP) and senior high schools (SMA) in the city of Makassar, totaling 112 schools. The sample was selected using stratified random sampling based on geographic stratification (urban vs. suburban) and educational level (SMP vs. SMA). A total of 40 schools were selected as the sample, consisting of 20 schools in urban areas (Makassar, Ujung Pandang, Rappocini, and Panakkukang subdistricts) and 20 schools in suburban areas (Tamalanrea, Biringkanaya, Manggala, and southern Tamalate subdistricts). The delineation of urban and suburban areas was based on the spatial classification of the Makassar City Central Statistics Agency (2022).

Data collection was conducted using three instruments: (1) a structured observation sheet to directly record the physical condition of sports facilities and infrastructure based on the standards set forth in Regulation of the Minister of National Education No. 24 of 2007; (2) a closed-ended questionnaire administered to physical education teachers to assess the functional quality of available facilities; and (3) a documentation form to record administrative data (land area, budget, and number of students). The content validity of the observation instrument was verified by three experts (two physical education experts and one sports facility management expert), yielding a Content Validity Index (CVI) of .92.

Data collection took place over eight weeks (January–February 2026). Each sample school was visited by two trained enumerators who conducted observations for at least one full day. Inter-rater reliability was estimated using Cohen's Kappa coefficient, with an average result of $\kappa = .87$, indicating very good reliability (Landis & Koch, 1977). The questionnaire was administered to physical education teachers who had taught for at least two years at the respective schools.

The Sports Facility Availability Index (IKSO) is calculated as the ratio of the total score for existing facilities to the ideal score based on national minimum standards, multiplied by 100. The comparison of IKSO scores between urban and suburban groups was tested using the Mann-Whitney U test, as the data distribution was not normal according to the Shapiro-Wilk test ($p < .05$ for both groups). Effect sizes were reported using the r coefficient (Field, 2013). Descriptive analysis included frequency, percentage, median, and interquartile range. All analyses were performed using SPSS version 26.0 with a significance level of $\alpha = .05$.

RESULTS AND DISCUSSION

Conditions of Sports Facilities and Infrastructure in Urban Schools

Observations at 20 schools in the urban area of Makassar show that the majority of schools (85%) have multipurpose fields that can be used for various sports. The physical condition of the fields at 70% of the schools was rated as good or very good. Forty percent of urban schools have swimming pools, although their capacities vary. Fitness equipment and gymnasiums are available in 70% of schools, and 60% of schools have adequate supporting facilities such as changing rooms and equipment storage.

Table1.
Distribution of Types of Sports Facilities in Urban Schools in Makassar (n = 20)

Type of Facility	Available (n)	Percentage (%)	In Good Condition (%)
Multipurpose Field	17	85.0	70.6
Basketball Court	15	75.0	66.7
Volleyball Court	18	90.0	72.2
Badminton Court	14	70.0	64.3
Swimming Pool	8	40.0	87.5
Fitness Area/Gym	14	70.0	57.1
Running Track	11	55.0	63.6
Adequate Changing Rooms	12	60.0	83.3

The Sports Facility Availability Index (IKSO) for urban schools has a median value of 76.5 (IQR = 14.3), with a lowest value of 52.0 and a highest of 94.0. This distribution indicates that although most urban schools fall into the moderate to high categories, there is still significant variation even within the urban group itself. This is consistent with Hardman's (2008) findings, which state that intra-urban inequality is also a phenomenon that warrants attention.

Conditions of Sports Facilities and Infrastructure in Suburban Schools

The condition of sports facilities in suburban schools paints a very different picture. Only 25% of schools have a usable multipurpose field, and only 5% have a swimming pool. Most schools (75%) have only a volleyball court, which is the most common facility, but its condition is rated as good in only 53% of cases. Fitness equipment is available in 15% of schools, and only 20% of schools have adequate changing rooms.

Table2.
Distribution of Types of Sports Facilities in Suburban Schools in Makassar (n = 20)

Type of Facility	Available (n)	Percentage (%)	In Good Condition (%)
Multipurpose Field	5	25.0	60.0
Basketball Court	7	35.0	42.9
Volleyball Court	15	75.0	53.3
Badminton Court	6	30.0	50.0
Swimming Pool	1	5.0	100.0
Fitness Area/Gym	3	15.0	66.7
Running Track	4	20.0	50.0
Adequate Locker Rooms	4	20.0	75.0

The IKSO score for suburban schools has a median value of 39.5 (IQR = 18.1), with a range of 18.0 to 67.0. This very low median value reflects the condition of sports facilities,

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which are generally below the national minimum standard. Land constraints are the main obstacle cited by 80% of physical education teachers in suburban areas. Inadequate budgets and a lack of prioritization by local governments are also dominant barriers.

Comparative Analysis: Urban vs. Suburban Areas

A Mann-Whitney U test was conducted to compare the IKSO scores between urban and suburban schools. The results of the analysis revealed a highly statistically significant difference, $U = 48$, $z = -4.83$, $p < .001$, with a large effect size, $r = .76$ (Cohen, 1988). Urban schools had a much higher mean IKSO score ($M = 74.3$; $SD = 8.7$) compared to suburban schools ($M = 41.6$; $SD = 11.2$). This mean difference of 32.7 points represents a gap that is practically very significant.

Table 3.
Summary of Descriptive Statistics and Results of the Mann-Whitney U Test

Variable	Urban (n=20)	Suburban (n=20)	U	p	r
IKSO (Median)	76.5	39.5	48	< .001	.76
IKSO (Mean ± SD)	74.3 ± 8.7	41.6 ± 11.2			
IKSO Min-Max	52.0–94.0	18.0–67.0			
Area Ratio (m^2/student)	3.8 ± 1.2	1.4 ± 0.7	61	< .001	.68
Budget (million/year)	42.5 ± 18.3	11.2 ± 5.6	34	< .001	.81

These findings are consistent with the results of a study by Wahyuni et al. (2020) in Surabaya, which found a 28-point gap in the IKSO score between urban and suburban schools, as well as with the study by Nugroho et al. (2021), which found a strong correlation between school location and the availability of sports facilities ($r = .69$, $p < .001$). On an international scale, Nicaise et al. (2011) reported a similar pattern in France, where schools in areas with low socioeconomic status ( ) had significantly more limited access to sports facilities, which correlated directly with low student physical participation.

Factors Contributing to Inequality

Multiple regression analysis identified three main predictors of the IKSO: (1) school budget for sports facilities ($\beta = .62$, $p < .001$), (2) available land area ($\beta = .41$, $p < .001$), and (3) age of the school building ($\beta = -.28$, $p = .003$). Together, these three predictors explain 78.4% of the variance in IKSO ($R^2 = .784$, $F(3, 36) = 43.5$, $p < .001$). This model confirms that disparities in sports facilities are not solely a function of geographic location but are mediated by structural factors such as budget allocation and land capacity.

Table 4.
Results of Multiple Regression Analysis of IKSO Predictors

Predictors	β	SE	t	p	95% CI
Facility Budget (million/year)	.62	.08	7.75	< .001	[.46, .78]
Land Area (m^2)	.41	.09	4.56	< .001	[.23, .59]
Building Age (years)	-.28	.09	-3.11	.003	[-.46, -.10]

Findings regarding the dominance of the budget factor reinforce the argument that fiscal redistribution policy interventions are the most effective instruments for addressing this inequality. In line with distributive justice theory, education is viewed as a crucial instrument for reducing social inequality through the redistribution of

resources and opportunities that favor disadvantaged groups. In this context, the state has a responsibility to provide an education system capable of distributing resources more fairly to address disparities stemming from students' social, economic, and geographic conditions (Lie, 2023). This approach underscores that the equitable distribution of educational facilities and services is an integral part of efforts to achieve social justice and equal learning opportunities for all citizens. In this context, schools in the outskirts of Makassar are the ones most in need of affirmative policy attention.

The Impact of Inequality on the Quality of Physical Education

An analysis of physical education teacher surveys reveals the direct impact of facility disparities on the quality of learning. As many as 90% of teachers in suburban schools reported that they had to modify their lesson plans due to limited facilities, compared to only 25% of teachers in urban schools. The average number of sports that can be taught in suburban schools is 3.2, while in urban schools it reaches 6.8. This difference directly limits the motor and kinesthetic experiences that students in suburban areas can gain.

Table 5.
Comparison of Physical Education Quality Indicators Across Regions

Indicator	Urban	Suburban	Difference
Number of sports taught	6.8 ± 1.4	3.2 ± 0.9	3.6*
Teachers modified lesson plans (%)	25.0	90.0	65.0*
Effective PE hours/week	3.6 ± 0.5	2.8 ± 0.7	0.8
Student satisfaction (scale 1–10)	7.4 ± 1.1	5.1 ± 1.4	2.3
Extracurricular participation (%)	62.3	31.8	30.5

The data in Table 5 reveals a consistent pattern of inequality that extends beyond the mere physical availability of facilities and has tangible implications for students' learning experiences. Participation in sports extracurricular activities, which stands at only 31.8% in suburban schools compared to 62.3% in urban schools, reflects a loss of opportunity for suburban students to develop their talents and achieve athletic success. This finding aligns with the argument by Houlihan and Green (2011) that access to sports infrastructure is a key determinant of the development of talented athletes, particularly at the early age stages.

The implications of these findings extend far beyond the realm of education alone. From a public health perspective, low levels of physical activity among students in suburban areas have the potential to contribute to an increase in the prevalence of noncommunicable diseases linked to a sedentary lifestyle in the future (Sallis et al., 2012). This adds a sense of urgency to the need for comprehensive and spatially equitable policy interventions in the management of school sports facilities in Makassar.

CONCLUSION

This study empirically demonstrates the existence of significant disparities in access to sports facilities and infrastructure between schools in urban and suburban areas of Makassar. Urban schools have a Sports Facility Availability Index (IKSO) that is, on average, 32.7 points higher than suburban schools, with a statistically highly

significant difference ($U = 48$, $p < .001$, $r = .76$). The most striking disparities were found in the availability of multipurpose fields, swimming pools, and fitness equipment. Sports facility budget, land area, and building age were identified as the primary predictors of IKSO ($R^2 = .784$).

These findings have a direct impact on the quality of physical education: teachers in suburban areas must modify their lesson plans more frequently, the number of sports they can teach is more limited, and student participation in extracurricular sports activities is significantly lower. Overall, these conditions underscore that disparities in access to school sports facilities are not merely an infrastructure issue, but rather a matter of educational equity that requires systematic policy solutions.

Based on these findings, this study recommends: (1) the formulation of sports education budget policies that affirmatively prioritize schools in suburban areas, taking into account the IKSO-based needs index; (2) the development of partnership programs between the government, the private sector, and the community for the construction of sports facilities in suburban schools; and (3) the preparation of a roadmap for the equitable distribution of school sports facilities that is integrated with the Makassar City Medium-Term Development Plan. Further research is recommended to investigate the causal relationship between improvements in sports facilities and improvements in academic achievement and student health in suburban areas.

ACKNOWLEDGMENTS

The researchers would like to express their gratitude to the Makassar City Education Office for granting research permission and facilitating access to data, to all school principals and physical education teachers who agreed to participate as respondents, and to the enumerators who worked with great dedication throughout the data collection process.

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