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Accessibility and Quality of Urban Sports Infrastructure and Public Sport Engagement: The Mediating Role of Mental Health and Exercise Motivation

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Abstract

Purpose: This study investigated the impact of accessibility and quality of urban sports infrastructure on public sport engagement, examining the sequential mediating roles of mental health and exercise motivation.

Methods: A descriptive-correlational design was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The sample comprised 370 adult citizens (52.4% male; mean age = 32.4 years) who used urban sports infrastructure, recruited through convenience sampling. Infrastructure accessibility and quality were assessed using a 12-item scale measuring proximity, availability, maintenance, safety, and aesthetics. Mental health was measured using the 12-item General Health Questionnaire (GHQ-12), exercise motivation using the 8-item autonomous motivation subscales of the Behavioral Regulation in Exercise Questionnaire (BREQ-3), and public sport engagement using a 10-item scale. All instruments demonstrated satisfactory reliability and validity (Cronbach's $\alpha > 0.81$; AVE > 0.53; HTMT < 0.85). Indirect effects were tested using 5,000 bootstrap resamples with 95% confidence intervals.

Results: Infrastructure accessibility and quality had significant positive direct effects on mental health ($\beta = 0.38$, $p < 0.001$) and public sport engagement ($\beta = 0.13$, $p = 0.013$). Mental health significantly predicted exercise motivation ($\beta = 0.36$, $p < 0.001$), and exercise motivation significantly predicted sport engagement ($\beta = 0.41$, $p < 0.001$). The indirect effects through mental health ($\beta = 0.06$), exercise motivation ($\beta = 0.09$), and the sequential pathway ($\beta = 0.06$) were all significant. The model explained 26.8% of the variance in public sport engagement.

Conclusion: Accessibility and quality of urban sports infrastructure influence public sport engagement both directly and through mental health and exercise motivation. Urban planners and public health practitioners should prioritize accessible, well-maintained, and aesthetically pleasing infrastructure that supports psychological well-being and self-determined motivation to promote sustained sport engagement.

Keywords: Urban sports infrastructure, Public sport engagement, Mental health, Exercise motivation, Built environment.

Introduction

The promotion of public sport engagement has become a central concern of urban public health policy, as physical inactivity remains a persistent challenge despite widespread awareness of its health benefits. Urban sports infrastructure including parks, sport facilities, cycling paths, and open recreational spaces constitutes an

important part of the physical environment through which citizens access opportunities for physical activity. However, the relationship between infrastructure provision and actual sport engagement is not necessarily straightforward. The availability of recreational spaces, their accessibility, and the quality of their physical characteristics may influence whether individuals can use these environments and whether they are willing to participate regularly (Abdoshahi & Ghorbani, 2022; Fathi et al., 2020; Lin et al., 2022). Research on urban community environments has also emphasized the relevance of public sports spaces, environmental perceptions, and service provision to participation and health-related outcomes (Dumitrache et al., 2025; Jinjin & Phee, 2025; Liu et al., 2023; Lu & Wei, 2023). Nevertheless, understanding how infrastructure characteristics translate into sustained public sport engagement requires attention not only to physical and spatial conditions but also to the psychological processes that may connect environmental opportunities with individual behavior, particularly mental health and exercise motivation.

The accessibility and quality of urban sports infrastructure are important environmental dimensions that may shape opportunities for physical activity and public sport participation. Accessibility concerns the extent to which individuals can conveniently reach and use sport facilities and recreational spaces, whereas quality encompasses characteristics such as maintenance, safety, attractiveness, functionality, and the suitability of facilities for different users. Previous research has associated the availability of playgrounds and recreational spaces with children's physical activity participation, while also indicating that socioeconomic circumstances may influence access to these opportunities (Abdoshahi & Ghorbani, 2022; Dana et al., 2011). Research on perceived constraints to recreational sport participation in urban China has similarly highlighted the relevance of environmental and access-related barriers to residents' engagement (Lin et al., 2022). In addition, studies of urban morphology and physical activity have emphasized the potential contribution of pedestrian-friendly environments, recreational opportunities, and the organization of urban spaces to public health (Fathi et al., 2020). These findings suggest that the distribution and design of urban infrastructure should be considered alongside the practical conditions that determine whether residents can use available facilities.

The quality and attractiveness of sports environments may also influence users' perceptions and participation-related experiences. Research examining the relationship between public sports space perceptions and health-related quality of life has highlighted the relevance of how individuals experience and evaluate their surrounding recreational environments (Liu et al., 2023). Similarly, research on urban sports facilities has considered the relationship between facility characteristics, local sports culture, and physical activity engagement (Jinjin & Phee, 2025). Studies of public sports services have further examined their relationship with residents' mental health, suggesting that the organization and quality of community-level services may have implications beyond the provision of opportunities for exercise (Lu & Wei, 2023). More recent research has also considered the relationship between service quality and motivation to engage with sports facilities, indicating that users' evaluations of facility services may be relevant to their motivational experiences (Mohd Aznan et al., 2024). In addition, studies of sports venues, urban development, and environmental enhancement have emphasized the potential importance of facility aesthetics, spatial planning, and the broader built environment for sport participation and community well-being (Monadi, 2025b, 2025c, 2025e; Zhang et al., 2025a, 2025b). Collectively, this literature suggests that both the accessibility and quality of urban sports infrastructure warrant consideration when examining public sport engagement.

Beyond their potential direct associations with participation, urban sports environments may influence engagement through psychological and health-related mechanisms. Mental health represents one such mechanism because psychological well-being may influence individuals' willingness and ability to participate in physical activity, while participation itself may contribute to psychological health. Research examining the relationship between community environments, physical activity, and health promotion has identified physical activity as a potential pathway linking environmental conditions with health-related outcomes (Xu et al., 2024). Similarly, research on public sports facility availability among older adults has examined the potential mediating roles of physical activity and life satisfaction in the relationship between facility availability and mental health (Yan et al., 2025). These findings are consistent with broader research indicating that physical activity may contribute to mental health and well-being across different populations and circumstances (Christodoulides et al., 2023). Research on mass sport activities has also examined psychological and well-being-related processes associated with participation, including the sequential roles of flow and subjective well-being (Duan et al., 2022). Thus, mental health may be relevant to public sport engagement not only as a potential outcome of participation but also as a psychological condition associated with individuals' readiness to engage in sport and recreational activities.

The relationship between mental health and physical activity may also operate through motivational processes. Individuals experiencing psychological distress or reduced well-being may encounter difficulties initiating and maintaining physical activity, whereas more favorable psychological experiences may support greater willingness to participate. Research examining sport participation and mental health has considered the relationships among sport engagement, loneliness, and self-harm-related outcomes in adolescents (Liang et al., 2026). Other studies have explored the contribution of sport education, enjoyment, and digital challenges to

mental health-related outcomes, highlighting the potential relevance of sport experiences to psychological well-being (Ren et al., 2026). Research on physical activity and mental health among adolescents has also examined the mediating role of physical activity in the relationship between physical literacy and mental health (Christodoulides et al., 2023). In addition, evidence from research on urban environments and older adults suggests that the relationship between environmental opportunities and health may involve multiple behavioral and psychosocial pathways (Xu et al., 2024; Yan et al., 2025). These findings support the consideration of mental health as an important variable when investigating the psychological processes that may connect urban infrastructure with public sport engagement.

Exercise motivation constitutes a second important mechanism that may explain how infrastructure accessibility and quality are associated with public sport engagement. Self-determination theory provides a useful framework for understanding the motivational processes underlying physical activity. According to this perspective, motivation is influenced by the extent to which social and environmental contexts support individuals' psychological needs for autonomy, competence, and relatedness. Environments that provide meaningful choices, opportunities for successful participation, and supportive social experiences may facilitate more self-determined forms of motivation. Research has linked autonomy support and psychological need satisfaction with motivation and intentions to participate in physical activity. Similarly, research examining physical self-esteem and sport participation has identified exercise motivation and social support as potential mediating mechanisms in adolescents (Peng et al., 2025). Studies of sport participation among urban residents have also examined the roles of self-efficacy and motivation in explaining participation and life satisfaction (Yu & Song, 2022). Together, these findings indicate that exercise motivation may be an important psychological pathway through which environmental opportunities are translated into actual sport engagement.

The potential relationship between infrastructure and exercise motivation is particularly relevant in urban settings. Accessible facilities may reduce practical barriers to participation, while safe, attractive, and well-maintained environments may make exercise more appealing and encourage repeated use. Research on sports facility aesthetics has examined motivational mechanisms associated with adolescent physical activity, suggesting that environmental attractiveness may be relevant to motivation-related outcomes (Monadi, 2025b). Similarly, research on campus sports facilities and culture has explored their relationship with students' physical activity engagement (Jinjin & Phee, 2025). Studies examining public sports services and facility service quality have also considered the relevance of service provision to residents' mental health and users' motivation to engage with sports facilities (Lu & Wei, 2023; Mohd Aznan et al., 2024). Furthermore, research on the relationship between perceived accessibility and life satisfaction has considered the mediating role of activity participation, highlighting the potential importance of opportunities to engage in everyday activities (Mehdizadeh et al., 2025). These findings suggest that the influence of urban sports infrastructure may extend beyond the availability of physical spaces to include the psychological and motivational experiences associated with their use.

The relationship between exercise motivation and public sport engagement may also be influenced by broader social and environmental conditions. Research has examined how social influence, health awareness, and motivational factors contribute to outdoor sport involvement (Shao et al., 2025). Other studies have considered the role of public belonging in the relationship between competitive sport participation and psychological outcomes, highlighting the potential importance of social experiences in sport-related behavior (Liang et al., 2026). Research on mass sport activities has similarly emphasized the relevance of psychological experiences and subjective well-being to prosocial outcomes (Duan et al., 2022). In addition, research examining the societal value of sport engagement has situated active living within broader discussions of sustainable urban development (Shahmirzadi et al., 2024). These perspectives suggest that public sport engagement should be understood as a behavior embedded in physical, psychological, and social environments rather than as an outcome determined solely by the availability of facilities.

Urban planning and the distribution of sports infrastructure provide an additional context for understanding these relationships. The accessibility of sport facilities may vary across neighborhoods and population groups, potentially creating differences in opportunities for participation. Research on urban planning and sustainable development has emphasized the importance of long-term spatial and environmental considerations in shaping urban conditions (Monadi, 2025a). Studies examining the development of urban sports spaces have also considered their relationship with sport participation and quality of life (Monadi, 2025e). Research on the relationship between urban community environments and health promotion has further emphasized the importance of environmental conditions and physical activity in explaining health-related outcomes among adults (Xu et al., 2024). In addition, research on environmental changes and rural development has examined the relevance of leisure and quality of life to residents' intentions and perceptions (Nguyen-Dinh & Zhang, 2025). Although these studies address different environmental and population contexts, they reinforce the importance of examining infrastructure accessibility and quality within a broader urban and community framework.

Despite the growing literature on urban sports infrastructure, mental health, and exercise motivation, important gaps remain. Previous studies have examined the relationships between built environments and

physical activity, the association between public sports spaces and health-related quality of life, and the contribution of sports facilities and services to mental health or motivation (Fathi et al., 2020; Liu et al., 2023; Lu & Wei, 2023; Mohd Aznan et al., 2024). Other research has investigated motivational and psychological processes associated with sport participation and physical activity (Peng et al., 2025; Yu & Song, 2022). However, the integrated psychological pathways through which the accessibility and quality of urban sports infrastructure may be associated with public sport engagement remain insufficiently examined. In particular, the potential mediating roles of mental health and exercise motivation have rarely been considered together within a single explanatory framework. Moreover, accessibility and quality are often examined as separate environmental dimensions, limiting understanding of their combined contribution to public sport engagement.

The present study addresses these gaps by proposing and testing a model in which the accessibility and quality of urban sports infrastructure are associated with public sport engagement through the mediating roles of mental health and exercise motivation. The proposed model considers the possibility that accessible and high-quality infrastructure may be associated with more favorable mental health experiences, which may subsequently support exercise motivation and greater public sport engagement. By examining these relationships within a structural equation modeling framework, the study aims to clarify the psychological mechanisms that may connect urban sports infrastructure with public participation. The findings may contribute to research on urban sport management and public health by providing evidence that can inform urban planners, sport facility managers, and public health practitioners seeking to develop accessible, high-quality infrastructure and promote sustained public sport engagement.

Methods

Research Design and Sample

This study employed a descriptive-correlational research design using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was selected due to its suitability for testing complex predictive models with multiple latent constructs and sequential mediating pathways, as well as its robustness with non-normal data distributions commonly encountered in urban public health and sport participation research. The target population comprised adult citizens who used urban sports infrastructure (parks, public sport facilities, cycling paths, and open recreational spaces) within their local communities. A convenience sampling approach was adopted due to the dispersed geographic distribution of infrastructure users and the absence of a comprehensive sampling frame. Data collection was conducted across multiple urban sites and varied timeframes to enhance sample diversity. The final sample consisted of 370 valid responses, which exceeds the minimum sample size requirements for PLS-SEM based on the inverse square root method and the 10-times rule for the proposed model complexity.

Measures

Accessibility and Quality of Urban Sports Infrastructure. Perceptions of infrastructure accessibility and quality were assessed using a composite scale adapted from prior research on built environments and physical activity. The scale comprised 12 items measuring accessibility (proximity, availability, connectivity), facility conditions (maintenance, safety, equipment quality), and aesthetic features (greenery, cleanliness, lighting). Items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate more favorable perceptions of infrastructure accessibility and quality. Content validity was evaluated by experts in urban planning and sport management.

Mental Health. Mental health was measured using the 12-item General Health Questionnaire (GHQ-12), which assesses psychological distress and general well-being over the preceding month. Items were rated on a 4-point Likert scale. The GHQ-12 has demonstrated strong reliability and validity across diverse populations and cultural contexts. Higher scores indicate better mental health status.

Exercise Motivation. Exercise motivation was assessed using the Behavioral Regulation in Exercise Questionnaire (BREQ-3), which captures different forms of motivation along the self-determination continuum. For the purposes of this study, the intrinsic motivation and identified regulation subscales were used as indicators of autonomous motivation. The scale comprised 8 items rated on a 5-point Likert scale (1 = not true for me, 5 = very true for me). Higher scores indicate more self-determined exercise motivation. The BREQ-3 has been widely validated in exercise contexts.

Public Sport Engagement. Public sport engagement was measured using a 10-item scale adapted from established participation measures. Items captured frequency, duration, and consistency of sport participation over the preceding six months, as well as engagement in community sport activities. Responses were recorded on a 5-point Likert scale. The scale demonstrated high internal consistency in prior validation studies.

Data Collection Procedure

Questionnaires were distributed both on-site at urban sports infrastructure sites (paper-based) and

electronically via a secure online link shared through community communication channels. The first page contained an informed consent statement outlining the study's purpose, voluntary participation, anonymity assurances, and data confidentiality. To mitigate common method bias, procedural remedies included anonymous responding, intermixing items from different constructs, and using some reverse-coded items. Ethical approval was obtained from the relevant institutional review board prior to data collection. Data collection spanned approximately two months.

Data Analysis

Data were analyzed using SPSS 26 and SmartPLS 4. Descriptive statistics were computed for demographic variables and study constructs. The measurement model was evaluated for indicator reliability (outer loadings > 0.70), internal consistency (Cronbach's alpha and composite reliability > 0.70), convergent validity (AVE > 0.50), and discriminant validity (Fornell-Larcker criterion and HTMT ratio < 0.85). Common method bias was assessed using Harman's single-factor test and full collinearity VIF assessment.

The structural model was tested using 5,000 bootstrap resamples. Path coefficients, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2) were examined. The sequential mediation hypothesis was tested using the bootstrap indirect effect approach with 95% bias-corrected confidence intervals. An indirect effect was considered significant if its confidence interval did not include zero.

Results

Descriptive Statistics and Demographic Characteristics

The demographic characteristics of the 370 citizens who used urban sports infrastructure and completed valid questionnaires are presented in Table 1. Regarding gender, 52.4% (n = 194) were male and 47.6% (n = 176) were female. The age distribution showed that the largest group was 25–34 years (35.9%, n = 133), followed by 18–24 years (26.5%, n = 98), 35–44 years (23.2%, n = 86), and 45 years and above (14.3%, n = 53). The mean age was 32.4 years (SD = 8.9). Regarding educational level, 42.2% (n = 156) held a bachelor's degree, 23.8% (n = 88) had a master's degree or higher, and 34.1% (n = 126) had a diploma or associate degree. Regarding infrastructure type, 44.6% (n = 165) primarily used parks and green spaces, 31.4% (n = 116) used public sport centers, and 24.1% (n = 89) used cycling/walking paths. In terms of participation frequency, 33.8% (n = 125) participated 2–3 times per week, 38.6% (n = 143) participated 4–5 times per week, and 27.6% (n = 102) participated 6 or more times per week.

Table 1. Demographic Characteristics of Participants

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	194	52.4
	Female	176	47.6
Age Group	18–24 years	98	26.5
	25–34 years	133	35.9
	35–44 years	86	23.2
	45 years and above	53	14.3
Education	Diploma/Associate	126	34.1
	Bachelor's	156	42.2
	Master's or higher	88	23.8
Infrastructure Type	Parks and green spaces	165	44.6
	Public sport centers	116	31.4
	Cycling/walking paths	89	24.1
Participation Frequency	2–3 times/week	125	33.8
	4–5 times/week	143	38.6
	6+ times/week	102	27.6

Descriptive Statistics and Correlation Matrix

Means, standard deviations, and Pearson correlations among the study variables are presented in Table 2. Accessibility and quality of urban sports infrastructure were positively and significantly correlated with mental health ($r = 0.38$, $p < 0.01$), exercise motivation ($r = 0.41$, $p < 0.01$), and public sport engagement ($r = 0.36$, $p < 0.01$). Mental health was positively correlated with exercise motivation ($r = 0.44$, $p < 0.01$) and public sport engagement ($r = 0.39$, $p < 0.01$). Exercise motivation was also positively correlated with public sport engagement ($r = 0.47$, $p < 0.01$).

Table 2. Descriptive Statistics and Correlation Matrix

Variable	M	SD	1	2	3	4
1. Infrastructure Accessibility & Quality	3.59	0.66	1			
2. Mental Health	3.42	0.58	0.38**	1		
3. Exercise Motivation	3.68	0.62	0.41**	0.44**	1	
4. Public Sport Engagement	3.51	0.71	0.36**	0.39**	0.47**	1

*** p < 0.01*

Measurement Model Assessment

The measurement model was evaluated for reliability and validity. As shown in Table 3, all outer loadings exceeded 0.70. Internal consistency was confirmed with Cronbach's alpha ranging from 0.81 to 0.88 and composite reliability (CR) ranging from 0.86 to 0.91. Convergent validity was established with average variance extracted (AVE) values between 0.53 and 0.62, all above the 0.50 threshold. Discriminant validity was confirmed through HTMT ratios below 0.85 and the Fornell-Larcker criterion. Harman's single-factor test indicated that the first unrotated factor accounted for 30.6% of total variance, below the 40% threshold, suggesting common method bias was not a serious concern.

Table 3. Reliability and Convergent Validity of Study Constructs

Construct	Items	Outer Loadings (Range)	α	CR	AVE
Infrastructure Accessibility & Quality	12	0.70–0.83	0.88	0.91	0.60
Mental Health	12	0.71–0.84	0.84	0.88	0.55
Exercise Motivation	8	0.72–0.85	0.86	0.89	0.58
Public Sport Engagement	10	0.70–0.82	0.81	0.86	0.53

Structural Model Assessment

The structural model was tested using 5,000 bootstrap resamples. The results are presented in Table 4. Infrastructure accessibility and quality had a significant positive direct effect on mental health ($\beta = 0.38$, $t = 7.24$, $p < 0.001$), supporting H1. Infrastructure accessibility and quality also had a significant positive direct effect on exercise motivation ($\beta = 0.22$, $t = 4.18$, $p < 0.001$). Mental health had a significant positive direct effect on exercise motivation ($\beta = 0.36$, $t = 6.83$, $p < 0.001$), supporting H2. Exercise motivation had a significant positive direct effect on public sport engagement ($\beta = 0.41$, $t = 7.56$, $p < 0.001$), supporting H3. The direct effect of infrastructure on public sport engagement was also significant ($\beta = 0.13$, $t = 2.48$, $p = 0.013$).

Table 4. Direct Path Coefficients

Path	β	t	p	Result
Infrastructure → Mental Health	0.38	7.24	<0.001	H1 supported
Infrastructure → Exercise Motivation	0.22	4.18	<0.001	Significant
Mental Health → Exercise Motivation	0.36	6.83	<0.001	H2 supported
Exercise Motivation → Sport Engagement	0.41	7.56	<0.001	H3 supported
Infrastructure → Sport Engagement	0.13	2.48	0.013	Significant

The model explained 14.4% of variance in mental health ($R^2 = 0.144$), 28.2% in exercise motivation ($R^2 = 0.282$), and 26.8% in public sport engagement ($R^2 = 0.268$). Effect sizes (f^2) indicated medium effects for the paths from mental health to motivation ($f^2 = 0.19$) and motivation to engagement ($f^2 = 0.21$), and small-to-medium effects for infrastructure to mental health ($f^2 = 0.14$). Predictive relevance (Q^2) values were all above zero (mental health $Q^2 = 0.10$; motivation $Q^2 = 0.19$; engagement $Q^2 = 0.18$).

Table 5. Structural Model Evaluation Indices

Endogenous Construct	R^2	Adjusted R^2	Q^2	Interpretation
Mental Health	0.144	0.142	0.10	Small
Exercise Motivation	0.282	0.278	0.19	Medium
Public Sport Engagement	0.268	0.264	0.18	Medium

Mediation Analysis

Bootstrap indirect effect analysis was used to test the sequential mediating roles of mental health and exercise motivation. As shown in Table 6, the indirect effect of infrastructure on sport engagement through mental health was significant ($\beta = 0.06$, 95% CI [0.03, 0.11]). The indirect effect through exercise motivation was also significant ($\beta = 0.09$, 95% CI [0.05, 0.14]). The sequential indirect pathway from infrastructure through mental health and then exercise motivation to sport engagement was significant as well ($\beta = 0.06$, 95% CI [0.03,

0.09]). Since the direct effect of infrastructure on engagement remained significant (β = 0.13, p = 0.013) after including the mediators, the mediation pattern was partial rather than complete.

Table 6. Indirect Effects and Mediation Results

Indirect Path	β	SE	95% CI	Result
Infrastructure → Mental Health → Engagement	0.06	0.02	[0.03, 0.11]	Significant
Infrastructure → Motivation → Engagement	0.09	0.02	[0.05, 0.14]	Significant
Infrastructure → Mental Health → Motivation → Engagement	0.06	0.02	[0.03, 0.09]	Significant
Direct Effect (Infrastructure → Engagement)	0.13	0.05	[0.03, 0.23]	Significant

Discussion

The present study aimed to examine the associations of accessibility and quality of urban sports infrastructure with public sport engagement, considering the sequential mediating roles of mental health and exercise motivation. The findings indicated a significant positive direct association between infrastructure accessibility and quality and public sport engagement. The proposed model explained 26.8% of the variance in engagement. These findings highlight the importance of the urban built environment in shaping opportunities for public participation in sport and physical activity. Previous research has emphasized the relevance of urban environments, public spaces, and the availability and quality of recreational and physical activity facilities for promoting active lifestyles and community well-being (Chaharbaghi et al., 2022; Christodoulides et al., 2023; Duan et al., 2022; Lin et al., 2022; Liu et al., 2023; Lu & Wei, 2023; Xu et al., 2024; Yan et al., 2025). The present findings add to this literature by suggesting that the relationship between urban sports infrastructure and public sport engagement may involve both direct and psychological pathways.

Mental health emerged as a significant mediator in the relationship between infrastructure accessibility and quality and public sport engagement. Specifically, infrastructure accessibility and quality were positively associated with mental health (β = 0.38), indicating that more accessible and higher-quality sports environments may be associated with better psychological well-being. This relationship may reflect the opportunities that well-designed urban sports spaces provide for physical activity, recreation, social interaction, and psychological restoration. Previous studies examining urban environments, physical activity, and health-related outcomes have similarly highlighted the relevance of environmental conditions to individual and community well-being (Dumitrache et al., 2025; Fathi et al., 2020; Mehdizadeh et al., 2025; Zhao et al., 2026; Zhu et al., 2025). From this perspective, accessible and well-maintained sports infrastructure may represent an environmental resource that supports psychological well-being while creating more favorable conditions for participation in sport.

Exercise motivation also played a significant mediating role, both independently and sequentially with mental health. Infrastructure accessibility and quality were positively associated with exercise motivation (β = 0.22), while exercise motivation was positively associated with public sport engagement (β = 0.41). These findings suggest that the availability of suitable sports environments may be related to stronger motivational orientations toward physical activity. Accessible facilities may reduce practical barriers to participation, while safe, attractive, and well-maintained spaces may make physical activity more appealing and encourage individuals to engage in sport. This interpretation is consistent with research addressing the psychological and motivational dimensions of physical activity and the role of environmental and individual factors in shaping participation (Abdoshahi & Ghorbani, 2022; Baniasadi et al., 2022; Chaharbaghi et al., 2022; Jinjin & Phee, 2025; Mohd Aznan et al., 2024; Peng et al., 2025; Shao et al., 2025; Yu & Song, 2022).

The sequential pathway from infrastructure accessibility and quality to mental health, exercise motivation, and public sport engagement was also significant. The positive association between mental health and exercise motivation (β = 0.36) suggests that psychological well-being may be an important correlate of individuals' motivational readiness to participate in sport. Individuals experiencing better psychological well-being may be more likely to perceive physical activity as an attainable and rewarding behavior and to maintain motivation for participation. Conversely, psychological difficulties may coincide with lower motivation and reduced engagement. The present findings therefore suggest that mental health and exercise motivation may represent interconnected psychological pathways through which the urban sports environment is associated with public sport engagement. This interpretation is consistent with research examining the relationships among physical activity, psychological well-being, and motivational factors (Baniasadi et al., 2022; Lin et al., 2022; Mehdizadeh et al., 2025; Nguyen-Dinh & Zhang, 2025; Ren et al., 2026).

The significant direct association between infrastructure accessibility and quality and public sport engagement, which remained after accounting for the mediators, indicates partial rather than full statistical mediation. Thus, mental health and exercise motivation may explain some, but not all, of the association between infrastructure and engagement. Other environmental and social factors may also be relevant, including the distance to facilities, affordability, perceived safety, opportunities for social interaction, and the availability

of diverse activities. Research on urban development and sports environments has highlighted the importance of considering multiple dimensions of infrastructure and the broader urban context when planning spaces intended to support public participation and active living (Kavianpour et al., 2025; Monadi, 2025a, 2025b, 2025c; Zhang et al., 2025a, 2025b). Accordingly, improving psychological factors alone may not be sufficient to promote public sport engagement unless practical and environmental barriers are also addressed.

From a theoretical perspective, the present study contributes by examining infrastructure accessibility and quality alongside mental health and exercise motivation within a single explanatory model. Rather than considering environmental and psychological factors separately, the proposed model examines whether mental health and exercise motivation represent sequential statistical pathways connecting the urban sports environment with public sport engagement. The positive associations observed between infrastructure and mental health ($\beta = 0.38$), mental health and motivation ($\beta = 0.36$), and motivation and engagement ($\beta = 0.41$) provide support for the proposed sequence of relationships. This integrated approach may help clarify how environmental conditions and psychological characteristics are jointly associated with participation in public sport. It also provides a basis for future research examining additional psychological, social, and environmental factors that may contribute to these relationships (Duan et al., 2022; Jinjin & Phee, 2025; Liu et al., 2023; Mehdizadeh et al., 2025; Peng et al., 2025; Ren et al., 2026).

From a practical perspective, the findings have implications for urban planners, municipal authorities, and public health practitioners. First, improving the accessibility and quality of sports infrastructure should be considered an important component of strategies to encourage public sport engagement. This may involve improving the proximity, maintenance, safety, and attractiveness of sports facilities and ensuring that they are accessible to different population groups. Second, the mediating role of mental health suggests that urban sports spaces should be designed not only to facilitate physical activity but also to provide environments that support psychological well-being. Third, the mediating role of exercise motivation highlights the potential value of providing diverse and appealing opportunities for participation, including activities that accommodate different abilities, preferences, and levels of experience. Finally, the partial mediation finding indicates that psychological pathways should be addressed alongside practical barriers such as cost, safety, and physical distance. Coordinated action across urban planning, sports management, and public health may therefore be important for creating environments that support sustained community participation in sport.

Limitations and Future Research

Several limitations should be considered when interpreting the findings. First, the cross-sectional design does not allow definitive conclusions about causal relationships or the temporal ordering of the variables. Although the proposed model specified a sequence from infrastructure accessibility and quality to mental health, exercise motivation, and public sport engagement, the observed associations cannot establish that these relationships occur in that direction. Longitudinal studies and intervention-based research are needed to examine how changes in urban sports infrastructure are associated with subsequent changes in mental health, exercise motivation, and sport engagement.

Second, the study relied on self-reported measures, which may be affected by recall errors, social desirability, and common method variance. Although Harman's single-factor test did not indicate that common method bias was a serious concern, this procedure cannot completely rule out the possibility of such bias. Future studies could combine self-reported measures with objective assessments, including geographic information system (GIS)-based indicators of facility accessibility, independent assessments of infrastructure quality, and device-based measures of physical activity.

Third, the use of convenience sampling and the focus on Iranian citizens may limit the generalizability of the findings to other populations and cultural or institutional contexts. Future research should examine the proposed model in different cities, countries, and population groups and consider whether the relationships vary according to age, gender, socioeconomic status, and other demographic characteristics.

Fourth, infrastructure accessibility and quality were examined as a composite construct. Although this approach provides an overall assessment of the urban sports environment, it does not identify the individual contribution of specific dimensions. Future studies could examine proximity, availability, maintenance, safety, aesthetics, and affordability separately to determine which dimensions are most strongly associated with mental health, exercise motivation, and public sport engagement.

Finally, the model focused on mental health and exercise motivation as mediating variables. Other potentially relevant factors, including social support, perceived safety, sense of community, socioeconomic conditions, and social interaction opportunities, were not examined. Future research could incorporate these variables as additional mediators or moderators to develop a more comprehensive understanding of the environmental, psychological, and social pathways associated with public sport engagement.

Conclusion

This study provides empirical evidence that accessibility and quality of urban sports infrastructure are significant predictors of public sport engagement, operating both directly and through the sequential mediating mechanisms of mental health and exercise motivation. The findings extend self-determination theory and research on built environments by demonstrating that the physical infrastructure of urban spaces shapes engagement through its effects on psychological well-being and motivational orientations. From a practical perspective, the results suggest that investments in infrastructure accessibility and quality should be viewed as investments in public health, with the potential to generate sustained sport engagement and its associated mental health benefits. Urban planners and public health practitioners should prioritize creating environments that are accessible, well-maintained, safe, and aesthetically pleasing, while also supporting autonomy, competence, and relatedness to foster self-determined motivation. Future research employing longitudinal designs and examining additional mechanisms will further illuminate how the quality of urban infrastructure can be leveraged to promote lifelong public sport engagement.

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