



Identifying the Factors Affecting Environmental Health in Sports Facilities Using an Evidence-Based Design Approach

Roodabeh Soleimani

Department of Architecture, South Tehran Branch, Islamic Azad University, Tehran, Iran.

Roxana Abdollahi*

Department of Architecture, Qo.C., Islamic Azad University, Qom, Iran.

Farideh Sharififar

Department of Sport Management, South Tehran Branch, Islamic Azad University, Tehran, Iran.

Hadi Ghoddusifar

Department of Architecture, South Tehran Branch, Islamic Azad University, Tehran, Iran.

Abstract

The aim of this study is to identify factors affecting the environmental health of sports venues using an evidence-based design approach. The research method was qualitative and based on semi-structured interviews with 12 experts in the field of architecture and sport management who were selected using purposive sampling. The data were analyzed using a thematic analysis approach and based on the six stages of Braun and Clarke (2006). The findings showed that the environmental health of sports venues is organized into five main categories including physical and environmental factors, psychological and cognitive factors, social and cultural factors, functional and productivity factors, and managerial and executive factors. These categories ultimately lead to four macro-outcomes including physical health, mental health, social health, and environmental sustainability. In the physical and environmental dimension, elements such as lighting, ventilation, thermal comfort, and ergonomic design play a key role in reducing injuries and promoting safety. In the psychological and social dimension, designing a relaxing environment, providing privacy, and creating interactive spaces can provide a positive and supportive experience for users. The results also showed that paying attention to functional and management dimensions through observing design standards, utilizing new technologies, stakeholder participation, and sustainable policymaking guarantees the sustainability and long-term use of these places. The innovation of the research lies in providing a comprehensive and integrated framework that can provide scientific and practical guidance for architects, sports managers, and policymakers towards sustainable development and improving the quality of life of sports venue users.

Introduction

The expansion of urbanization, changing lifestyles, and reduced physical activity have caused human physical and mental health to be increasingly influenced by the quality of built environments. In this regard, sports facilities, as important public spaces, play a significant role in promoting the health, well-being, and social interactions of users. However, many of these spaces are unable to provide a safe, sustainable, and health-oriented environment due to poor

* Corresponding Author: roxanaabdollahi@iau.ac.ir

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environmental design, lack of health standards, and disregard for the psychological and social needs of users. An evidence-based design approach, relying on scientific data and user experiences, allows for a detailed analysis of the quality of the environment and improvement of the performance of sports spaces. The present study, with the aim of identifying factors affecting the environmental health of sports venues, attempts to provide a comprehensive framework for explaining the physical, psychological, social, functional, and managerial dimensions of these spaces, so that the conditions can be created for improving the quality of the environment, increasing user satisfaction, and achieving sustainable development in sports venues.

Methods and Materials

This research was conducted using a qualitative approach and thematic analysis method, and its data were collected through semi-structured interviews with 12 experts in the fields of architecture, sports psychology, and sports coaching and facility management. Data analysis was conducted based on Braun and Clarke's six-step model, during which 78 initial codes were extracted and, after refining, classified into 51 basic codes, 12 organizing themes, and five main categories.

Results and Discussion

The findings showed that the factors affecting the environmental health of sports venues can be categorized into five main dimensions, including physical and environmental, psychological and cognitive, social and cultural, functional and productivity, and managerial and executive factors. In the physical and environmental dimension, components such as light, ventilation, thermal comfort, acoustics, ergonomic design, and accessibility play a key role in promoting physical health and reducing sports injuries. In the psychological dimension, creating psychological comfort, reducing stress, a sense of security, and maintaining privacy were identified as the most important factors affecting the positive experience of users. The findings also showed that designing interactive spaces, paying attention to spatial justice, and cultural compatibility can promote social health and increase user participation. In the functional and managerial areas, observing design standards, using new technologies, sustainable policymaking, continuous monitoring, and stakeholder participation are considered requirements for promoting environmental health.

Table 1. Extracted themes and their classification

Code Type	Main Theme	Subtheme	Open Coding
Influential Factors	Environmental features derived from evidence-based design	Physical and environmental codes	Lighting (natural and artificial)
			Indoor air quality (ventilation, humidity)
			Temperature and thermal comfort
			Acoustics (noise reduction, sound insulation)
			Ergonomic design (adaptation of space to the user)
			Spatial layout and organization
			Accessibility (for people with limited mobility)
			Physical safety (protection, non-slip surfaces)
			Green spaces and natural elements (biophilic design)
		Psychological and cognitive codes	Reducing stress and anxiety
			Creating privacy
			Sense of security (psychological and social)
			Improving concentration and physiological comfort
Social and cultural codes	Enhancing environmental identity		
	Psychological support for users		
	Facilitating social interactions (gathering spaces)		
	Cultural compatibility (consideration of cultural values)		
	Community and user participation		
	Social justice and equal access		

Code Type	Main Theme	Subtheme	Open Coding
Outcome Codes	Environmental health of sports facilities	Functional and productivity codes	Cultural identity of the environment
			Environmental health management
			Injury prevention and operational safety
			Adherence to design standards
			Compatibility with new technologies
		Management and executive codes	Flexibility in use
			Ease of maintenance and repair
			Continuous evaluation and monitoring
			Stakeholder participation (users, managers)
			Education and awareness-raising
Outcome Codes	Environmental health of sports facilities	Physical health	Sustainable policymaking and management
			Recording and analyzing user feedback
			Reduction of physical injuries (preventing musculoskeletal injuries and sports accidents)
			Indoor air quality (proper ventilation, humidity, air purification)
			Enhancing physical safety (using anti-slip materials and complying with safety standards)
		Mental health	Improving hygiene conditions (waste management, cleanliness and access to sanitation facilities)
			Reducing stress and anxiety (calm and supportive environment)
			Enhancing a sense of psychological security (creating safe and comfortable spaces)
			Improving concentration and mental performance (reducing noise and optimizing layout)
			Creating privacy (personal and separate spaces)
Outcome Codes	Environmental health of sports facilities	Social health	Active user participation (creating opportunities for interaction and participatory decision-making)
			Supporting specific groups (creating appropriate spaces for people with special needs)
			Promoting social cohesion (designing multipurpose spaces for collective interaction)
		Environmental sustainability	Reducing energy consumption (using energy-efficient technologies and smart systems)
			Using sustainable materials (using environmentally friendly materials)
			Managing resources and waste (reducing waste production and recycling materials)
			Preserving and enhancing natural elements (increasing green space and applying biophilic principles)
Categorical variables	Gender	Female, Male	
	Age Range	Teen, Young, Adult	
	Skill Level	Amateur, Semi-Professional, Professional	

Source: Research Findings

Conclusion

The results of the study indicate that the environmental health of sports venues is a multidimensional concept that goes beyond purely physical considerations, and its achievement requires an integrated consideration of physical, psychological, social, functional, and managerial dimensions. The main innovation of the study lies in combining qualitative data from expert interviews with the existing theoretical literature to provide an integrated framework for the design and management of sports venues that can be used as a practical guide for architects, sports managers, and policymakers. This framework, while helping to improve the quality of life of

users, provides the basis for sustainable development and increasing the useful life of sports facilities.

Keywords: environmental health, sports facilities, evidence-based design approach, built environment, environmental sustainability.