

PRIMARY RESEARCH

Evaluated Of playground quality according to comfortability for healthy and disabled children case study: Mellat park, Qazvin, Iran

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Abstract

The quality and accessibility of playgrounds significantly impact the physical, social, and cognitive development of children. This study evaluates the quality of Mellat Park in Qazvin, Iran, focusing on its suitability for both healthy and disabled children. The primary objective is to assess the playground based on comfort, accessibility, safety, completeness of facilities, and leisure aspects. A quantitative descriptive approach was employed, involving surveys from 60 parents of healthy children and 60 parents of disabled children. The scoring method was based on established criteria from Moore (1992) and ADA & ABA (2004) guidelines. The results indicated that the playground was classified as "sufficient" for healthy children with a score of 518, but "bad" for disabled children with a score of 395. Key findings revealed significant shortcomings in accessibility and completeness of facilities for disabled children. Recommendations include enhancing accessible routes, improving connectivity from parking areas to play areas, expanding suitable facilities, and upgrading amenities for comfort. This study underscores the need for inclusive playground designs to promote equitable play opportunities for all children.

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I. INTRODUCTION

Engaging in play is a crucial element of childhood, significantly impacting children's overall development. Traditionally, play was viewed as an additional component in child development, but modern theorists have highlighted its vital role in understanding the world and as a marker of cognitive growth [1]. It is indispensable for supporting children's physical well-being, fostering social and emotional skills, and strengthening their sense of community [2].

However, despite the recognized importance of play, not all children have the same opportunities to engage in it. The World Health Organization (WHO) estimates that around 10% of the world's population lives with a disability, with approximately 1.3% being children under 15 years old [3]. Disabilities can create significant barriers, as current social structures often do not meet the needs of individuals with physical, sensory, learning, mental health, or emotional challenges, thereby hindering their full participation

in societal activities [National Disability Authority [4]. Playgrounds, as vital spaces for interaction, communication, and expression, should be designed to be inclusive, providing abundant opportunities for all children, including those with disabilities [5]. Such inclusive playgrounds are crucial for promoting social integration and ensuring that all children reap the benefits of play. Studies indicate that well-designed inclusive playgrounds can significantly improve the quality of life for children with disabilities, allowing them to interact with peers and develop essential life skills [6] and [7].

This study focuses on evaluating the quality of playgrounds based on comfort for both healthy and disabled children, using Mellat Park in Qazvin, Iran, as a case study. Mellat Park, situated 140 kilometers from Tehran, serves as a test site to determine whether it provides the same level of comfort for disabled children as it does for healthy ones. The evaluation aims to identify the specific needs and challenges faced

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by disabled children in playgrounds and suggest improvements to create more inclusive play environments.

Inclusive playgrounds are designed to accommodate children with physical, sensory, and cognitive impairments. These playgrounds feature accessible pathways, sensory-friendly equipment, and play structures that encourage interaction between children with and without disabilities [8] and [9]. The goal is to create environments where all children can play together, fostering a sense of community.

Previous research has identified various barriers to playground use for children with disabilities. Physical barriers include inaccessible entry points, unsuitable ground surfaces, and a lack of appropriate playground equipment [10]. Social barriers, such as negative societal attitudes and lack of awareness, also significantly hinder the ability of children with disabilities to engage in play [7].

By examining Mellat Park, this study aims to contribute to the broader discussion on inclusive playground design. It seeks to provide practical insights for urban planners, policymakers, and community organizations to create more inclusive, comfortable, and accessible playgrounds for all children. The findings are expected to inform future playground design and policy efforts, ensuring that children with disabilities are not excluded from the right to play and fully participate in society [11] and [12].

LITERATURE REVIEW

The quality of playgrounds has become an essential topic in urban planning and child development studies, particularly concerning their accessibility and inclusivity for both

healthy and disabled children. Playgrounds serve as crucial environments for physical, social, and cognitive development. Therefore, assessing their quality, especially in terms of comfort and accessibility, is critical for promoting inclusive play.

Accessibility is a fundamental aspect of playground quality. Inclusive playgrounds should be designed to accommodate children with various disabilities, providing features like ramps, accessible paths, and sensory-friendly equipment [2]. The ADA guidelines [13] emphasize creating accessible routes to playgrounds and play structures, ensuring that a variety of ground-level activities are accessible.

Safety in playgrounds is another critical variable. Safe playgrounds are characterized by features that prevent accidents and injuries, such as adequate distance from traffic, absence of sharp objects, and soft play surfaces [3]. Security measures, such as proximity to settlements, visibility for parental supervision, and location within activity centers, are also essential to ensure a safe play environment.

Leisure and comfort in playgrounds are determined by factors such as cleanliness, availability of seating and trash bins, and adequate shading [6]. Playgrounds should also avoid being multi-use areas that could disrupt play, such as parking lots or waste disposal sites.

The completeness of play facilities refers to having adequate and well-maintained equipment that meets the needs of all children [14]. This includes ensuring that there are enough play structures to prevent overcrowding and that the equipment is in good condition.

TABLE 1
LITERATURE REVIEW

Name of the Scholar	Research Year	Research Field	Variables	Method Type	Type of Analysis	Summary of Results
Morgenthaler, T., et al.	2023	Environmental qualities in playgrounds	Accessibility, inclusivity, environmental qualities	Scoping review	Qualitative	Identified environmental qualities that enhance outdoor play for children with and without disabilities.
Soltani, S. H. K., et al.	2012	Disabled children in playgrounds	Accessibility, safety, social inclusion	Pilot study	Mixed methods	Found that playgrounds need to improve in design and facilities to be more inclusive for disabled children.

CONT.....

Name of the Scholar	Re- search Year	Research Field	Variables	Method Type	Type of Analysis	Summary of Results
Van Melik, R.,	Al- thuizen, N.	2022	Inclusive play policies	Acces- sibility, policy imple- menta- tion	Case study	Qualitative & High- lighted the impor- tance of inclusive policies for play- grounds to improve access for disabled children.
Haq, A. N., et al.	2023	Public play spaces usability	Accessibility, us- ability	Survey	Quantitative	Examined the us- ability of public play spaces for children with disabilities, recommending specific design improvements.
Sterman, J. J., et al.	2020	Capabilities ap- proach in play- grounds	Inclusivity, capa- bilities approach	Survey	Qualitative	Applied the capabil- ities approach to as- sess playground in- clusivity, finding sig- nificant gaps in in- clusive play opportu- nities.
Gately, K. A., et al.	2023	Accessible play- grounds review	Accessibility, occupational justice	Sys- tematic review	Qualitative	Conducted a system- atic review on acces- sible playgrounds, highlighting occupa- tional injustices and the right to play.
Movahed, M., et al.	2023	Health promotion through playgrounds	Health benefits, accessibility	Survey	Mixed meth- ods	Discussed how acces- sible playgrounds promote health for all children, empha- sizing the need for inclusive play areas.

The literature consistently highlights the importance of designing inclusive playgrounds that cater to the needs of both healthy and disabled children. Accessibility, safety, security, leisure, and the completeness of facilities are critical variables that determine the overall quality of playgrounds. Studies suggest that while progress has been made, there are still significant gaps in providing truly inclusive play environments. The findings emphasize the need for continued efforts in improving playground design, implementing inclusive policies, and ensuring that playgrounds offer safe, accessible, and engaging spaces for all children.

A. Quality of Children's Playgrounds Determined by Several Variables

The overall quality of children's playgrounds hinges on various essential factors that ensure these spaces are inclusive, safe, and enjoyable for all children. Moore[15] identifies key variables such as accessibility, safety, security, and leisure,

which are vital for fostering a supportive play environment, particularly for children with disabilities.

1) *Accessibility* Accessibility serves as a crucial measure of a playground's quality, indicating how easily it can be accessed from different points. A high-quality playground should not be enclosed by high walls or barriers over 150 cm in height and should be free from hazards like rivers, large sewers, or highways nearby. Additionally, pedestrian paths must be separated from vehicle lanes to enhance safety [15]. For children with physical, intellectual, and sensory disabilities, simply having access is not enough; the playground must be designed to meet their specific needs. The assessment of Mellat Park's accessibility involved considering public transport efficiency and feedback from parents, underscoring the significance of inclusive design in public spaces [3] and [2].

2) *Safety* Safety in children's playgrounds means ensuring that the environment does not pose any harm or danger to

the children. Key safety indicators include maintaining a safe distance from vehicles (greater than 5 meters), avoiding sharp boundaries such as wires, ensuring gentle slopes without steep curves, and providing play materials that do not pose safety risks [6]. These measures help prevent accidents and injuries, making playgrounds safe havens for children to explore and play.

3) *Security* Security in playgrounds involves protecting children from various disturbances and ensuring a secure environment. This includes situating playgrounds within 200 meters of settlements to facilitate supervision by parents and caregivers, ensuring high visibility for easy monitoring, and positioning playgrounds within 100 meters of activity centers [15]. These factors collectively contribute to a secure play environment where children can engage freely under the watchful eyes of adults.

4) *Leisure* A playground must provide a comfortable and inviting environment, free from distractions and hazards. Essential features include clean surroundings without scattered garbage, availability of seating areas, garbage bins, and shady trees. Playgrounds should not serve multiple conflicting purposes, such as sudden vehicle parking or waste disposal areas, as these can disrupt the play experience [16]. Ensuring a dedicated and well-maintained space for play enhances the overall leisure experience for children.

B. The Basic Points of the ADA with Regard to Playgrounds

Addressing the quality of playgrounds involves ensuring they meet the diverse needs of all children, including those with disabilities. By emphasizing accessibility, safety, security, and leisure, playgrounds can become inclusive environments that support the healthy development and social integration of every child. The Americans with Disabilities Act (ADA) provides comprehensive guidelines to ensure playgrounds are both accessible and inclusive. The ADA Accessibility Guidelines [13] specify several critical points:

- **Accessibility:** Playgrounds must feature accessible routes both to and within play structures. This includes ensuring that one of each type of ground-level activity is accessible to children with disabilities, facili-

itating easy access and movement for those with mobility impairments [11].

- **Safety:** Playgrounds should incorporate soft contained play structures to reduce the risk of injury. Maintaining the clear width of accessible routes is essential to ensure safe navigation for children with disabilities, creating a secure play environment [17].
- **Leisure:** The ADA mandates that playgrounds provide transfer points or seats at entry points to aid access for children with disabilities. Appropriate seating and resting areas within the playground are also required to ensure all children can comfortably enjoy their time in the play area [14].

C. Evaluation of Mellat Park

This study evaluates Mellat Park in Qazvin, Iran, focusing on accessibility, safety, security, and leisure to determine its overall quality for both healthy and disabled children. The assessment of accessibility examines the park's design and infrastructure to ensure it accommodates children with various impairments. Safety measures are reviewed for compliance with established standards, while security is evaluated based on the park's location and visibility. Leisure is assessed by observing the park's cleanliness, availability of amenities, and overall environment. This thorough Evaluation aims to identify areas for improvement and provide recommendations to enhance the park's inclusivity and comfort for all children.

II. METHOD AND MATERIAL

Participants

The data collection process for this study involved administering questionnaires to parents of both disabled and healthy children, aged up to 14 years old. The study targeted 60 parents of disabled children and 60 parents of healthy children. This sample size was chosen to provide a balanced perspective on the playground's quality from both groups. The distribution of children across different age groups is illustrated in Figures 1 and 2. For healthy children, 23% were in the age group of 9 to 10 years, while the lowest users were between 3 to 4 years old. Among disabled children, the majority were between 8 to 9 years old, with the lowest users being between 4 to 5 years old.

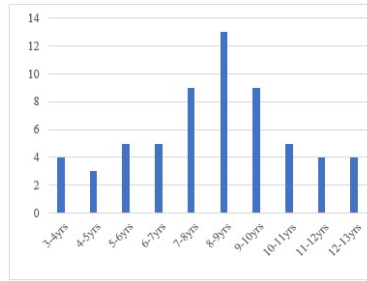


Fig. 1. Age of disabled children

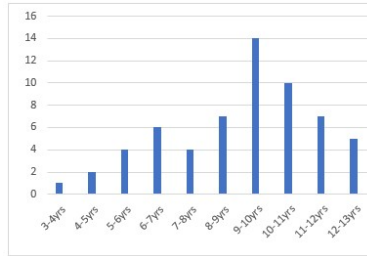


Fig. 2. Age of Healthy children

A. Procedure

The primary aim of this research was to evaluate the quality of the Mellat Park public playground in Qazvin, Iran. The study employed a quantitative approach, focusing on descriptive analysis to assess various quality indicators. Four main criteria were used to evaluate the playground: Accessibility, Safety, Completeness of Playing Facilities, and Leisure. These criteria were derived from existing litera-

ture and standards, particularly from the works of [15] and [13].

The quality of Mellat Park was measured using a scoring method based on these criteria. Each criterion was evaluated against specific indicators, as detailed in Table 1. The scoring system classified the playground’s quality as follows: 3 for fully meeting the criteria, 2 for partially meeting the criteria, and 1 for failing to meet the criteria.

TABLE 2
PLAYGROUND QUALITY VARIABLES, CRITERIA, AND INDICATORS

Variable	Criteria	Score	Indicators (Moore)	Indicators (ADA & ABA)
Safety	Safe	3	Close proximity to settlements ($\leq 200m$) Visible to parents Distance to environmental activity centers ($\leq 100m$) Free from crime threats	1008.2.2 Soft Contained Play Structure 1008.2.4 Clear Width
	Safe enough	2	One indicator not met or unfulfilled	
	Unsafe	1	Two or more indicators not met or unfulfilled	
Leisure	Comfortable	3	Clean area with no strewn garbage Availability of seating and trash cans Shady trees present No misuse as parking or waste disposal sites	Suitable toilet facilities 1008.4.4 Entry Points and Seats 1008.4.5 Transfer Supports
	Comfort enough	2	One indicator not met or unfulfilled	
	Uncomfortable	1	Two or more indicators not met or unfulfilled	
Completeness of Playing Facilities	Complete	3	Adequate facilities for the number of children Good condition of game facilities	
	Complete enough	2	One indicator not met or unfulfilled	
	Incomplete	1	Two or more indicators not met or unfulfilled	
Accessibility	Accessible	3	Accessible from all directions No high barriers ($> 150\text{ cm}$) Not located near rivers, sewers, or highways Separate pedestrian paths from vehicle lanes	1008.2.5 Ramps 1008.3 Transfer Systems 1008.4 At least 50% of components on accessible route
	Accessible enough	2	One indicator not met or unfulfilled	
	Inaccessible	1	Two or more indicators not met or unfulfilled	

B. Methodological Framework

The evaluation framework for this study integrates both the practical and theoretical aspects of playground design and usability. By combining Moore’s [15] practical indicators and the ADA & ABA [13] standards, the research provides a comprehensive assessment of Mellat Park’s suitability for both healthy and disabled children. This methodology ensures that the playground is evaluated not only for its physical and structural attributes but also for its usability and inclusivity.

The questionnaires administered to parents included questions designed to capture their perceptions of the playground’s quality based on the aforementioned criteria. The responses were then quantified and analyzed to generate a composite score for each criterion. This scoring method allowed for a detailed and nuanced evaluation of Mellat Park’s overall quality.

III. DATA ANALYSIS

The collected data were subjected to statistical analysis using appropriate software tools to ensure accuracy and reliability. Descriptive statistics were used to summarize the findings, providing insights into the distribution of scores across different criteria. This approach facilitated a clear understanding of the strengths and weaknesses of Mellat Park’s playground in terms of accessibility, safety, completeness of facilities, and leisure.

To examine the comfort ability of Mellat Playground for both healthy and disabled children, we conducted a survey involving parents and utilized a scoring method based on established criteria. This approach enabled a comprehensive

assessment of the playground’s quality in terms of accessibility, safety, completeness of playing facilities, and leisure.

A. Classification of Mellat Playground and Result

Upon completing the quality assessment, we determined the classification and interval of scores. The highest possible score for each criterion was 3, while the lowest was 1. Given there were 60 respondents and 4 questions, the calculation was as follows:

- Highest score: $30=7203$ times 60
- times 4 = $72030=720$
- Lowest score: $10=2401$ times 60
- times 4 = $24010=240$

Next, we calculated the class range and interval:

- Class range: $720-240=480720 - 240 = 480720-240=480$
- Number of classes (K): $K=1+3.3\log_{10}NK = 1 + 3.3 \log NK=1+3.3\log N$
- o For $N=4N = 4N=4$, $\log_{10}4=0.602$
- $\log 4 = 0.602\log 4=0.602$
- o $K=1+3.3.602=2.986\approx 3K = 1 + 3.3$ times $0.602 = 2.986$
- approx. $3K=1+3.3.602=2.986\approx 3$
- Interval: $480/3=160480 / 3 = 160480/3=160$

Based on the class and interval, we established three classes of playground quality. The following table summarizes the scores and frequencies for each variable:

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TABLE 3
MELLAT PLAYGROUND QUALITY SCORING

Variable	Score Criteria	Fre- quency (Healthy)	T (Healthy)	Fre- quency (Dis- abled)	T (Dis- abled)	Indicators (Moore)	Indicators (ADA & ABA)
Safety	Safe	9	27	41	123	Located within 200m of residential areas Visible to parents Within 100m of activity centers No crime risks	1008.2.2 Soft Con- tained Play Struc- ture 1008.2.4 Clear Width
	Safe enough	49	98	36	72	One criterion not met	
Completeness of Fa- cilities	Unsafe	2	2	0	0	Two or more criteria not met	
	Complete	7	21	29	87	Cleanliness maintained Avail- able seating and trash bins Shaded areas No misuse for parking or waste disposal	
	Complete enough	18	36	18	36	One criterion not met	
	Incomplete	35	35	13	13	Two or more criteria not met	

CONT.....

Variable	Score Criteria	Frequency (Healthy)	T (Healthy)	Frequency (Disabled)	T (Disabled)	Indicators (Moore)	Indicators (ADA & ABA)
Leisure	Comfortable	9	27	14	42	Sufficient facilities for the number of children Well-maintained equipment	Suitable toilet facilities 1008.4.4 Entry Points and Seats 1008.4.5 Transfer Supports
	Comfort enough	20	40	30	60	One criterion not met	
Accessibility	Uncomfortable	31	31	16	16	Two or more criteria not met	
	Accessible	3	9	21	63	Accessible from all directions No high barriers (> 150 cm) Not situated near rivers, sewers, or highways Separate pedestrian and vehicle paths	1008.2.5 Ramps 1008.3 Transfer Systems 1008.4 At least 50% of components on accessible route
	Accessible enough	12	24	28	56	One criterion not met	
	Inaccessible	45	45	11	11	Two or more criteria not met	

B. Analysis

The analysis reveals that Mellat Playground generally performs better for healthy children compared to disabled children across all evaluated variables. The total score for healthy children was 518, while for disabled children, it was 395. This difference highlights several critical areas where Mellat Playground needs to improve to better serve disabled children.

- **Safety:** While both groups generally found the playground safe, there were specific concerns for disabled children regarding visibility and the proximity of the playground to residential areas.
- **Completeness of Facilities:** Facilities were frequently rated as inadequate for disabled children, indicating a shortfall in the availability and maintenance of play equipment suited to their needs.
- **Leisure:** Disabled children experienced lower comfort levels, with significant issues related to the availability of

shaded areas and sufficient seating.

- **Accessibility:** The most significant disparity was in accessibility, where many respondents noted that the playground was either inaccessible or only partially accessible for disabled children.

These findings are consistent with prior research, which underscores the importance of designing more inclusive and accessible playgrounds [3] and [2]. The results suggest that substantial improvements are needed to ensure Mellat Playground can effectively cater to both healthy and disabled children, fostering a truly inclusive play environment.

IV. RESULTS

The quality assessment of Mellat Playground was conducted using a scoring system based on established criteria from Moore [15] and the ADA & ABA [13] guidelines. The scores were categorized into three classes to determine the overall quality of the playground

TABLE 4
CLASS AND STAGE OF PLAYGROUND QUALITY

Information	Score Range	Quality	Class
The playground meets all criteria for safety, leisure, completeness of playing facilities, and accessibility.	560-720	Good	1
Certain aspects of the criteria are not fully satisfied, impacting the overall availability and usability of the playground.	399-559	Sufficient	2
The playground does not meet the necessary quality criteria, rendering it unsuitable for use.	238-398	Bad	3

A. Classification and Scoring Results

Based on the analysis, the total score for healthy children was 518, placing it in the "Sufficient" quality class. Conversely, the total score for disabled children was 395, which

fell into the "Bad" quality class. These results indicate significant disparities in the playground's ability to accommodate both groups of children.

Analysis of Variables

Accessibility: For healthy children, the accessibility variable was rated as "Accessible enough," with many respondents indicating that access from all directions was insufficient. For disabled children, 75% of respondents stated that the lack of suitable accessibility between play equipment and between parking and play areas caused the accessibility variable to be rated as "Inaccessible."

Completeness of Playing Facilities: Parents of disabled children frequently mentioned the lack of adequate play facilities and the condition of existing facilities as unsuitable for their needs. This discrepancy contributed significantly to the lower scores for disabled children.

Leisure and Comfort: For healthy children, the leisure variable received an "Enough" rating due to the lack of sitting groups and suitable seats. For disabled children, this rating was further impacted by the absence of suitable toilet facilities, resulting in an "Uncomfortable" score.

Safety: Approximately 68.3% of parents of healthy children considered Mellat Playground to be safe, while 81.6% of parents of disabled children deemed it safe enough. However, the perception of safety did not fully compensate for the deficits in other variables, particularly for disabled children.

V. DISCUSSION

The findings of this study reveal several critical deficiencies in Mellat Playground's ability to serve disabled children compared to healthy children. The lower ratings in accessibility and completeness of facilities indicate a significant need for improvements to enhance inclusivity.

- **Accessibility:** Disabled children faced considerable challenges in moving between different areas of the playground. This issue is consistent with previous studies emphasizing the need for accessible pathways and equipment in inclusive playground designs [6] and [2].
- **Completeness of Facilities:** The playground's lack of suitable and well-maintained equipment for disabled children highlights a requirement for better planning and design. Providing diverse and inclusive play equipment is crucial for ensuring equitable play opportunities [16].
- **Leisure and Comfort:** The lack of adequate seating and toilet facilities points to the necessity for more comprehensive amenities to improve comfort for all users. These results support studies that advocate for universal design principles in playgrounds [14].
- **Safety:** While safety was generally rated positively by both

groups, it remains essential to uphold high standards and continually address any potential hazards to safeguard all children.

The evaluation of Mellat Playground highlights the quality disparities between the experiences of healthy and disabled children. To address these issues, implementing inclusive design principles is vital to ensure playgrounds are accessible, safe, comfortable, and well-equipped for all children. Future enhancements should aim to remove barriers and improve the overall usability of playgrounds, fostering an inclusive and engaging environment for every child.

VI. CONCLUSION

Creating high-quality play environments necessitates consideration for both healthy and disabled children. Missed opportunities for disabled children to participate in play activities alongside their peers significantly hinder their social development and acquisition of social skills. The findings from this research, based on criteria and class range analysis, underscore a pressing need to enhance the current design of Mellat Playground, particularly in terms of accessibility and the status of facilities.

A. Recommendation

To improve the accessibility of Mellat Playground, the study recommends the following actions:

1. **Increase Accessible Routes:** Develop more suitable accessible routes through the play area to connect all main elements. This includes ensuring that pathways are wide enough and surface materials are appropriate for children with mobility impairments [2] and [3].
2. **Enhance Connectivity from Parking Areas:** Provide better access from parking areas to the play area. This can be achieved by installing ramps and ensuring pathways are smooth and free from obstacles [6].
3. **Enhance Facilities:** Augment the quantity of appropriate play equipment to match the number of children utilizing the playground. The facilities should address both the physical and mental requirements of children, ensuring they are inclusive for all disability types [16] and [17].
4. **Upgrade Amenities for Comfort:** Enhance comfort by providing more seating and shaded areas, suitable toilet facilities, and ensuring cleanliness and maintenance of the playground [14] and [11].

Implementing these recommendations will significantly improve the comfort and usability of Mellat Playground, making it a more inclusive environment that supports the development and well-being of all children.

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