

Assessment of the current status of playground safety in the midwestern region of Turkey: an effort to provide a safe environment for children

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SUMMARY: Uskun E, Kişioğlu AN, Altay T, Çıkınlar R, Kocakaya A. Assessment of the current status of playground safety in the midwestern region of Turkey: an effort to provide a safe environment for children. Turk J Pediatr 2008; 50: 559-565.

This study aimed to identify and evaluate the degree of conformity to the playground standards and the level of compliance with current safety specifications of the playgrounds in the midwestern region of Turkey.

An observational technique was used at a total of 57 public playgrounds. A playground safety control form was prepared based on the United States National Program for Playground Safety and the Consumer Product Safety Commission security standards, since there is no national law covering playground equipment and safety in Turkey. The study evaluated the surroundings of the playground, arrangement of equipment in the playground, and characteristics of the equipment. The percentage of playgrounds surveyed with inadequate or hard surfacing was 80.7%. Fifty-two percent of the equipment was found to be inappropriate. Equipment was higher than the recommended heights.

The results of our study unfortunately point out that playgrounds for children do not meet many of the safety criteria.

Key words: playground equipment safety, children's safety.

Playing is a natural activity for children. The important role of play in the physical, intellectual, psychosocial and moral development of children has long been recognized^{1,2}. Public playgrounds are important for children's play and development. There are many benefits for children when they engage in play activities, but these activities carry some risk of injury. Playground mishaps are some of the most common sources of injury and are the leading killer in children. A playground should provide a child with an enjoyable play experience; one which is inviting, stimulating and exciting. Most importantly, it should provide a child with a safe place to play³.

Playground-related injuries are a significant public health issue resulting in traumatic experiences for children and substantial medical

costs for the community⁴. A growing number of publications have emerged in the recent literature on play-related injuries^{1,5-20}.

Most of the children were injured because they were playing in an unsafe environment. These environments could be identified and modified in order to make the play areas safer for children³. In many countries, safety standards have been developed as a means of reducing the risk of injury in playgrounds²¹⁻²⁶. These standards contain some measures and recommendations about the safe design, installation, and maintenance of playgrounds and equipment to reduce the risk of injuries. The establishment and management of playgrounds for children is the obligation of municipalities according to the laws and regulations in Turkey. However, there are no

legal regulations and standards to be obeyed in order to protect children against injuries and to provide for their safety. There are no units controlling the safety of playgrounds for children founded by the municipalities.

This study aimed to identify and evaluate the degree of conformity to the playground standards and the level of compliance with current safety specifications of the playgrounds in Turkey.

Material and Methods

In this descriptive study conducted in October 2005, an observational technique was used at a total of 57 public playgrounds present in the urban area of Isparta, in the midwestern region of Turkey. A playground safety control form was prepared based on the United States National Program for Playground Safety (NPPS)²⁷ and the Consumer Product Safety Commission (CPSC) security standards². There is no national law covering playground equipment and safety in Turkey along with the absence of any World Health Organization (WHO) criteria for playground design and safety. A control form that included the criteria that need to exist in the playgrounds was prepared to examine the conformity with playground standards. All visual inspections and measurements were made by the same team of investigators who were systematically trained in the use of the control form.

Assessment Criteria

The study evaluated the following parameters using the playground control form:

- *The surroundings of the playground:* the presence of a danger (for example irrigation canal, voltage line around the playground), traffic rules and regulations around the playground, and supervision of children on playgrounds.
- *Arrangement of equipment in the playground:* protective surface properties, organization of equipment according to age groups, presence of an adequate zone under and around the play equipment, between the equipment, and between the equipment and the other barriers.
- *Characteristics of equipment:* Equipment types and numbers; produced from which materials; according to the norm of equipment - its

height, the condition of its surface; presence of sharp points or edges; and presence of chipped or peeling paint.

Each piece of playground equipment was evaluated as 'appropriate' or 'inappropriate' according to its features. Swings were evaluated as appropriate in the presence of a protective bar and safe entries and exits to the field. The slides were considered as appropriate when the following criteria were present: a location in the shade, smooth sliding surface without roughness, a waiting platform with security fence before the top platform, a landing section parallel to the ground, and a maximum height under 6 feet (1.8 m). Seesaws were accepted as appropriate when there was a soft bumper under the bottom of the seat to absorb impact with the ground and all pivot points were covered to prevent pinched fingers. Merry-go-rounds were accepted as appropriate if they were anchored firmly into the ground; had handles that children could grasp easily; the bottom surface was positioned so that children could not slide underneath; and the gearbox was covered so that fingers could not get caught. Climbing equipment was accepted as appropriate if it was not higher than 6 feet (1.8 m).

Data Analysis

In this descriptive study, all data were evaluated using SPSS (version 9.0; California, USA, 1999). Descriptive statistics were used to evaluate data.

Results

Surroundings of the Playground

A total of 57 playgrounds were evaluated. Forty-seven of the playgrounds (82.5%) were adjacent to a street and in 14 of them (26.3%), barriers surrounded the playgrounds, but only 7 playgrounds (14.9%) had barriers that could actually keep the children from running into the street. In addition, there were traffic signs by the street indicating the existence of the playground in only 2 cases (4.3%), and there was a barrier to reduce speed in only 1 (2.1%) of the streets around the playgrounds. Inspector security staff were present in only 4 playgrounds (7.0%) (Table I).

In the vicinity of 18 of the playgrounds (31.6%), a dangerous surrounding was noted (i.e. irrigation canal, voltage line around the playground) for which preventive measures had not been taken.

Table I. Surrounding Environment and Evaluation of the Adequate Zone in Playgrounds

	Appropriate		Inappropriate	
	n	%	n	%
Surrounding environment				
Adjacent to a street	47	82.5	10	17.5
Presence of a barrier surrounding the playground	14	26.3	43	63.7
Presence of a barrier that keeps children from running into a street*	7	14.9	40	85.1
Presence of a traffic sign by the street indicating the existence of the playground*	2	4.3	45	95.7
Presence of a barrier to reduce of speed on the road*	1	2.1	46	97.9
Presence of an inspector security staff	4	7.0	53	93.0
Adequate zone				
Equipment-Surrounding Area safety distance	53	93.0	4	7.0
Equipment-Equipment safety distance	28	49.1	29	50.9
Safety distance between barriers	43	75.4	14	24.6

* Not evaluated in those playgrounds without direct openings to the streets (n=10).

Arrangement in the Playground

Protective surface properties: The playgrounds had various surface materials. The percentage of playgrounds with adequate surfacing such as sand was 19.3% (n=11). There was no rubber or synthetic surfacing in the playgrounds. Percentage of playgrounds surveyed with inadequate or hard surfacing (such as cement [3.5%, n=2], grass [5.3%, n=3], hard packed soil [71.9%, n=41]) was 80.7% (n=46).

Organization of the equipment according to age groups: We found no playground in which toy equipment was grouped according to appropriate age groups, such as 2 to 5 years and 5 to 12 years. Equipment for younger and older children was grouped together and there was no notification on the equipment about what age group they were produced for.

Presence of an adequate zone: The safety distance between the playing equipment and the outer wall of the park was appropriate in 53 (93%), and the distance between the bars of fences was appropriate in 43 (75.4%) parks. In about half of the parks (n=28, 49.1%), the distance between the equipment and the front and back safety distances around the swings were inappropriate. The evaluation of the adequate zone in playgrounds is presented in Table I.

Characteristics of the equipment: There were a total of 343 pieces of playground equipment for children. The most abundant equipment numerically were swings (n=120, 35.0%). The average number of pieces of equipment in each park was 6.0 ± 4.5 and each park possessed at least 3 pieces. There were no swings in

1 (1.8%), no slides in 7 (12.3%), no seesaw in 11 (19.3%), no merry-go-rounds in 28 (49.1%), and no climbing equipment in 35 (61.4%) of the parks. Means, standard deviations, and minimum and maximum numbers of equipment present in the playgrounds are presented in Table II.

Seventy-nine percent of the equipment in playgrounds was produced from iron, 4.4% with fiberglass and 16.6% with both iron and fiberglass. Fifty-two percent of the equipment was found to be inappropriate. Slides were determined as inappropriate on a large scale (94.5%). Characteristics of play equipment observed on public playgrounds are presented in Table II.

Discussion

In this study, our primary focus was to determine the degree of appropriateness of playground equipment and the level of compliance with current safety specifications in Turkey. The safety of children in public playgrounds is a complex interaction between several factors. It was reported that the type of surfacing, type of equipment, and height of equipment were of the utmost importance¹³. It was also reported that protective surfacing materials that were hard, paved surfaces (i.e. concrete, asphalt), and earth surfaces including grass, soil and hard-packed dirt were unacceptable because they could not provide adequate protection against falls. It has been accepted that protective surfacing is the most critical safety factor on playgrounds, since approximately 80% of all injuries are caused

Table II. Characteristics of Play Equipment Observed on Public Playgrounds

Characteristics	Total	Swing	Slide	Seesaw	Merry-go-round	Climbing equipment
Equipment number (min-max)	343 (3-37)	120 (0-8)	73 (0-8)	78 (0-14)	37 (0-5)	35 (0-4)
Mean (SD)	6.0 (4.5)	2.1 (1.0)	1.3 (1.2)	1.4 (1.9)	0.7 (0.8)	0.6 (1.0)
Materials (%)						
Iron	79.0	86.7	71.2	73.1	75.7	85.7
Fiberglass	4.4	2.5	8.2	3.9	8.1	-
Iron and fiberglass	16.6	10.8	20.6	23.0	16.2	14.3
Appropriate with the norm (%)						
Appropriate	47.8	62.5	5.5	60.3	56.8	48.6
Inappropriate	52.2	37.5	94.5	39.7	43.2	51.4
Height (%)*						
Less than 6 feet (1.8 m)	76.9	-	90.4	-	-	48.6
6 feet (1.8 m) and over	23.1	-	9.6	-	-	51.4
Equipment surface condition (%)						
Badly kept	59.2	57.5	52.1	57.7	67.6	74.3
Well kept	40.8	42.5	47.9	42.3	32.4	25.7

* Height was evaluated only on climbing equipment and slides (n=108).

by falls²⁸. We found that 80.7% of the 57 playgrounds surveyed lacked adequate protective surfacing. The ratio of unacceptable playground surfaces in our study was consistent with the ratio of 87.5% that was determined by Acik et al.²⁹, in their study in an eastern region of Turkey. A study performed in a Montreal public playground⁸ and another study conducted by the Consumer Federation of America and U.S. Public Interest Research Group²⁸ established that 75% of the playgrounds surveyed in study areas lacked adequate protective surfacing. The proportion of inadequate surfaces found in playgrounds in other countries was lower than in our results.

The height of the equipment from which children fall and the playground surfacing onto which they land are two important risk factors for playground-related injury¹⁰. Therefore, injury prevention in playgrounds has focused on height of equipment, and the most effective surfaces to absorb energy when a child falls^{8,30}. European standards suggest that the maximum fall height should be raised from 2.5 to 3.0 m¹². Laforest et al.⁸ proposed 2 m (6.7 feet) for the maximum acceptable height of equipment. The CPSC suggested that this height should be a maximum of 6 feet (1.8 m) in the Public Playground Safety Checklist². However, Mott et al.¹³ and Chalmers et al.⁶ clearly showed that the risk of injury was significantly increased at heights over 1.5 m. Macarthur et al.¹⁰ found that height of fall was an important risk factor for severe playground injury. Specifically, they stated that falls from >1.5 m were associated with a two-fold increased risk of severe injury, compared with falls from ≤1.5 m. We determined that 51.4% of the climbing equipment was unsafe because the equipment was 6 feet (1.8 m) or higher. Cradock et al.³¹ found that 50% of the playgrounds had climbing equipment with platform heights greater than 6 feet in their study in Boston. In the Safe Play Research²⁸, the proportion of the height of the play equipment with climbers or slides was 58%. In other regions of Turkey, 75% of the playgrounds were found to have equipment higher than 6 feet (1.8 m)²⁹. In our study, approximately half of the climbing equipment was higher than the recommended height, which is 6 feet. The high number of climbing equipment pieces that are at dangerous heights in our region is

a cause for concern and places the children at risk. We suggest that slides do not cause as considerable a danger as climbing equipment because they are mostly (90.4%) below the recommended height. However, a greater proportion of slides included in our study did not meet the criteria. The reasons for this were the following: the slides were not located in shaded areas; the sliding surface was not smooth; and the final portion of the slide was not parallel to the ground. These mentioned criteria are as important as the height of the slide for protection against injuries. Metal surfaces on platforms and slide beds should be avoided unless they can be located out of direct sunlight to avoid the risk of contact burn injury. If the slides are located in direct sunlight, the metal can heat to temperatures in excess of 120° and young children who climb or sit on the hot surface can sustain severe burns³².

The NPPS recommends that parents be proactive in selecting age-appropriate equipment and requesting separate play areas for different age groups, as from ages 2 to 5 and 5 to 12. It was recommended that these areas should be marked by signs indicating the age-appropriate areas³³. For younger children, CPSC has recommended playgrounds having separate areas with appropriately sized equipment and materials to serve their developmental levels, as children are developmentally different in size and ability. Equipment such as chain or cable walks, free standing arch climbers, free standing climbing events with flexible components, fulcrum seesaws, log rolls, long spiral slides (more than one turn 360°), overhead rings, parallel bars, swinging gates, track rides and vertical sliding poles were not recommended for pre-school-aged children (2 through 5 years)². In our study, we deduced that the playgrounds were not designed according to different age groups and that they were all commonly used by all age groups. Children are not capable of deciding the suitability of equipment for themselves and younger children especially may get seriously injured while playing with equipment that is inappropriate for their developmental stage and capabilities. In our region, equipment for different age groups is kept in the same playground and this is a dangerous condition that should be prohibited immediately.

Climbing equipment varies widely, including arch climbers, sliding poles, chain or net climbers, upper body equipment (monkey bars, overhead horizontal ladders, overhead rings), dome climbers, parallel bars, balance beams, cable walks, suspension bridges, and spiral climbers². Climbing equipment may be dangerous for children. It is known that the most common cause of playground injuries is falls from equipment such as climbers, monkey bars, and slides³⁴. Mott et al.¹³ established that the probability of receiving an injury when playing on monkey bars was twice that of a climbing-frame and seven times that of swing or slide. Waltzman et al.³⁵ stated that playing on monkey bars was the cause of a large number of serious childhood injuries. The most common among these are long-bone fractures, particularly supracondylar fractures. Nixon et al.¹⁵ found that horizontal ladders produced more injuries than other play equipment and they were also the most frequently used piece of equipment in public schools and parks. Mahadev et al.¹¹ determined that monkey bars or upper body devices were the most common cause (66%) of all childhood extremity fractures in their study. Lillis et al.³⁶ reported that climbing apparatus-related injuries accounted for nearly two-thirds of hospitalizations and that older children sustained injuries on climbing apparatuses more frequently, whereas younger children sustained more injuries on slides. It is seen in the literature that climbing equipment constitutes an important percentage of the equipment causing injuries. Due to the fact that climbing equipment, especially monkey bars, requires upper body strength and coordination, young children are at high risk of injury since they lack these abilities¹³. We detected in our study that 10.2% of playing equipment was climbing equipment. When we take into account the fact that equipment for different age groups is not arranged in different locations, it may be anticipated that climbing equipment in our region may result in even more dangerous consequences.

Our study was conducted in a certain region and the results may not reflect the whole country. However, as there are no standardization criteria or regulations for playground safety, we may anticipate that parks in other regions also lack adequate safety properties or at least fail to reach certain standards. Research on safety of playgrounds should be increased in our country.

In conclusion, the results of our study unfortunately point out that playgrounds for children do not meet many of the safety criteria. The grounds in a vast majority of playgrounds were not covered with suitable materials necessary to prevent or minimize injuries. Equipment was determined to be at dangerous heights. Climbing equipment in particular was higher than the recommended 6 feet. None of the playgrounds was designed for different age groups. As long as our children continue to play in these inadequately safe playgrounds and as long as required regulations are ignored, children face a high risk of injuries daily. Local authorities should make public playgrounds safer. To improve playground safety in Turkey, the authors of this study offer the following recommendations:

- Safety regulations for playgrounds should be developed in Turkey and compliance with them must be obligatory. Old playgrounds should be evaluated for the required preventions and re-established if necessary, and the newly constituted playgrounds should be designed to meet the exact criteria.
- There should be an adequate number of staff employed to watch over the children during the time they spend in the playground.
- The playgrounds in our country should designate age-appropriateness.
- Proper surfacing material should be provided under and around playgrounds in addition to proper supervision of children on playgrounds.
- There should be no equipment at dangerous heights in playgrounds.
- Parents, school administrators, childcare providers and playground personnel should be informed about the safety criteria of playgrounds and the steps to take to protect children from injury. They should evaluate their local playgrounds and work to make each playground safer.

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