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ORIGINAL ARTICLE

Child injuries in Greek Summer Camps

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Abstract
The purpose of this study was the description of injuries sustained by campers at summer camps, aged 7-15 years. A sample of 8 camps from the Creek camp population participated in this injury surveillance study. Doctors and camp directors completed reports detailing the number of events sustained and provided specific information about each event. During the period of the study, 726 injury reports completed. A total of 427 (58.8%) males and 299 (41.2%) females reported having an injury. The leading causes of injury in children's were: falls, slips, crushed by object, hit/bitten and fall of stable extent. The parts of body most often affected were the knee, head, ankle and wrist/hand. The most frequent activities of injuries were sports, free play and walking in camp yard. Data collected via such systems can be used to calculate injury rates, to describe patterns of injury and to identify risk factors for camper – related injury. All this provide the data needed to develop prevention interventions to decrease the number of youth whose camp experiences are negatively affected by injury.

Keywords: *injuries; children; summer camp*

Introduction

Summer camp is an extremely popular activity for children. For 140 years, parents have been sending their children to rural settings to provide for a break from their familiar routine (American Camping Association, 2002). Every year, approximately 10 million children attend camp, supported by 1.2 million staff members (American Camping Association, 2002). Interest in camp has been increasing, with an annual rate of growth in the industry of 8% to 10% per year.

The same trend is taking place in the contemporary Greek society. Thousands of children every year participate in the Greek summer camps (Afthinos, 1998). Safety is a priority for and an important factor for the owners, the managers of camp and the State, which is responsible for the regulations. After all, the physical and emotional condition of a child returning home at the end of a season is the primary concern and interest of all (Key, 1998). The goals of camp include improving skills, increasing independence, making friends, experiencing a new environment, being exposed to positive role models and most importantly, having fun (Thurber & Malinowski, 2000).

In the past, summer camps faced less regulations, fewer demands, children much easier to manage and parents who were far less opinionated and interested in control. The world has changed dramatically and the camp industry has not been exempt (Schirich, 1999). Today, creating the culture of safety demands an intelligent system of examining every expected and unexpected injury that could compromise the safety of a child at a camp (Cole & Gable, 2000; Friedman, 2001).

Injuries constitute one of the greatest threats to the health of children in the industrialized world. They are the leading cause of childhood deaths and even when non-fatal, may have major consequences for victims, their families and society at large (Laflamme & Eilert – Peterson, 1998a; Ministry of Health, PRC, 2000; Murray & Lopez, 1996; Stoddard & Saxe, 2001).

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The health and wellness of campers is clearly one of the most important responsibilities during the camp season. Recent development research revealed that in addition to the cost of camp, physical and emotional safety was a priority for parents (American Camp Association, 2006). Meeting this obligation depends largely on starting out with a sound base of facts about the health of each person at the camp and understanding how can influence camp life. Monitoring trends in injury occurrence and developing effective injury prevention strategies will help to decrease the incidence of injury in camp

The objective of this study was to investigate the occurrence of injury among children in camp environment in order to inform injury prevention strategies. Specifically, the study sought to characterize the nature and circumstances surrounding injuries in camps children's.

Method

Participants

A sample of interested residential camps was selected form each sampling frame in an attempt to capture as representative a sample of summer camps as possible. Selected camp (n=8) completed 726 injury reports gathered over a 3 month summer period (June 2003 to August 2003) in Greece.

Measurements and Procedures

Reportable injury events had to meet the following criteria: an injury that occurring during a camper's participation in the camp program, whether at camp or during an off-site camp activity, an injury for which the camper required medical attention and an injury that removed the camper from their camp routine.

A standardized registration form was employed, specifically "Students Injury and Incident Report for Use in Swedish School" (Laflamme et al. 1998b), which it was designed in accordance with Sweden's National Board of Health and Welfare's classification of injuries (The Swedish National Board of Health and Welfare, 1989) which is a further development of a classification and set of definitions constructed by the Nordic Medico-Statistical Committee (NOMESCO, 1990). Report adjusted in order to be used for Greek summer camps. Data were collected in camp infirmary. Generally, doctors and camp directors completed the form.

Injury reports collect information about camper exposure data, injury incidence data and detail information about each injury reported. For each injury event doctors and camp directors completed an injury report form that compiled detailed information about the camper experiencing the injury event (age, gender), information about the injury (body part) and information about the circumstances associated with the event (camp activity).

Statistical Analysis

Descriptive statistics were used to examine injuries in camp by age and gender categories. The distribution of injuries by cause, body part affected and activities were examined.

Results

Of the 8 residential camps asked to report each session completed 726 injury reports. Camp doctors and directors diagnosed the majority of reported injuries (100%).

Age and gender

The distribution of injuries by gender (Table 1) shows that 58.8% of males reported one injury as compared to 41.2% of females. The proportion of male and female pupils reporting, a camp injury tended to increase at the age group 10-12 years (10.9725±1.7763).

Table 1. Number and percentage of injuries by specific age and gender groups

	Boys N=427		Girls N=299	
Age (years)	No. of subjects	Prevalence of injury*	No. of subjects	Prevalence of injury*
7-9	55	12.9	96	32.1
10-12	249	**58.3**	168	**56.2**
13-15	123	28.8	35	11.7
Total	427	58.8	299	41.2

*Percentage weighted based on total population.

Cause of camp injury

Falling was the leading cause of injuries at summer camps in male's pupils (24.6%) (Table 2). This was followed by slip (24.1%), collision with other person (14.1%), crushed by objects (13.1%), hit/bitten (11.5%) fall of stable extent (8.4%) and other (4.2%) in males. In females, crushed by objects was reported to be the first leading cause of injury (21.7%), followed by slip (20.1%), hit/bitten (16.7%), fall of stable extent (14.0%), falling (11.4%), other (10.4%) and collision with other person (5.7%). In both males and females, the proportion of injuries cause by fall, collision with other person and crushed by object was seen to increase with increasing age and the proportion of injuries caused by slip, hit/bitten and other was seen to decrease with in increasing age. The proportion of injuries caused by falls of stable extent was seen to increase with increasing age only at girls 13-15 years old.

Table 2. Proportion of camp injuries by age, gender and cause (%)*

	Boys				Girls			
Cause of injury	Age (years) 7-9 n=55	Age (years) 10-12 n=249	Age (years) 13-15 n=123	Total n=427	Age (years) 7-9 n=96	Age (years) 10-12 n=168	Age (years) 13-15 n=35	Total n=299
Falling	9.1	24.5	**31.7**	**24.6**	8.3	11.3	20.0	11.4
Slipped on	25.5	**24.9**	22.0	24.1	24.0	18.5	17.1	20.1
Fall of stable extent	12.7	8.8	5.7	8.4	16.7	11.3	20.0	14.0
Collision with other person	9.1	16.1	12.2	14.1	2.1	6.0	14.3	5.7
Crushed by object	9.1	10.4	20.3	13.1	7.3	**28.6**	**28.6**	**21.7**
Hit/Bitten	**27.3**	11.2	4.9	11.5	**28.1**	13.7	0.0	16.7
Other	7.3	4.0	3.3	4.2	13.5	10.7	0.0	10.4
Total	100	100	100	100	100	100	100	100

*Percentage weighted based on total population.

Body part affected

The parts of the body most often affected by injuries in both males (23.7%) and females (19.7%) were the knees (Table 3). This was followed by ankle (19.7%), head (15.9%), other (9.4%), wrist/hand (7.7%), finger (6.1%), toe (5.2%), shoulder (4.7%), back

(4.2%) and chinbone (3.5%) in males. In females, head was reported to be the second most often affected body part (19.1%), followed by other (15.4%), toe (8.0%), wrist/hand (7.7%), ankle (7.0%), back and chinbone (4.3%), shoulder (3.3%) and finger (1.1%). Males experienced a greater proportion of injuries of ankle than females whereas females experienced a greater proportion of the head and other body parts than males.

Table 3. Proportion of camp injuries by body part affected, age and gender (%)*

	Boys				Gils			
Body part affected	Age (years) 7-9 n=55	Age (years) 10-12 n=249	Age (years) 13-15 n=123	Total n=427	Age (years) 7-9 n=96	Age (years) 10-12 n=168	Age (years) 13-15 n=35	Total n=299
Head	14.5	16.1	16.3	15.9	15.6	**20.8**	20.0	19.1
Back	12.7	3.6	1.6	4.2	7.3	3.6	0.0	4.3
Shoulder	3.6	4.0	6.5	4.7	4.2	3.0	2.9	3.3
Wrist/Hand	12.7	7.2	6.5	7.7	10.4	5.4	11.4	7.7
Finger	10.9	2.8	10.6	6.1	1.0	12.5	**31.4**	1.1
Knee	**16.4**	23.7	**26.8**	**23.7**	20.8	19.0	20.0	**19.7**
Ankle	5.5	**25.7**	13.8	19.7	7.3	7.7	2.9	7.0
Toe	9.1	5.2	3.3	5.2	8.3	7.7	8.6	8.0
Other	10.9	6.8	13.8	9.4	**22.9**	14.3	0.0	15.4
Chinbone	3.6	4.8	0.8	3.5	2.1	6.0	2.9	4.3
Total	100	100	100	100	100	100	100	100

*Percentage weighted based on total population.

Activity when injured

Most injuries occurred while participating in sports in both male and female (Table 4). Injuries also occurred with a high frequency while free playing (26.1% for females, 14.8% for males), walking in camp yard (16.0% for females, 4.2% for males) or eating (8.7% for females, 7.7% for males). The proportion of injuries occurring while participating in sports activities was seen to increase with increasing age of the children. In contrast, the proportion of injuries that occurred during free play, eating, walking in camp yards, sleeping or during other activities was seen to decrease with increasing age.

Table 4. Proportion of camp injuries by activity, age and gender (%)*

	Boys				Girls			
Activity when injured	Age (years) 7-9 n=55	Age (years) 10-12 n=249	Age (years) 13-15 n=123	Total n=427	Age (years) 7-9 n=96	Age (years) 10-12 n=168	Age (years) 13-15 n=35	Total n=299
Sports	9.1	57.8	76.4	56.9	5.2	38.5	68.6	31.4
Free Play	36.4	13.7	7.3	14.8	30.2	26.2	14.3	26.1
Eating	25.5	7.6	0.0	7.7	15.6	6.5	0.0	8.7
Walking in camp yard	11.0	3.6	2.4	4.2	21.0	15.0	8.6	16.0
Sleeping	5.5	4.8	3.3	4.4	13.5	5.4	5.7	8.0
Other	12.7	12.4	10.6	11.9	14.6	8.3	2.9	9.7
Total	100	100	100	100	100	100	100	100

*Percentage weighted based on total population.

Discussion

Overall findings revealed a high rate of injury among camp children aged 10-12 years. Males were more likely to have experienced an injury compared to females. Children aged

13-15 years also tended to report having been injured more frequently especially boys, than children in minor age group. Greater body mass and an increased competitive aggressiveness may account for this, as well as the possibility that older children are participating in more risky activities than younger (Spinks, McClure, Bain & Macpherson, 2006; Cristoforidis & Cambas, 2006). This finding was similar to several other studies (Chen et al. 2005; Nagaraja et al. 2005, Pickett et al. 2006) and likely reflects gender –based differences in perception, motor ability, injury or activity patterns (Kontos, 2004, Pickett et al. 2006).

Falls and slips represented the leading causes of injury in camps children's followed by crushed by object, collision with other person and hit/ bitten. These findings are similar to results from several other studies (Brehaut et al. 2003; Hambridje et al. 2002; Papageorgiou, Mavromatis & Kosta, 2006; Perry et al. 2005). Falling, crushed by object, collision with other person and hit/ bitten was seen to increase with increasing age in that study (Faelker et al. 2000).

In this study, the parts of the body most frequently affected by injury were the knee, the head and the ankle. Males experienced a greater proportion of injuries of ankle, whereas females experienced a greater proportion of injuries of the head and other body parts. Age was positively associated with the likelihood of injuries at the lower and upper extremities (Every, Meeuwisse & McAllister, 2006; Lipskie & Breslin, 2005)

In this study, children 10-12 and 13 -15 years were most likely to be participating in sports activities when injured. Rates of sports-related injuries have been found to be high among adolescents (Every et al. 2006) and represented the most common form of injury in the multi-country Health Behavior in School – aged Children (ages 11-15 years) survey (Pickett et al. 2005). Children 7-9 years were most likely to be participating in free play in camps yard when injured. Injury prevention strategies may be most needed that focus on sports activities in older children, whereas younger children may also strategies targeting free play related injuries. Camps director need to recognize that injuries are not inevitable part of participation in activities but are predictable and preventable. In camps need to be aware of the high risk of injury associated with activities and should design age-appropriate activities for children to reduce the risk of injury.

Conclusion

Injuries are a significant risk to camp children and represent an important population health concern. Recognition of the magnitude of this problem in recent years has stimulated an increasing interest in injury prevention. The current study identified a number of issues for children camp injuries that need to addressed. The main causes of children's injury were: falls, slips, crushed by object, collision with other person and hit / bitten. Many injuries were related to sports activity and free play. Injury prevention and control strategies targeted at these areas are needed in order to reduce the rate of injuries among children in camp environment. Research examining the effectiveness of injury intervention among children's and how to best combine intervention strategies, taking in the consideration the determinants of health, is also required.

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