

ETIOLOGICAL SCENARIO OF CHILDHOOD INJURIES AND PREVENTIVE STRATEGIES: A SURVEY OF PRIMARY/ELEMENTARY SCHOOLS IN SAUDI ARABIA

Mohammed Khalaf AIMutairi, Sami Saleh Alenazi,
Abdullah Alanazi, Nawfal Algerian, Abdullah Alqahtani,
Nesrin Alharthi, Salaad Mohamud[^], Shoeb Qureshi*

*Department of Emergency Medical Services and *Research
Methodology, College of Applied Medical Sciences, [^]College of
Medicine, King Saud Bin Abdul-Aziz University for Health Sciences,
Riyadh, Saudi Arabia*

ABSTRACT

Objective: The aim of this study was to assess the etiological scenario of childhood injuries related with the condition of primary/elementary schools in Saudi Arabia with a view to ascertain the remedial measures. **Methods:** This study was conducted on 35 primary/elementary schools. The study included Demographic data about the school type, age, strength of students and teachers, basic life support training, traffic and parking lots and play areas. Our check list concentrated on the etiological factors of injury caused and the possible preventing measures. Data was analyzed by SPSS using Chi square test. **Results:** The increased number of class rooms, number of floors and inadequate teacher/student proportion might contribute to injuries recorded, in addition to insufficient stop signs, decal system, surveillance cameras and recording camera systems, whereas the speed bumps/humps and other traffic calming devices were significantly adequate. The availability of convenient fire exits, normal indicator panel, presence of whistles, gongs, air horns, visibility of fire extinguishers and external safe escape stairs were significantly positive. The play areas surface, paint, preservation, and fencing were significantly good, The condition of stairs and stairwells showed the handrails, ceiling tiles, plaster, handrail on stairways, and lighting and ramps or steps were adequately maintained. **Conclusion:** Most of the schools are maintained perfectly, however; there are some negative aspects including traffic control measures, lack of decal system, deficit surveillance and recording cameras and maintenance of playgrounds which require attention. Periodic survey of different schools in the Kingdom will be a boon for improvement in safety and prevention of injuries.

Key words: Primary schools, Riyadh, demographic data, injury, etiology, prevention, SPSS

Introduction

Injuries in children are known to cause considerable economic and family burdens and threaten students' health and life. Childhood injuries have become a serious public health problem that necessitates urgent attention of the society, schools, families and government. Injury control and prevention among elementary and secondary school students is indispensable and will help in manifold ways to shrink the burden on the family to build a harmonious family and society. ^[1]

As soon as children begin to move, they start to explore surroundings and play with new objects. In this way, they acquire the skills they need to survive. At the same time, they come into contact with objects that can cause severe injuries. Children are more vulnerable to injuries as their activities are beyond the sense of any danger. Playing with fire, touching hot and/or sharp objects can result in burns and/or injuries. Child injuries are a significant area of concern from age one and progressively contribute more to overall rates of death until they reach adulthood. Hundreds of thousands of children die each year from injuries or violence, and millions of others suffer the consequences of non-fatal injuries. Childhood injuries are considered major cause for mortality in children and non measurable cause of non fatal injuries. Majority of these are unintentional and are the result of road traffic collisions, drowning, burns (fire or scalds), falls or poisoning. ^[2] The analyses of the South and East Asian community surveys of injury show just how significant child injury is. Injury is responsible for 30% of deaths in 1–3-year-olds, with the figure approaching 40% in 4-year-olds and 50% to 60% among those aged 5 to 17 years. The number of children injured or disabled each year as a result of road traffic crashes is not precisely known, but has been estimated at around 10 million. ^[2, 3]

Regular physical activity during childhood and at school is one of the important parts of requirements of normal growth, development and well-being. To achieve physical activity promotion among school child aged population recess as outside of class time efforts is scheduled and allows students to engage in physical and social activities. ^[4]

Zhang and Zhan ^[5] in their attempt on a systematic review indicated that majority of the childhood injuries among primary and middle school students in China were due to fall, hurt during sports activities and transportation vehicles. According to the WHO Global Burden of Disease project for 2004, showed an estimated 424 000 people of all ages died from falls worldwide, and they ranked as the twelfth leading cause of death among 5 to 9-year-olds and 15 to 19-year-olds. Morbidity from falls is much more common and represents a significant burden on health-care facilities around the world. In most countries, falls are the most common type of childhood injury seen in emergency departments, accounting for between 25% and 52% of assessments. ^[6, 7]

More than 200,000 children 14 years and younger are treated for injuries from the playground. 45% are severe injuries that include fractures, dislocations, internal injuries and concussions. Intensive and detailed attention should be given to playground injuries by educating the public to the relative hazard of injury when paved surfaces are beneath such playground equipments as slides, swings and climbers. Likewise, 53% of all poisonings occurred among children under 6 years old. Many children like to get into cabinets and open up interesting containers and drink or eat whatever is inside including cleaning substances, pain relievers, cosmetics, foreign bodies and plants. While burns from fire contribute to the majority of burn-related deaths in children, scalds and contact burns are an important factor in overall morbidity from burns and a significant cause of disability. Chemical and electrical burns among children, though, are relatively rare. ^[8, 9, 10]

The population in Kingdom of Saudi Arabia is approximately 29,994,272, and this large number of population has 6,897 primary schools. The number of classes in these schools is 69,433 which will accommodate 1,285,270 students, i.e 18-19 in each class. ^[11] This study will be carried out in Riyadh city which has a total population approximately 5,700,000 with 1480 (1034 government and 446 private) primary schools. ^[12] The present observational study on selected sample of Riyadh primary schools was conducted on their general conditions to record the etiological bases of the school related injuries among students and to investigate how best the trauma due to falls, fire, burns and traffic accidents in and around the schools can be prevented.

Methods:

The main objective of the study was to study the etiological scenario and preventive strategies of childhood injuries by survey of the primary/elementary schools in Riyadh taken as a national representative sample of the Kingdom of Saudi Arabia and evaluate the possible preventive measures.

Study Area/Setting:

This study was conducted on randomly selected schools in Riyadh, the capital city of Saudi Arabia. Riyadh is centrally located and has a population of about 5 million. There are thousands of schools to cater the educational needs of the children in different provinces. These schools are distributed in almost all the areas (Central, Eastern, Western, Northern and Southern).

Study Subjects:

A total of 35 primary/elementary schools (7 schools from each province) were randomly selected from 5 different provinces of Riyadh. There were total 5 schools managed by Government and 2 schools sponsored by private management.

Study Design:

This was a cross-sectional study of 35 primary/elementary schools of different areas of Riyadh. The study was questionnaire based on the pattern of quantitative analysis.

Sample Size:

The sample of 35 schools depended on the extensive questionnaire and the available time to conduct the study.

Sampling technique:

Stratified random sample of 35 primary/elementary schools was selected from 5 different regions of Riyadh.

Data Collection methods, instruments used, measurements

Following approval from institutional review board of National Guard, the questionnaire of the study was subjected to analysis in different selected schools. All data were tabulated in master sheet for analysis. The data collection sheet was designed using the schools' safety inspection checklists for Virginia Public Schools, Fire Safety Maintenance and General Schools Safety Review. ^[13-15] This was modified according to our objective taking in consideration of the Saudi culture.

Data Management and Analysis Plan:

The data from the excel sheet was imported to SPSS software (version 20). The statistical analyses were performed using SPSS version 20. A backup soft copy version as well as a hard copy print was dated, saved and secured after each data entry update. Statistical analysis of study variables was carried out using SPSS software. The responses on questionnaire on study were analyzed by plotting them against the incidence of injury in the school to obtain significance by Pearson Chi square test.

QUESTIONNAIRE FOR THE STUDY

❖ *School injury prevention measures site visits and survey:*

1. Type of the school :
<input type="checkbox"/> governmental <input type="checkbox"/> private <input type="checkbox"/> others
2. Area of the school:
<input type="checkbox"/> Center <input type="checkbox"/> east <input type="checkbox"/> west <input type="checkbox"/> south <input type="checkbox"/> north
3. Age of school:
<input type="checkbox"/> < 5years <input type="checkbox"/> 5-10 year5s <input type="checkbox"/> >10 years
4. Numbers of classrooms per school:
<input type="checkbox"/> < 10 <input type="checkbox"/> 10-20 <input type="checkbox"/> > 20
5. Numbers of teachers per school :
<input type="checkbox"/> <10 <input type="checkbox"/> 10-20 <input type="checkbox"/> 20-30 <input type="checkbox"/> >30
6. Numbers of students per school:
<input type="checkbox"/> Less than 250 <input type="checkbox"/> 250-500 students <input type="checkbox"/> More han 500 students
7. How many floors in the school:
<input type="checkbox"/> One <input type="checkbox"/> Two <input type="checkbox"/> Three
8. How many of the teachers are well trained in life saving?
<input type="checkbox"/> None <input type="checkbox"/> Less than 5 <input type="checkbox"/> 5-10 <input type="checkbox"/> 10- 20 <input type="checkbox"/> Most of them
9. How many injuries per happened in the school per year?
<input type="checkbox"/> Less than 5 <input type="checkbox"/> 5-10 <input type="checkbox"/> 10-20 <input type="checkbox"/> More than 20
10. How many deaths between students related to injury in the school in the last 5 years)
<input type="checkbox"/> None <input type="checkbox"/> Less than 5 <input type="checkbox"/> More than 5
11. Do you have hotline to red crescent and fire department?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not clear

❖ **TRAFFIC AND PARKING LOT SAFETY:**

		Yes	No
12	Stop signs, other devices adequately control inflow, outflow of traffic		
13	Parking areas are visible from adjacent street(s)		
14	Parking areas are patrolled during school hours; student arrivals and departures are monitored		
15	Do driving lanes have directional markings?		
16	Are fire lanes marked with approved fire lane signs, yellow curbing, and without any obstruction?		
17	Is there a designated parking area for students arriving and leaving at atypical times?		
18	Are there signs designating the speed limit?		
19	Are speed bumps/humps or other traffic calming devices used?		
20	Are student drop off areas away from other high traffic areas?		
21	Is visitor parking close to the main entrance?		
22	Is parking controlled by a decal system?		
23	Are assigned parking spaces specified by number instead of name/position?		
24	Is student access to parking areas restricted to times of arrival and dismissal?		
25	Are surveillance cameras used to monitor parking lots?		
26	If yes, does the camera system allow for recording?		
27	Are there designated bicycle parking areas?		
28	Are all areas accessible to patrol vehicles?		
29	Are staffs on duty in the morning and afternoon to monitor lots?		
30	Are bus loading areas clearly marked and restricted to other vehicles during use		
31	Is staffs assigned to monitor bus areas?		
32	Is staff assigned to all other areas during drop off and pick up of students?		

❖ **Fire safety:**

		Yes	No
33	Can all fire exits be opened immediately and easily?		
34	Are fire doors clear of obstructions?		
35	Are escape routes clear?		
36	Is the indicator panel showing 'normal'?		
37	Are whistles, gongs or air horns in place?		
38	Are luminaries and exit signs in good condition and undamaged?		
39	Is emergency lighting and sign lighting working correctly?		
40	Are all fire extinguishers in place?		
41	Are fire extinguishers clearly visible?		
42	Are vehicles blocking fire hydrants or access to them?		
43	Are external escape stairs safe?		
44	Are external routes clear and safe?		
45	Are all equipments in good condition?		
46	Has all fire fighting equipment been checked by a competent person?		

❖ Falls Safety:

Playground :		Yes	No
47	Are play areas free of surface irregularities such as holes, sprinkler heads or worn depressions?		
48	Are painted and preserved surfaces in good and safe condition?		
49	Are playground-paved surfaces free of loose gravel and debris?		
50	Are playground surfaces free of excess water build-up?		
51	Do climbers have tight steps or rungs, slip-resistant surfaces, and no cracks or rusted areas?		
52	Is all playground equipment inspected regularly?		
53	Is the playground properly fenced?		

Stairs and Stairwells:		Yes	No
54	Are all handrails in good repair and provided on both sides?		
55	Are ceiling tiles or plaster in proper repair?		
56	Are doors and hardware in good working order?		
57	Are handrails provided on stairways?		
58	Are windows in good working condition and free of cracks?		
59	Is lighting in the stairwells adequate to eliminate shadows and glare?		
60	Is storage allowed under the stairs?		
61	Is the lighting insufficient for ramps or steps to be seen clearly and without glare?		
62	Are ramps steep or slippery?		

Results

The different markers of study were plotted against the incidence of injury (Figure 1) in different schools to obtain significance by Chi square test. The data on demographic markers including type of school, area, age, class rooms, strength of teachers, students, number of floors in the school building, teachers trained in life saving, deaths, hotline to Red Crescent and fire department are included in Table 1. The increased number of class rooms, students per school, number of floors in school building and deaths due to injuries were found significant ($p < 0.05$; $p < 0.01$) in response to the injuries recorded. These changes might be related to the possible causes of injuries. The other parameters were statistically insignificant. The categorical data on school conditions (Table 2) on stop signs and other devices which adequately control inflow, outflow of traffic, parking controlled by decal system, surveillance cameras, recording by camera system and designated bicycle parking areas were significantly ($p < 0.05$; $p < 0.01$) insufficient, whereas the speed bumps/humps and other traffic calming devices were significantly ($p < 0.05$) adequate. The other markers were insignificant and do not respond to the injuries recorded. Table 3 includes facilities available for fire safety. The response to questions on availability of convenient fire exits, normal indicator panel, presence of whistles, gongs, air horns, visibility of fire extinguishers, external safe escape stairs were significantly ($p < 0.05$; $p < 0.01$) positive, whereas other parameters were insignificant in response to the injuries observed in different schools. The responses to questions on falls safety in play areas in different schools are included in Table 4. The response to paints and preservation of in play ground surfaces and fencing of the playground were found significantly ($p < 0.01$) affirmative, while the other markers did not show any significance in response to injuries observed. The markers of study on condition of stairs and stairwells in different schools showed that the handrails, ceiling tiles or plaster, handrails on stairways, windows being free of cracks, lighting in the stairwells, ramps or steps and were significantly ($p < 0.05$; $p < 0.01$) positive, additionally, the ramps were not steep or slippery ($p < 0.01$), whereas the other markers were insignificant (Table 5).

Figure 1: Incidence of Injuries recorded per year in schools under investigation

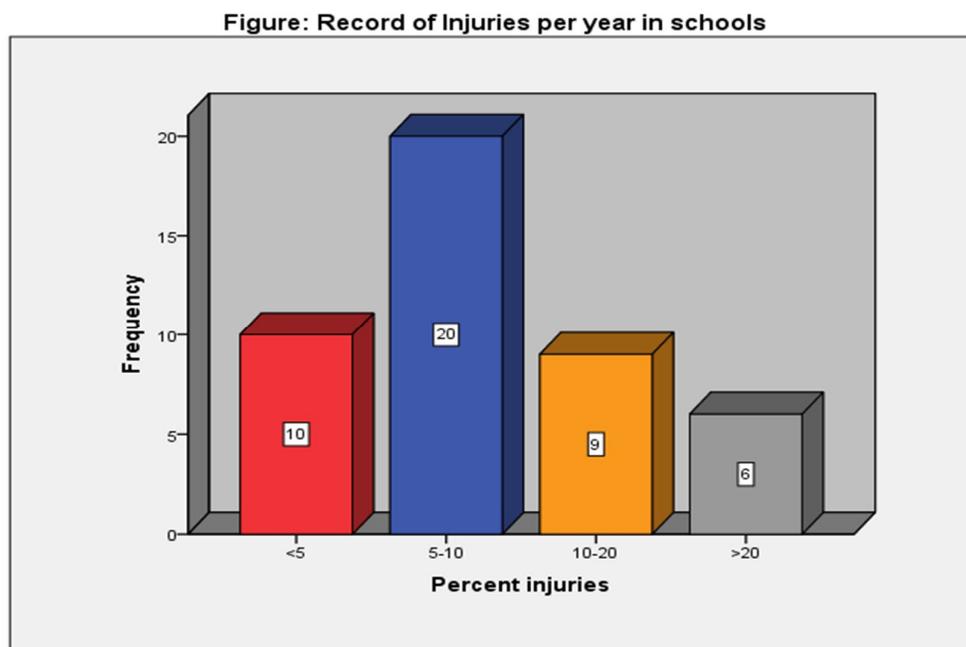


Table 1: Evaluation of Demographic markers on school, teachers, students, and access to hotline to Red Crescent and fire department

Serial	Marker of study	Pearson Chi square value	Probability value
1	Type of school	0.367	0.947
2	Area of school	10.010	0.350
3	Age of school	9.975	0.353
4	Number of classrooms per school	15.419	0.017*
5	Number of teachers per school	23.081	0.082
6	Number of students per school	13.359	0.038*
7	Number of floors in the school	13.070	0.042*
8	Number of teachers trained in life saving	6.611	0.358
9	Deaths caused due to injuries	12.265	0.007**
10	Hotline to red crescent and fire department	2.361	0.501

*p<0.05; **p<0.01

Table 2: Quantification of traffic and parking lot safety in different schools of Riyadh

Serial	Markers of study	Pearson Chi square value	Probability value
12	Stop signs, other devices adequately control inflow, outflow of traffic	8.066	0.045*
13	Parking areas are visible from adjacent street(s)	1.160	0.763
14	Parking areas are patrolled during school hours; student arrivals and departures are monitored	3.975	0.264
15	Do driving lanes have directional markings?	7.128	0.68
16	Are fire lanes marked with approved fire lane signs, yellow curbing, and without any obstruction?	4.082	0.253
17	Is there a designated parking area for students arriving and leaving at atypical times?	2.615	0.455
18	Are there signs designating the speed limit?	2.136	0.545
19	Are speed bumps/humps or other traffic calming devices used?	7.929	0.048*
20	Are student drop off areas away from other high traffic areas?	1.718	0.633
21	Is visitor parking close to the main entrance?	1.801	0.615
22	Is parking controlled by a decal system?	14.335	0.002**
23	Are assigned parking spaces specified by number instead of name/position?	6.081	0.108
24	Is student access to parking areas restricted to times of arrival and dismissal?	5.261	0.154
25	Are surveillance cameras used to monitor parking lots?	9.777	0.021*
26	If yes, does the camera system allow for recording?	9.777	0.021*
27	Are there designated bicycle parking areas?	9.777	0.021*
28	Are all areas accessible to patrol vehicles?	6.159	0.104
29	Are staffs on duty in the morning and afternoon to monitor lots?	2.077	0.557
30	Are bus loading areas clearly marked and restricted to other vehicles during use	1.837	0.607
31	Is staffs assigned to monitor bus areas?	4.201	0.241
32	Is staff assigned to all other areas during drop off and pick up of students?	2.496	0.476

*p<0.05; **p<0.01

Table 3: Markers on Fire safety-related markers on fire exits, obstructions, luminaries, emergency lighting, fire extinguishers, and fire-fighting equipment in different schools of Riyadh

Serial	Marker of study	Pearson Chi square value	Probability value
33	Can all fire exits be opened immediately and easily?	14.346	0.002**
34	Are fire doors clear of obstructions?	5.925	0.115
35	Are escape routes clear?	4.276	0.233
36	Is the indicator panel showing 'normal'?	16.175	0.063**
37	Are whistles, gongs or air horns in place?	10.518	0.015*
38	Are luminaries and exit signs in good condition and undamaged?	4.336	0.227
39	Is emergency lighting and sign lighting working correctly?	4.336	0.227
40	Are all fire extinguishers in place?	4.522	0.210
41	Are fire extinguishers clearly visible?	8.845	0.031*
42	Are vehicles blocking fire hydrants or access to them?	3.147	0.370
43	Are external escape stairs safe?	22.088	0.009**
44	Are external routes clear and safe?	5.911	0.116
45	Are all equipments in good condition?	5.885	0.117
46	Has all fire fighting equipment been checked by a competent person?	6.644	0.084

*p<0.05; **p<0.01

Table 4: Description of fall' safety and play areas in different schools of Riyadh

Serial	Marker of study	Pearson Chi square value	Probability value
47	Are play areas free of surface irregularities such as holes, sprinkler heads or worn depressions?	6.111	0.106
48	Are painted and preserved surfaces in good and safe condition?	13.621	0.003*
49	Are playground-paved surfaces free of loose gravel and debris?	1.608	0.658
50	Are playground surfaces free of excess water built up?	2.16	0.491
51	Do climbers have tight steps or rungs, slip-resistant surfaces, and no cracks or rusted areas?	5.360	0.147
52	Is all playground equipment inspected regularly?	6.119	0.106
53	Is the playground properly fenced?	12.445	0.006*

*p<0.01

Table 5: Condition of stairs, stairwells, ceiling tiles, doors and hardware, handrails, ramps in different schools of Riyadh

Serial	Marker of study	Pearson Chi square value	Probability value
54	Are all handrails in good repair and provided on both sides?	20.836	0.000**
55	Are ceiling tiles or plaster in proper repair?	9.581	0.022*
56	Are doors and hardware in good working order?	7.697	0.053
57	Are handrails provided on stairways?	9.777	0.021*
58	Are windows in good working condition and free of cracks?	19.910	0.000**
59	Is lighting in the stairwells adequate to eliminate shadows and glare?	24.014	0.000**
60	Is storage allowed under the stairs?	4.114	0.249
61	Is the lighting insufficient for ramps or steps to be seen clearly and without glare?	12.482	0.006**
62	Are ramps steep or slippery?	30.309	0.0001**

P<0.05; p<0.01

Discussion

Worldwide, injuries are the leading causes of morbidity and death in all ages from infancy to children aged 10 to 19 years. Each year approximately 950,000 children aged less than 18 years are reported to die as a result of an injury or violence. Most of these are due to unintentional injuries which are the result of road traffic crashes, drowning, burns, falls and poisoning, with the highest rates occurring in low-income and middle-income countries. In addition to these deaths, tens of millions more children sustain injuries that do not kill them but are serious enough to require hospital treatment and sometimes result in disability.^[16] However, most of the injuries are preventable and can be controlled. Many countries around the world give little attention and hence lack of effective and organized injury prevention program is noticeable in many developed countries, including Saudi Arabia. The present investigation on etiological and preventive strategies on school related injuries was conducted in view of a paucity of literature on relevant studies in Saudi Arabia.

The results on demographic data showed that increased number of class rooms, students per school, number of floors in the school building were significant causes of injuries among the school children. There are also more chances of accidents and injuries when the student-teacher ratio is inappropriate in different schools. Lack of control of students might be the major reason. These types of injuries are unintentional. In a study on epidemiology of school-related injuries, Lenaway et al.^[17] also reported that unintentional injuries are the leading cause of morbidity and mortality. Our studies on schools in Riyadh showed that the stop signs and other devices which adequately control inflow and outflow of traffic, parking controlled by decal system, surveillance cameras and recording by camera system, in addition to designated bicycle parking areas were not adequate and deserve more attention. Nevertheless, there was significant provision of bumps/humps and other traffic calming devices. Speed has been shown to be one of the common contributing factors in accidents and related injuries. Provision of bumps/humps within the school premises is the measures of speed reduction to avert motor vehicle crashes.^[18]

There were observed a perfect availability of fire exits, normal indicator panels, whistles, gongs, air horns, presence of fire extinguishers and external safe escape, however; the other markers needed attention. In an earlier study, Warda et al.^[19] also found interventions of house or school fire are very important to prevent fire related injuries. On falls' safety and play areas in different schools, the surfaces of play areas were perfectly painted and the playground were properly fenced, while the other markers needed attention in different schools under study. The concerns of childhood obesity and inactivity increase the significance of playgrounds which offer a chance for children to be active. However; playgrounds have risks, with injuries from falls. The playground injuries can be reduced by lowering the heights of play equipment and using soft, deep surfaces to cushion falls.^[20] In an earlier study, Pantano et al.^[21] reported that the risk factors related with playground depend mostly on inadequacy of the playground equipment and of its installation, besides maintenance. Moreover the playground surfaces are often non-elastic and the first-aid kits insufficient. The condition of stairs, stairwells, ceiling tiles, doors and hardware, handrails was found well in almost all the schools, ramps were not steep and slippery.

Conclusion / Recommendations

The significantly affirmative signs observed in different schools included traffic calming devices, speed bumps/humps, availability of convenient fire exits, normal indicator panels, presence of whistles, gongs, air horns, visibility of fire extinguishers, safe external escape stairs, paint covered play surfaces and fenced grounds. In addition, the condition of stairs and stairwells, handrails, ceiling tiles, plaster, handrails on stairways, lighting in the stairwells, ramps and steps, windows were also significantly adequate. Nevertheless, increased class rooms and floors in school building, besides disproportionate teacher student ratio, teachers' training in basic life support, and lack of stop signs, decal system, and surveillance cameras can be improved to increase the preventive measures. In order to reduce the incidence of injury, health education and improvement of environment should be particularly strengthened in the future. Moreover, periodic survey of different schools in the Kingdom will be a boon for safety and prevention of injuries.

References

1. Fang Y, Zhang X, Chen W, Lin F, Yuan M, Geng Z, Yu H, Dai L. Epidemiological characteristics and burden of childhood and adolescent injuries: a survey of elementary and secondary students in Xiamen, China. , 2015;15:357.
2. Peden M, Oyegbite K, Ozanne-Smith J, Hyder AA, Branche C, Fazlur Rahman AKM, Rivara F, Bartolomeos K. World report on child injury prevention, 1. Wounds and injuries – prevention and control, 2. Accident prevention, 3. Child welfare. World Health Organization 2008. Switzerland.
3. Linnan M, Anh LV, Cuong PV, Rahman F, Rahman A, Shafinaz S et al. Child mortality and injury in Asia: survey results and evidence. Florence, UNICEF Innocenti, Research Centre, 2007 available from: (http://www.unicef-irc.org/publications/pdf/iwp_2007_06.pdf, accessed 21 January 2008). (Innocenti Working Paper 2007-06, Special series on child injury No. 3). Florence.
4. Shaghghi A, Piri M, Allahverdipour H, Asghari-Jafarabadi M. Recess Activity and General Health Status among Iranian Elementary Schools' Pupils. Health Promot Perspect. 2013;3:45-54.
5. Zhang Q, Zhan SY. [Systematic review on the rate for injury incident among elementary and middle school students in China]. Zhonghua Liu Xing Bing Xue Za Zhi. 2007;28:881-5.
6. Achebe UJ, Akpuaka FC. Chemical burns in Enugu. West African Journal of Medicine, 1989; 8:205–208.
7. Chuang SS, Yang JY, Tsai FC. Electric water heaters: a new hazard for pediatric burns. Burns, 2003; 29:589–591.
8. Nursal TZ, Saffle JR, Davis B, Williams P. Burns in southern Turkey: electrical burns remain a major problem. Journal of Burn Care and Rehabilitation, 2003; 24:309–314.
9. Khambalia A, Joshi P, Brussoni M, Raina P, Morrongiello B, Macarthur C. Risk factors for unintentional injuries due to falls in children aged 0–6 years: a systematic review. Injury Prevention, 2006; 12:378–385.
10. Bartlett SN. The problem of children’s injuries in low-income countries: a review. Health Policy and Planning, 2002; 17:1–13.
11. AlQahtany A, Rezgui Y and Haijiang L. A Consensus-Based Framework for the Sustainable Urban Planning Development: “As an Approach for Saudi Arabian Cities” International Journal of Environmental Science and Development, 2014; 5: 2.
12. Available from: http://portal.moe.gov.sa/pages/stats_summary.aspx
13. Available from: <http://education.qld.gov.au/health/pdfs/healthsafety/slips-checklist.pdf>
14. Available from: <http://www.plymouth.gov.uk/appendices-4.pdf>
15. <http://www.moi.gov.sa/wps/portal/civildefence/Main/Safety/>
16. Harvey A, Towner E, Peden M, Soori H, Kidist Bartolomeos K. Injury prevention and the attainment of child and adolescent health. Bulletin of the World Health Organization 2009;87:390-394.
17. Lenaway DD, Ambler AG, Beaudoin DE. The epidemiology of school-related injuries: new perspectives. Am J Prev Med. 1992;8:193-8.
18. Afukaar FK. Speed control in developing countries: issues, challenges and opportunities in reducing road traffic injuries. Inj Control Saf Promot. 2003;10:77-81.
19. Warda L¹, Tenenbein M, Moffatt ME. House fire injury prevention update. Part II. A review of the effectiveness of preventive interventions. Inj Prev. 1999;5:217-25.
20. Fuselli P, Yanchar NL; Canadian Paediatric Society, Injury Prevention Committee. Preventing playground injuries. Paediatr Child Health. 2012;17:328-30.
21. Pantano LC, Bevilacqua L, Capodilupo A, Pannozzo F, Picarazzi A. [Risk factors present in the recreation areas of nursery schools]. Pediatr Med Chir. 1989;11(4):441-5.