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Epidemiological Features and Risks of Accidental Injuries Among Adolescents at Schools Environments in Dubai

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Abstract

Background: Child injuries are an important public health and development issue. According to a recent report by WHO and UNICEF, more than 2000 child die each day as a result of unintentional or accidental injuries. *Objectives:* To study the epidemiological features and risk factors of injuries among student at private schools in Dubai. *Methodology:* Cross-sectional study was conducted on students of grades 7 – 12, both males and females in Dubai's private schools. The minimal sample size is 1000 student. Multistage stratified random sample with proportional allocation was carried out. The stratification was based upon regions (Deira and Bur Dubai), and gender (male and female). The data was collected from students by a pilot study tested self administered questionnaire composed of 32 items. *Results:* It demonstrates that most injuries happened due to falls (62%) followed by cuts (13%) and least involved cause (1%) was accidental poisoning. It revealed that most of the injuries (36%) occurred due to school safety measures and least (10%) due to student's exhaustion. By noticing the association between injury severity and age it's apparent that each age group is having the mild injury as the most common one than moderate and severe. For the association between injury severity and sex, it was seen that in both sex the most dominant type of injury was the mild injury about 89.6% in male and 86.8% in females. On the other hand, the severe injury was the least pronounced one in both sex forming 15% in male and 6% in females. As per the nationality association with the injury type, it can be noticed that both nationalities have the mild injuries the most common one, 90.3% in UAE nationals and 88.4% in non-UAE nationals. *Conclusions:* School related unintentional injuries reflected and highlighted an important issue that must be considered carefully, especially among preparatory grades students as this age group has unique life style characteristics. Unintentional injuries could be the result of several factors.

Keywords

Epidemiological Features, Risks, Accidental Injuries, Schools, Dubai

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1. Introduction

WHO stated that injuries are a leading cause of the global burden of death and disability for all age groups below 60.[1] Injuries affect health and welfare of all age groups regardless of country of origin, economic status through premature death, disability, medical costs and loss of productivity.[2] Child injuries are an important public health and development issue.[3] According to a recent report by WHO and UNICEF, more than 2000 child die each day as a result of unintentional or accidental injuries.[3] Death is the most notable measure of injury but it's not the only one or the most

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common one.[4] Injuries were categorized into fatal and nonfatal ones. The fatal injuries were further categorized into unintentional and intentional. The unintentional injuries included: road traffic collisions, drowning, burns (fire or scalds), falls or poisoning asphyxiation, choking, animal or snakebites, hypothermia and hyperthermia.4 Moreover as per this combined report of WHO and UNICEF, the unintentional injuries account for 83% of all child injury deaths. Africa has the highest rate of unintentional childhood injuries death; it was found that Africa is 10 times higher than high-income countries in Europe and Western Pacific countries such as Netherlands, Sweden and UK.[4]

In the Eastern Mediterranean Region, the burden of unintentional child injuries is one of the highest in the world, especially in low- and middle-income countries. The Eastern Mediterranean Region endures about 12% of all unintentional injury deaths of the world in those fewer than 20 years of age, again differentially affecting the disadvantaged sections of the society.[4]

Children's physical and cognitive abilities, dependence degree, risk behaviours are all subjected to change eventually as they grow and develop.[5] As they grow further their curiosity and wish for adventures grow and don't match their capacity to perceive danger.[6] Along with this, their short stature increases their risk in road environment, as they are less visible than adults if hit by any vehicle and more susceptible than adults to have a head or neck injuries.[7] There are some other physical characteristics that make children vulnerable to injuries. For example, their skin that may be burnt at lower temperatures than adults, as a small amount of poison can be toxic. Their smaller size that creates as a risk of body parts entrapment most dangerously for their head.

Several studies of road traffic injuries have showed lack of knowledge, skills and levels of concentration of children that are required to manage the road environment. Also their physical and cognitive abilities do not match each other.[8] Boys tend to have more frequent and severe injuries than girls.[9] This fact has been proved in many developed countries,[10] but this pattern is less uniform in low and middle-income countries and the overall gender difference is clear. Many theories have been proposed for the injury rates difference between boys and girls.[11] Some of these state that boys engage themselves in more risky behaviour than girls, that they have more impulsively and they are less likely to be retrained by their parents than girls.[12]

Most of the childhood injuries rest in low and middle-income countries, and are disproportionately distributed.[13] A broad range of socioeconomic factors is associated with injury risk.[14] They range from economic factors such as family income; to social factors such as maternal education; to factors related to family structure such as single parenting, maternal age, numbers occupying the household and number of children; to factors related to accommodation e.g. type of tenancy, type of housing, and level of crowding. The risk of injury is affected by these socioeconomic factors in several ways.[14] In poor household, parents may not be able to properly care for and supervise their children. Children living in poverty may be exposed to hazardous environments such as fast moving traffic, lack of safe facilities for playing, cramped living conditions with lack of proper kitchens, unprotected windows and house roofs and safe stairs.

Poor access to good quality medical services is an important factor in variation of mortality rates. For instance, a Nigerian study of 84 children showed that 27% of these admitted children for burn died as a result of their injury.[15] This contrasts with a study held in Kuwait on 388 children from which 1% just died of the injury.[16]

One set of behavioral factors that play a prominent role in child injury risk is the influence of parents. Among young children, a constellation of traits encompassing parental supervision and monitoring, parental mental health, and parental engagement in the child's life appears to be among the strongest behavioral correlates to pediatric injury outcomes.[17] During early child development, parents have the responsibility to supervise young children in potentially injurious situations because children do not yet have the cognitive, perceptual, motor, or impulse control capacities to engage safely in dangerous situations. Parents also serve as role models for young children and spend considerable time training children about safety-related rules and how to make safe decisions in potentially dangerous environments. As children develop, parents and other adults play a diminishing role in protecting children from injury. By school age; children make decisions about how to behave independently, and therefore accept increasing responsibility to protect their own safety. However, parents continue to play some role in pediatric injury prevention after children enter school.[18]

2. Objectives

To study the epidemiological features and risk factors of injuries among student at private schools in Dubai.

3. Methodology

Cross sectional study design was held on students of grade 7 – 12 both males and females in Dubai's private schools. Sample size was calculated using computer program EPI-Info version 6.04. The minimal sample size would be 1000 student. Multistage stratified random sample with proportional allocation was carried out. The stratification was

based upon regions (Deira and Bur Dubai), and gender (male and female). The data was collected from students by a pilot study tested self administered questionnaire composed of 32 items. The English questionnaire was reviewed by community medicine consultants and translated into Arabic language The questionnaire was adopted and modified from a validated and reliable questionnaire from a study held in China.[19] It was reliable and validated as Cronbach's α coefficient of reliability is 0.78 in this study. It aims at gathering information about students who have been involved in the event of unintentional injuries at school.

4. Results

Figure (1) shows frequency distribution of injuries according to cause in Dubai private schools (grade 7-12) in 2012. It demonstrates that most of the injuries happened due to falls(62%) followed by cuts(13%) and least involved cau se (1%)was accidental poisoning.

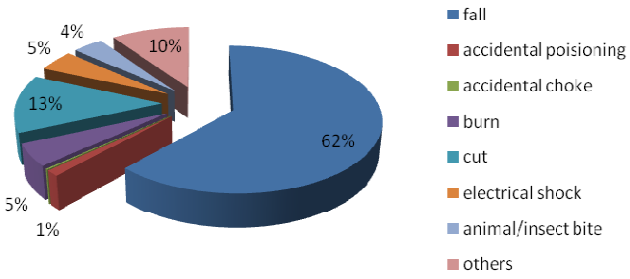

Figure (1). Frequency distribution of injuries according to types of injury among study population in Dubai private schools, 2012.

Figure (2) shows the frequency distribution of injuries according to their causes in Dubai private schools (grade7-12) 2012. It revealed that most of the injuries (36%) occurred due to school safety measures and least (10%) due to student's exhaustion.

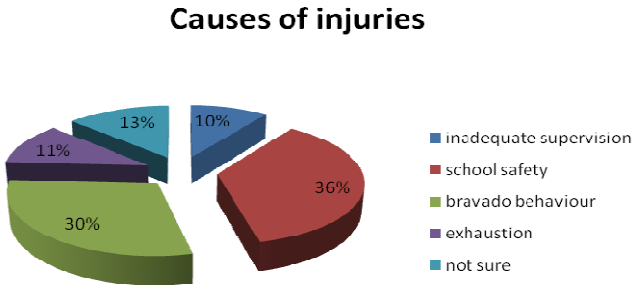

Figure (2). Frequency distribution of injuries according to causes of injury among study population in Dubai private schools, 2012.

Table (1) shows the association between injury severity and variables such as age, gender and nationality in Dubai private schools in 2012. By noticing the association between injury severity and age it's apparent that each age group is having the mild injury as the most common one than moderate and severe. So for 12, 13 age group, out of 573 injuries most of them 86.2% are mild and least (2.4%) are severe. For 14, 15 age group, from 315 injuries, 94% are mild, and only 3% are severe. For 16, 17 age group, which is about 112, 99% are mild injuries and 4% are severe. This means that as the age increases, the injuries decrease with it. By looking at the frequencies of injuries in each age group, it's clear that the youngest group,12,13, have the higher amount of injuries (573) compared to other groups which form 315 in age group 14,15 and 112 in 16,17 age group. For the association between injury severity and sex, it was seen that in both sex the most dominant type of injury was the mild injury about 89.6% in male and 86.8% in females. On the other hand, the severe injury was the least pronounced one in both sex forming 15% in male and 6% in females. As per the nationality association with the injury type, it can be noticed that both nationalities have the mild injuries the most common one, 90.3% in UAE nationals and 88.4% in non-UAE nationals.

Table 1. Association between (gender, nationality and age) and injury severity in Dubai private schools, 2012.

		Injury severity			Total
		Mild	Moderate	Severe	
Gender	Male	665 (89.6%)	62 (8.4%)	15 (2.0%)	742 (100%)
	Female	224 (86.8%)	28 (10.9%)	6 (2.3%)	258 (100%)
Total		889 (88.9%)	90 (9.0%)	21 (2.1%)	1000 (100%)
Chi square	1.57	p-value	.454		
Nationality	UAE	251 (90.3%)	24 (8.6%)	3 (1.1%)	278 (100%)
	Non UAE	638 (88.4%)	66 (9.1%)	18 (2.5%)	722 (100%)
Total		889 (88.9%)	90 (9.0%)	21 (2.1%)	1000 (100%)
Chi square	2.052	p-value	.358		
Age	12-13	494 (86.2%)	65(11.3%)	14 (2.4%)	573 (100%)
	14-15	296(64%)	16(5.1%)	3(1%)	315(100%)
	16-17	99(88.4%)	9(8%)	4(3.6%)	112(100%)
Total		889(88.9%)	90(9%)	21(2.1%)	1000(100%)
Chi square	13.824	* p-value	.008		

Table (2) and (3) demonstrate the association between degree of injury and parent's educational level and family income as well. By comparing the father's educational level with injury severity it can be seen that secondary graduate fathers, about 94.4% of them had children involved in mild injuries and about 87.9% of 794 of fathers who college was graduates had their children involved in mild injuries. Follows the Least number of fathers 11 and 7 respectively, were found to be illiterate or having primary school degree also had their children involved in mild injuries mostly.

On the other hand, by observing the mother's educational levels it was found that highest number of injuries was in children of college graduate mothers about 670 as 90.4% of these were mild injuries. Follows secondary school graduate mothers who had about 84.2% out of 228 injured children and only 5% of them with severe injuries. The least count was of mothers with primary degrees who formed about just 15 injuries and were only mild.

Finally, by having a look at the salary one can see that most of the injured children were of those with income of 10,000 AED-20,000 AED composing 88.5% of 538 injuries and just 2.6% of them were severe. Follows injured children whose family income was about >20,000 AED, from 375 injuries 88% were mildly injured and only 6% severely.

Table 2. Association between Father's education and income, and injury severity in Dubai private schools, 2012.

Father's education	Degree of severity of injury			Total
	Mild	Moderate	Severe	
Illiterate	11 (100%)	0	0	11 (100%)
Primary	7 (63.6%)	4 (36.4%)	0	11 (100%)
preparatory	20 (90.9%)	2 (9.1%)	0	22 (100%)
Secondary	153 (94.4%)	7 (4.3%)	2 (1.2%)	162 (100%)
College/higher	698 (87.9%)	77 (9.7%)	19 (2.4%)	794 (100%)
Total	889 (88.9%)	90 (9.0%)	21 (2.1%)	1000 (100%)
Chi square test	17.938	* p-value .022		

Table 3. Association between mother's education and income, and injury severity in Dubai private schools, 2012.

Mothers education		Mild	Moderate	Severe	Total
Illiterate		45 (91.8%)	2(4.08%)	2(4.08%)	49(100%)
Primary		15(100%)	0	0	15(100%)
preparatory		31(81.6%)	5(13.2%)	2(5.3%)	38(100%)
Secondary		192(84.2%)	31(13.6%)	5(2.2%)	228(100%)
College/higher		606(90.4%)	52(7.8%)	12(1.8%)	670(100%)
Total		884(88.9%)	90(9.0%)	21(2.1%)	1000(100%)
Chi square test		18.036	*p-value .054		
	>20,000	330(88%)	39(10.4%)	6(1.6%)	375(100%)
Income	10,000-20,000	476(88.5%)	48(8.9%)	14(2.6%)	538(100%)
	<10,000	83(95.4%)	3(3.4%)	1(1.1%)	87(100%)
Total		889(88.9%)	90(9.0%)	21(2.1%)	1000(100%)
Chi square test		5.726	p-value .22		

5. Discussion

The current study results shows an inverse relationship of injury rate and age as the youngest age group of 12-13 years had about 57.3% of injuries compared to other age groups. This goes with the results of a study held in France in 2007 (Determinants of school injury proneness in adolescents: a prospective study), also agreed with this fact in 2007[12]. They found in it that frequent injuries were common and were strongly associated with younger age as they had 18% of injuries in age group of 12 and less. This shows that age is an important factor in unintentional school injuries among children. As the researcher thinks this may be due to their inability to judge about consequences of different movements or activities they engage themselves in with or without an adult[55]. In contrast another study held in Finland on a student sample of 1135 of age group7-15, aiming at analysis of gender differences in injuries in Finland schools showed that as the age increases of the student his risk of injury also increases. They explained this by having boys to decrease their control over their body by puberty or risk taking behavior tendencies increase with age[56].

For the gender, the study revealed that there was no statistically significant difference between male and female as the p= .454. In the researcher's point of view, this may be due to low incidence rate of the current study compared to that of other international studies. This result is different from some other studies such as the one held in China by Huan *et al.* about unintentional injuries at school with population of 10,000 students attending 6 primary and 4 middle schools selected randomly. They had a statistically

significant result with p=.023 for gender being a risk factor in injury occurrence[52].

Regarding the economic costs of unintentional injuries in the current study sample, it was estimated to be about 15,670 AED ($4,266) for 979 injuries (mild and moderate) in both males and females. While generalizing this to all students of preparatory and secondary school students it was estimated to be about 472,500 AED (128,634.45$). These figures are lower than those in other countries such as USA where these types of injuries cost around $516,938 - $ 9,550,704/year [37]. This difference in cost effectiveness of both countries comes from the former stated as a developing and the later as a developed country. In both there are clear issues regarding the health care system findings, the insurance coverage and degree of development of the national health care systems and beside all of this the population density difference between Dubai and other compared areas [37].

It has been demonstrated that there is a significant statistical association (p =. 022) between father's educational level and injury occurrence among children. It showed that fathers with a college/higher degree had mostly their children involved in an unintentional mild injury. In researcher's point of view, this may be due to continuous business, with studies or work, or their absence from direct supervision and guidance of their children regarding avoidance of these types of injuries. This is different than the Velestino town, Greece study about incidence of unintentional injuries and risk factors in children, that showed a p = .09 [58.] This has been justified by the researchers in that study by creation of a safer environment by the highly educated parents and provision of role models for safer behavior by them as well.

As for types of injuries in this study, it was seen that falls (P=.000) account for half of all types of injuries (58.2%). This result was similar to a study held in Ismailia in Egypt on 1303 students of grade 6-8, where falls accounted for about 26%, which were most frequent types of injuries[59]. These results also were similar to a study held in Saudi Arabia about pattern of injuries among children, and with a sample of 1650 aged <18years old. It showed that falls are the most common type of injuries in their sample as it was about 40.4%[60]. In researcher's view, being in the school environment is as a place where students can spend their full energy and this is done by engaging in different activities such as playing mostly in playgrounds and the most possible and expected type of injury to occur in there is a fall.

This study also found that mostly the responsible person for causing the injury was the student himself as it was statistically significant with a p=.000. As per the researcher's thoughts, this may be due to aggressiveness of the youth and high boosts of energy in them which makes them to engage themselves in each single activity even without thinking of its consequences on their health. This finding was similar to that of the France study which was mentioned above[12]. They found that students who were less calm and easily irritated were injuring themselves most of the time. The researchers in that study referred this to personality traits which they clearly stated in their results, but this was not mentioned in the current study but may still be the case here as well. By noticing the causes of the unintentional injuries it was showed in the current study that most of the injuries occurred due to school safety factors, as it accounted for about 364 of the 1000 injuries and p= .001. This may be due to the reason that some of the schools were not having a proper play ground with complete safety measures for performing physical activities. Some other schools had the bad construction of stairs that resulted in falls in most of the students in the sample group. This was different from the causes listed in the France study[12]. They concluded that exhaustion was the main cause of school injuries in their sample population which in turn lead to lack of attention, lack of risk of awareness, lack of experience, nervous irritation and weaker physical abilities making the student prone to injuries. Among the positive findings in the current study was association of injuries with the students study mark, with a p-value of .048 with most of the injuries occurring in students with study marks of 85% or higher. As per the researcher's justification, this may be referred to the high IQ levels of them which makes them involve themselves in more than one activity at a time, doesn't matter if mental or physical leading them to face these types of injuries. This observation was disagreed with the France study which showed that poorer average school performance was a risk for frequent injuries[12].

6. Conclusion

School related unintentional injuries reflected and highlighted an important issue that must be considered carefully, especially among preparatory grades students as this age group has unique life style characteristics. Unintentional injuries could be the result of several factors.

Recommendations

Develop and implement written policies, guidelines and standards for unintentional injury prevention. Establishment of a survey system for estimating injuries occurring in schools at least in Dubai. Decision makers should realize that injuries incidence and costs are a problem and prompt researchers to study and design proper solutions for them.

References

[1] Corso P, Finkelstein E, Miller T, Fiebelkorn I, Zaloshnja E. Incidence and lifetime costs of injuries in the United States. Injury Prevention 2006 August 01; 12(4): 212-218.

[2] Danseco ER, Miller TR, Spicer RS. Incidence and costs of 1987–1994 childhood injuries: demographic breakdowns. Pediatrics 2000; 105(2). e27. (DOI: 10.1542/peds.105.2.e27). Search Google Scholar

[3] WHO | Preventable injuries kill 2000 children every day Available at: http://www.who.int/mediacentre/news/releases/2008/pr46/en/. Accessed 5/26/2012, 2012.

[4] World_report.pdf (application/pdf Object) Available at: http://www.unicef.org/eapro/World_report.pdf. Accessed 5/21/2012, 2012.

[5] Jiang X, Zhang Y, Wang Y, et al. An analysis of 6215 hospitalized unintentional injuries among children aged 0–14 in northwest China. Accid Anal Prev 2010; 42(1): 320-326. CrossRefMedlineWeb of Science

[6] Marttunen MJ, Henriksson MM, Isometsä ET, et al. Completed suicide among adolescents with no diagnosable psychiatric disorder. Adolescence 1998; 33:669--81.

[7] CDC. Epidemiologic notes and reports cluster of suicides and suicide attempts---New Jersey. MMWR 1988; 37:213--6.

[8] CDC. Effectiveness in disease and injury prevention adolescent suicide and suicide attempts---Santa Fe County, New Mexico, January 1985--May 1990. MMWR 1991; 40:329--31.

[9] Murphy SL. Deaths: final data for 1998. Natl Vital Stat Rep 2000; 48:1--106.

[10] Cohen LR, Potter LB. Injuries and violence: risk factors and opportunities for prevention during adolescence. Adolesc Med State Art Rev 1999; 10: 125—35.

[11] Nader PR, Brink SG. Does visiting the school health room teach appropriate or inappropriate use of health services? Am J Public Health 1981; 71: 416--9.

[12] Passmore DL, Gallagher SS, Guyer B. Injuries at school: epidemiology and prevention. Cambridge, MA: Harvard University School of Public Health, New England Injury Prevention Research Center, 1989. (NEIPRC Working paper series no. 17.

[13] US Congress, Office of Technology Assessment. Risks to students in school. Washington, DC: US Government Printing Office, 1995; publication no. (OTA) ENV-633.

[14] Kirkpatrick-Smith J, Rich AR, Bonner R, Jans F. Psychological vulnerability and substance abuse as predictors of suicide ideation among adolescents. Omega 1991--1992; 24:21--33.

[15] Brent DA, Kerr MM, Goldstein C, Bozigar J, Wartella M, Allan MJ. An outbreak of suicide and suicidal behaviour in a high school. J Am Acad Child Adolesc Psychiatry 1989; 28:918--24.

[16] Taketa S. Student accidents in Hawaii's public schools. J Sch Health 1984; 54: 208—9.

[17] Schwebel DC, Brezausek CM. How Do Mothers and Fathers Influence Pediatric Injury Risk in Middle Childhood? Journal of Pediatric Psychology 2010 September 01; 35(8): 806-813.

[18] (Petrass L, Blitvich JD, Finch CF. *Parent/caregiver supervision and child injury: A systematic review of critical dimensions for understanding this relationship. Family and Community Health 2009; 32: 123-135.)*

[19] Robinson TN, Wilde ML, Navracruz LC, Haydel KF, Varady A. Effects of reducing children's television and video game use on aggressive behavior: a randomized controlled trial. Arch Pediatr Adolesc Med 2001; 155: 17--23.