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Direct Cost of Unintentional Injuries Among Students Populations in Dubai

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Abstract

Background: Unintentional school injuries have gained great importance in the field of Public health worldwide as it affects the student population from many aspects and raises the burden of direct medical costs in health settings. Objectives: To estimating the direct cost of unintentional injuries among students in private schools in Dubai. Methodology: Cross-sectional study was conducted 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). Cost has been estimated through multiplying the incidence rate / number of injuries by cost of visit and oriented to male, female, mild, moderate, first and second visit. The cost has been estimated from the direct cost of service point of view only. Results: It demonstrated that the total cost reached about 905,240 AED. It revealed that injuries in boys were far more expensive, about 9,250 AED, compared to those in females which were only about 2,720 AED both making about 11,970 AED. Total direct costs of both mild and moderate injuries among the study population according to sex were around 15,670 AED. Conclusions: Estimated costs of unintentional injuries at schools are high and proper management of the leading causes is absent. The burden of unintentional injuries is not low, and may cause long term financial exhaustion beside its health related consequences. Recommendations: Enforcement of laws (legislations) related to safety and injuries prevention. Empowerment of the population by training, mass media exposure regarding prevention and control of injuries.

Keywords

Direct Cost, Unintentional Injuries, Students, Dubai

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1. Introduction

Unintentional school injuries have gained great importance in the field of Public health worldwide as it affects the student population from many aspects and raise the burden of direct medical costs on the health settings. The majority of cost-associated studies for unintentional injuries have been done in high-income countries. In one study of unintentional injuries that occur in the home in the United States, the total societal cost was estimated to be approximately US $217 billion. Of that, falls accounted for by far the largest proportion (42%) of the total cost.[1] In another study of childhood unintentional injuries, the total cost, which included loss of future work and quality of life, was US $347 billion per year or US $17,000 per child injured.[2] A few cost-associated studies for unintentional injuries overall have been

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done in LMIC as well. A recent analysis of over 6,000 children less than 15 years of age hospitalized for unintentional injuries in China showed a mean institutional cost of US $166 and a mean length of stay of over 17 days per injury case. Although the injury costs were not broken down overall by cause of injury, the cost associated with poisonings averaged US $53 per case, and for scald injuries was US $198 per case. These estimates do not include the costs to the individuals as a result of the injuries or associated costs such as loss of wages for parents.[3] A community-level analysis in Vietnam showed that the total annual cost of unintentional injuries was over USA $235,000 (equivalent to the income of 1,800 people), of which over 90% fell on individuals.[4]

Injuries are linked to activities, conditions and the environment, and are also associated with certain individual characteristics such as age, sex, and physical ability, lack of knowledge, personality, behavior, and family characteristics.[5] Smoking, alcohol use, health status and sleep disorders are known to affect physical and mental abilities and increase the risk of injury in adults, and these factors may also lead to school injuries. The increased risk may also be due to the conditions for which youngsters are taking the drugs. School marks may also be associated with injuries because they may indicate the student's capacity for certain school activities. Knowledge of the role of these factors may be useful for injury prevention and for school physicians, parents and school staff to raise student awareness of the risks and to find remedial measures.[6]

Childhood injuries cost estimation is an important aspect of the whole injury burden estimation. As these estimates reduce different outcomes of injuries to a common metric. This allows gauging the size of different problems, assessing risks, setting research priorities, and tailoring the most suitable interventions that are able to reduce the burden of these unintentional injuries. Measurement of the interventions benefits, for e.g. in dollars, helps planners and strategists as well as evaluators to estimate the net cost of a safety investment. These injuries cost estimates also provides insight about the magnitude of these problems in specified regions, thus allow proper allocation of available resources.[7]

2. Objectives

To estimating the direct cost of unintentional injuries among students in schools in Dubai.

3. Methodology

Cross sectional study design was conducted 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). Complete list of private schools was obtained from Knowledge and Human Development Authority (KHDA). Cost has been estimated through multiplying the incidence rate/ number of injuries by cost of visit and oriented to male, female, mild, moderate, first and second visit. Average cost was calculated separately for first and second visit and then added together as follows: If unit had just one visit it was multiplied by the cost of injury (mild/moderate)*2. If unit had second visits it was multiplied by the cost of injury (mild/moderate) * 3. The cost has been estimated from the direct cost of service point of view only.

4. Results

Table (1) shows direct costs of *mild injuries* among study population according to sex in Dubai private schools, 2012. It revealed that injuries in boys were far more expensive, about 9,250 AED, compared to those in females which were only about 2,720 AED both making about 11,970 AED.

Table 1. Direct costs of mild injuries among study population according to sex in Dubai private schools, 2012.

Sex	Number of 1st visit	Number of 2nd and 3rd visits	Cost of 1 visit (AED)	Number of total visits	Total cost
Male	665	224	10(AED)	889	9,250(AED)
Female	224	60	10(AED)	284	2,720(AED)
Total	889	284	10(AED)	1,173	11,970(AED)

Table 2. Direct costs of moderate injuries among study population according to sex in Dubai private schools, 2012.

Sex	Number of 1st visit	Number of 2nd and 3rd visits	Total number of visits	Cost of 1 visit (AED)	Total cost
Male	62	49	111	20	2,740
Female	28	24	52	20	960
Total	90	73	163	20	3,700

Table (2) demonstrates direct costs of moderate injuries among study population according to sex in Dubai private schools in 2012. Results are similar to those in the previous table, as this one showed that in boys the injuries cost was about 2,740 AED and 960 AED in females making a total of 3,700 AED.

Table 3 demonstrated the total direct costs of both mild and moderate injuries among the study population according to sex. It revealed that was around 15,670 AED.

Table 4 shows the estimated direct costs of mild injuries according to sex among all students' population in Dubai private schools in 2012. It demonstrates that for mild injuries in male students total estimated costs were about 331,390 AED and for females were about 101,350 AED. For both together it costs around 432,740 AED.

Table 3. Total Direct costs of mild and moderate injuries among study population according to sex in Dubai private schools, 2012.

	Number of 1st visit	Number of 2nd and 3rd visits	Total number of visits	Cost of 1 visit (AED)	Total cost
Mild	889	284	1,173	10	11,970
Moderate	90	73	163	20	3,700
Total	979	357	1,336	30	15,670

(First visits + second visits)* cost of 1 unit (mild/moderate injury)

Table 4. Estimated direct costs of mild injuries according to sex among all students' population in Dubai private schools, 2012.

Sex	Number of 1stvisit	Number of 2nd and 3rd visits	Total number of visits	Cost of 1 visit (AED)	Total cost
Male	19,801*	6,669**	26,470	10(AED)	331,390***
Female	6,669	1,733	8,402	10(AED)	101,350
Total	26,470	8,402	34,872	10(AED)	432,740

* incidence rate per 1000 population multiply by total no of male 12-18 years categorized as mild injuries As number of mild injuries with 1st visit reached) it would be 19,801 injures.
** By referring to table (5), the number of 2nd and 3rd visits was divided by the number of 1st visits and the percentage was multiplied in the 1st visits.
***Total number of visits multiplied by cost of unit (one visit).

Table 5. Estimated direct costs of moderate injuries according to sex among all students' population (secondary &preparatory) in Dubai private schools, 2012.

Sex	Number of 1stvisit	Number of 2nd and 3rd visits	Total number of visits	Cost of 1 visit (AED)	Total cost
Male	1,846*	1,458**	3,304	20(AED)	427,520***
Female	833	708	1,541	20(AED)	44,980
Total	2,679	2,166	4,845	20(AED)	472,500

* using the number of moderate injuries with 1st visit reached 62 in 1000 students, so estimated (moderate injuries of male age group of 12-18) would be 1,846, and for females same was done so they had 833 injuries.
** By referring to the number of 2nd and 3rd visits was divided by the number of 1st visits and the percentage was multiplied in the 1st visits.
***Costs for each types of visit were calculated as follows:
1st visit x cost of visit (20) and 2nd visit x cost of visit (20) by 2, Total cost = a + b.

Table 6. Estimated total direct costs of mild and moderate injuries according to sex among all students' population (secondary &preparatory) in Dubai private schools, 2012.

Sex	Number of 1stvisit	Number of 2nd and 3rd visits	Total visits	Total cost
Mild	26,470	8,402	34,872	432,740
Moderate	2,679	2,166	4,845	472,500
Total	29,149	10,568	39,717	905,240

Table 5 shows the estimated direct costs of moderate injuries according to sex among all students' population in Dubai private schools in 2012. It demonstrates that for this type of injuries in male students total estimated costs were about 427,520AED and for females were about 44,980AED. For both it reached about 472,500 AED.

Table 6 showed the total direct costs of both mild and moderate injuries among all students' population in Dubai private schools in 2012. It demonstrated that the total cost reached about 905,240AED.

5. Discussions

This study is one of the few studies in UAE that aimed at exploring direct economic costs. The economic costs of unintentional injuries in the current study sample were 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.[8] 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.[8]

Concerns of western countries concentrated on that plenty students are getting injured on school grounds every year - costing accident compensation scheme hundreds of thousands of dollars. They believe some claims may be from over-protective and anxious parents. A lot of claims were made by students for accidents that took place on school grounds or in school buildings between 2010 and 2014 in New Zealand. The number of claims rose each year to 3192 claims in 2014. The cost of claims was highest in 2013 at $802,009. Meanwhile, more than 500 claims were made by teachers over the five-year period. The number of claims was highest in 2013, at 137 claims, but the total cost of claims was highest in 2012, at $100,248.[9] This issue is very important to be studies in the UAE and to investigate impacts of it on health systems and health insurance in the country.

Another study found that the annual statewide estimates were $9.9 million in medical costs, $44.7 million in human capital costs, and $144.6 million in comprehensive costs. The mean medical cost was $709 per injury (95% CI $542 to $927), $2223 per injury (95% CI $1709 to $2893) in human capital costs, and $10 432 per injury (95% CI $8062 to $13 449) in comprehensive costs. Sport and competition division were significant predictors of injury costs. It concluded that the injuries among high school athletes represent a significant economic cost to society and further research should estimate costs in additional populations to begin to develop cost-effective sports injury prevention programs.[10]

6. Conclusions

Estimated costs of unintentional injuries at schools are high and proper management of the leading causes is absent. The burden of unintentional injuries is not low, and may cause long term financial exhaustion beside its health related consequences.

Recommendations

Enforcement of laws (legislations) related to safety and injuries prevention. Empowerment of the population by training, mass media exposure regarding prevention and control of injuries. Establishment of national injuries prevention programs to address all factors related to unintentional injuries. Establishing community partnerships, alliances of multispectral approach to properly addressing injuries using different strategies.

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