Association between health-related quality of life and children's unintentional injuries

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Abstract

Objective: To examine the association between health-related quality of life (HRQOL) and unintentional injuries among children.

Methods: Overall, 3375 children aged 6-10 years were randomly selected from primary schools in Iran. HRQOL was measured by 56 items taken from seven domains of TNO AZL child quality of life (TACQOL) parent form. Parents were interviewed to collect information about incidence, cause and a brief description of injury within the past 12 months prior to the study.

Results: The response rate was 3375 of 3792 (89%). There was a significant trend for increasing occurrence of injury with decreasing of HRQOL (P<0.001). Adjusted OR for injury was significantly higher in very low (2.38, 95% CI: 1.45-3.86), low (2.18, 95% CI: 1.34-3.56), medium (1.73, 95%CI: 1.06-2.83) HRQOL groups compared to reference group (very high HRQOL). The median of total HRQOL (P<0.001) and all its domains (P=0.017) (except autonomous functioning) was less in injured group compared to the uninjured one.

Conclusion: This study found an association between HRQOL and unintentional injury among primary schoolchildren. This is a preliminary finding and so further investigations with a well-defined analytical design needs to be done (JPMA 58:674; 2008).

Introduction

Unintentional injury is a leading threat to children's health.[1-3] It is estimated that in some European countries one in four children receive medical attention for an injury each year, in either primary or secondary care.[4] The high proportion of children and young adults and the substantial socio-economic consequences of childhood injuries in less developed countries require prudent attention to the issue of injury control.[5] The identification of the characteristics that contribute to injury risk is critical to the development and evaluation of paediatric injury prevention strategies.[6]

Injuries result from a predictable interaction among host, environment, and injury agents.[6] The significant association of child behavioural characteristics with injury risk supports recommendations by previous researchers that child behavioural characteristics be considered as a potential predictor in childhood injury research.[7-9] There is increasing evidence that children differentially engage in

risk behaviours based on individual-difference characteristics (e.g., behavioural intensity and inhibitory control).[10]

Health-related quality of life (HRQOL) has become recognized as an important health outcome, some contend the most important outcome in child health services research.[11,12] No other study, to our knowledge, has documented association between HRQOL as a personal factor and probability of occurring risk taking behaviour or unintentional injury. However, there are some studies about association between unintentional injury and risk factors related to some domains of HRQOL. For example, the association of self-reported poor health status, poorer ability to concentrate and emotion-based factors with injuries has been investigated.[13,14] Risk taking has been related to aspects of temperament, aggressive behaviour, perceptual analysis skills, beliefs about injury vulnerability and estimation of physical abilities.[15] These risk factors might be used as proxies for HRQOL domains. So, domains of HRQOL and consequently total HRQOL might be associated with occurrence of unintentional injury.

The mechanism of effect of HRQOL on unintentional injury is ambiguous in spite of some associations between domains of HRQOL and occurrence of injury. The relationship between HRQOL and risk taking behaviour or human errors might be other mechanisms of attaining injury.

The aim of this study was to test whether HRQOL was associated with unintentional injuries among children aged 6-10 years.

Methods

From a total of 400 primary schools in Iran, with 128,499 pupils, 76 schools were randomly selected in five different educational districts according to the number of students. Schools were stratified by number of pupils in each one, and by private/state type. From each school 50 pupils (10 pupils in each classroom of year classes one to five) aged 6 to 10 years, were randomly selected. Parents (mothers) of selected pupils were invited to their children's schools on different occasions by an invitation letter. The mothers completed and signed an informed consent form to collect information from them and their children by interviewers. Children living without either mother or both parents were excluded. For each school two trained interviewers completed the questionnaires. There were questions for measuring HRQOL and about demographic characteristics of children, occurrence of unintentional injury, family status and parent's job and education.

For measuring HRQOL 56 items taken from seven domains of TNO AZL child quality of life (TACQOL) parent form were employed.[16] The questionnaire was in English and translated into the Persian language. Seven 8-item scales were physical, motor, autonomous, cognitive and social functioning, positive and negative emotions. In each item, the frequency of occurrence of domains was assessed. All domains were computed by totaling "always," "often," "only within the past few weeks," "occasionally," and "never." Items were scored by assigning a value of 5 for "always" to 1 for "never" for positive well-being items (e.g., social functioning) ,and 5 for "never" to 1 for "always" for negative well-being items (e.g., negative emotions). Total scales of HRQOL scored from 56 to 280 (8-40 for each domain), with higher score indicating better HRQOL. The reason for this type of categorization was clarifying association between HRQOL and unintentional injury and probability of calculating odds ratio. More details about the measuring of children's HRQOL are available elsewhere.[17]

Information on children's unintentional injuries within the past 12 months prior to the date of study was collected from parents. There were questions on occurrence, cause and a brief description about the injury. We defined that an injury event, to be counted, must have caused the person to go to a hospital or clinic, resulting in medical attendance, so only moderate to severe injuries were included while 'mild to some moderate injuries' were excluded. Data of unintentional injury reported by parents were confirmed by 17 accident and emergency departments in the city. The definition of unintentional injury used in this study followed the International Classification of Diseases-version 10 (S00-T98 and V01-Y98).[18]

Statistical package for social sciences (SPSS-version 11.5) was employed for all data analyses. Mann-Whitney test was used to compare HRQOL and its seven domains in injured and uninjured children because the data of HRQOL were severely left skewed. There was not any standard base for categorization of HRQOL in literature review. Scale reliability for Persian questionnaire was assessed by Cronbach alpha.

The association between HRQOL and occurrence of unintentional injury was assessed using binary logistic regression. Child's sex and age, birth order, number of children in family and mother's education level were supposed as probable confounding variables. The association between occurrence of injury and these variables were explored by univariate analysis. Only significant variables were controlled to assess the association of each level of HRQOL and injury events. Results are presented as cross-tabulations, unadjusted and adjusted odds ratio (OR) with 95% confidence interval (CI). Chi square trend test (linear by linear association) was employed if there was a trend for children with lower HRQOL to have a higher incidence of injury. There was

little missing data in this study which did not have any effect on the results.

Results

Children were categorized into five ordered groups as quintiles for amount of HRQOL: 56-225 (very low), 226-245 (low), 246-259 (medium), 260-269 (high), 270-280 (very high). The Cronbach alpha was 0.74, 0.75, 0.73, 0.81, 0.89, 0.73, 0.90 and 0.77 for total HRQOL, body, motor, cognitive, autonomous, social functioning and positive and negative moods, respectively.

The response rate was 3375 of 3792 (89%). The mean age of mothers and their children were 34.9±6.4 years, and 7.9±1.5 years, respectively. Overall, 3264 (96.7%) children were living with both parents, and 49.3% were males.

Table1: Number (%) and 95% confidence interval of injury event by child's sex, mother's educational level, child's birth order and number of children in family.

	Total number	Number (%) of injury event	95% CI	P value
Sex:				<0.001
Male	1663	134 (8.1%)	(6.8-9.4)	
Female	1712	75 (4.4%)	(3.4-5.4)	
Mother's educational level:				0.339
Illiterate	556	26 (4.8%)	(3.0-6.6)	
Primary	975	71 (7.3%)	(5.7-8.9)	
Middle	610	34 (5.6%)	(3.8-7.4)	
High school or higher	1220	78 (6.4%)	(5.0-7.8)	
Child's birth order:				0.260
1	959	53 (5.5%)	(4.2-6.8)	
2 and 3	1278	90 (7.1%)	(5.7-8.5)	
>3	1131	64 (5.7%)	(4.3-7.1)	
Number of children in family:				0.404
1 and 2	1042	66 (6.4%)	(4.9-7.9)	
3 and 4	1296	86 (6.7%)	(5.3-8.1)	
>4	1037	55 (5.4%)	(4.0-6.8)	

* Total numbers reported are less than total subject numbers (3375) and injury events (210) due to incomplete reporting

Of all the parents who participated in the study, 210 reported their children's injury event within the past 12 months prior to the date of study. The incidence rate (I.R) of unintentional injury was 6.2% (95%CI: 5.5-7.1%, n=3375). The top five causes of unintentional injuries were from falls (51.6%, I.R= 3.2%, n=108), transport accidents (25.1%, I.R=1.6%, n=53), struck by thrown, projected or falling object (11.2%, I.R=0.7%, n=24), poisoning (5.1%, I.R=,0.33%, n=11) and burns and scalds (4.7%, I.R=0.3% , n=10).

Total scales were scored from 56 to 280 (8-40 for each domain), with higher score indicating better HRQOL. The incidence rates of unintentional injury were 8.3%, 7.9%, 6.3%, 5.0% and 3.7% for very low, low, medium, high and very high groups of HRQOL, respectively. The linear-by-linear association indicated that there was a significant trend for increasing occurrence of injury with decreasing of HRQOL (P<0.001).

Table 2: Association between levels of HRQOL* and occurrence of unintentional injuries among children within the year prior to the date of data collection.**

	Unadjusted OR	P Value	Adjusted OR***	P Value
HRQOL**				
Very high (n=649)	1.00		1.00	
High (n=661)	1.37 (0.80-2.31)	0.247	1.4 (0.82-2.36)	0.215
Medium (n=719)	1.73 (1.06-2.83)	0.033	1.73 (1.06-2.83)	0.033
Low (n=680)	2.22 (1.35-3.60)	0.002	2.18 (1.34-3.56)	0.002
Very low (n=661)	2.34 (1.43-3.82)	0.001	2.38 (1.45-3.86)	0.001

* HRQOL scores were 56-225 for very low, 226-245 for low, 246-259 for medium, 260-269 for high, and 270-280 for very high.
** The incidence rates of unintentional injury were 8.3%, 7.9%, 6.3%, 5.0% and 3.7% for very low, low, medium, high and very high groups of HRQOL, respectively.
*** Adjusted by sex.

The incidence rate of unintentional injury in boys was more compared to girls (8.1% versus 4.4%, P<0.001). Children's mean age, mother's educational level, child's birth order and number of children in family were not significantly different between injured and uninjured groups. (Table 1). Unadjusted OR of injury event and adjusted OR by sex were calculated for each level of HRQOL. OR was significantly higher in very low, low, medium HRQOL groups compared to reference group (very high HRQOL). There was no significant difference between very high and high HRQOL groups (Table 2).

HRQOL and its seven domains were compared among injured and uninjured groups. The median of HRQOL was less in injured group compared to uninjured ones (P<0.001). All domains of HRQOL were significantly less in injured groups except for domain of autonomous functioning (Table 3).

Table 3: Comparison of HRQOL median and its domains among injured and uninjured children.

	Injured (n=210)		Uninjured (n=3165)		P value
	Median	IQ Range*	Median	IQ Range*	
Body functioning	36	7	39	5	<0.001
Motor functioning	39	4	40	3	0.010
Autonomous functioning	40	4	39	5	0.131
Positive emotions	34	9.25	36	10	0.017
Negative emotions	33	8	35	7	<0.001
Cognitive functioning	36	8	38	7	0.007
Social functioning	37	6	38	5	0.005
Total HRQOL	245	35.25	254	34	<0.001

* IQ Range: Inter Quartile range.

Discussion

This is the first study, to our knowledge, aimed to assess association between HRQOL and occurrence of unintentional injury in this group of children. The results suggest that level of HRQOL and its domains (except autonomous functioning) for injured children are significantly less compared to uninjured group. Also, there was a trend for children with lower HRQOL to have a higher incidence of unintentional injury. Similar to other studies,[13,14,19-21] males had higher injury rates than females and the most frequent cause of injury was a fall.

The high response rate (89%) gives credibility to the results of our study. It was a population-based study and the subjects should be a good representation of the children in the city.

There are few similar studies in literature to be employed for comparing our findings with students in primary schools in this community. Some risk factors of unintentional injury related to domains of HRQOL have been assessed in different studies. For example, self-reported poor health status reported as a risk factor in school children, is related to body functioning domain of HRQOL.[13]

Findings show that cognitive factors predict childhood injury.[1,7] Cognitive factors influence children's decisions about engaging in behaviours that threaten their safety.[1] The judgment of risk is related to self-reported risk taking behaviour.[19,22] Children who underestimate the environmental risk or overestimate their physical activity have a higher rate of unintentional injury.[19,20,22] Also, difficulty in concentration or easy diversion of attention increases the risk of injury.[13] These risk factors might be related to cognitive functioning domain of HRQOL.

There are some probable risk factors related to positive and negative emotions and social functioning domains of HRQOL. For example, temperament is associated with child unintentional injury risk.[15,19,20] In addition, aggressiveness, oppositional, impulsive and under-controlled behaviour predict an increase risk of subsequent and concurrent injury event.[7,15,19,22] Antisocial behaviours, discipline problems and disruptive behaviours are other risk factors of injury.[7,10,23]

Few published studies have carefully considered how individual differences in motor ability may lead some children to have increased risk of injury. Available literature examining children's motor ability and possible links to unintentional injury risk is mixed.[24] Autonomous functioning was not different between injured and uninjured children in our study. There was no other study for comparison.

The inherent weakness of cross-sectional studies is applicable to our results. The time of measuring HRQOL and occurring unintentional injury are almost the same although measuring HRQOL at the point of time may determine quality of life in previous time. For this reason, association identified between HRQOL and unintentional injury did not necessarily imply causal relationship and more studies are necessary to document causality relationship.

In this study, the translated questionnaire to Persian language was validated; but, cultural differences with other places in Iran and other countries decrease the generalizability of this study.

In this study, some probable confounders were controlled; but, it was necessary to control more exact variables about parent's surveillance, environmental agents and socioeconomic status as confounders to document effect association between HRQOL and injury event. It was impossible in this study, because it was secondary analyses of data. Some significant results might be due to large sample size; e.g., significant difference of motor functioning between injured and uninjured children.

In this study, maybe some parents could not remember the occurrence of injuries amongst their children or attendance at the hospitals/clinics because of injuries over the year prior to the data collection, which might lead to underestimations of the injury rates.

In this study, children's HRQOL was measured with TACQOL, a developed generic instrument.[24] However, it is noted that each research who purports to address the quality of life actually examines a very narrow and specific set of factors.[17,25]

The best way to decrease incidence of unintentional injury is prevention.[13,19,20] Injury scholars have long debated the relative value of environmentally oriented injury prevention strategies versus person-oriented.[20] This study suggests that preventive strategies, while addressing broader community and environmental risk factors for injuries, need to address the human factors such as quality of life associated with these injuries. Also, it improves the concept of HRQOL application as a predictor. HRQOL is usually used as outcome in research, seldom used as a predictor.[11,12]

In conclusion, this study found an association between HRQOL and unintentional injury. This is a preliminary finding and further investigations with a well-defined analytical design need to be done. If the role of HRQOL as a predictor of unintentional injury is demonstrated by complementary studies, it can be considered in preventive strategies and proper interventions can be designed for control of injury. Children's HRQOL should be applied as a predictor factor for their unintentional injuries and need to be considered on prevention and control of childhood injury programs.

Acknowledgement

The authors would thank Dr. Alireza Abadi, for statistical advice, parents and children who participated in this study and the staff of selected primary schools for their assistance.

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