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Original Article (Pages: 1715-1724)

Association of Socio-economic Status with Injuries in Children Andadolescents:the CASPIAN-IV Study

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Abstract

***Background*:**Childhood and adolescence injuries are still frequently occuring in developing countries. This study aims to assess the association of socio-economic status (SES) with injuriesin Iranian children and adolescents.

***Materials and Methods*:** This multicentricsurvey was part of a national surveillance program, which was conducted in 2011-2012 amongst 14,880 students aged6-18 years. Participants were randomly selected from urban and rural areas of 30 provinces in Iran. Socio- economic status (SES) of participants was categorized to "low", "middle" ,and "high" by using principle component analysis method by considering parental job and education as well as family assets. Prevalence, types and places of injuries were based on the questionnaire of the World Health Organization- Global School-based student Health Survey (WHO-GSHS).Multivariate modelwas used for comparison of variables between SES groups.

***Results*:** Overall, 13486 out of 14880 invited students (response rate: 90.6%) participated in this study.Their mean (SD) age was12.47 (3.36) years.Boys and urban residents constituted the majority of participants (50.8% and 75.6%, respectively). Compared with low SES group, odds of sport injury was higher in students with middle (OR=1.44; 95%CI: 0.92-2.26) and highSES (OR=1.96; 95%CI: 1.27-3.01). Compared to participants withlow SES,odds of home injuries was significantly lower in high SES group (OR=0.78; 95%CI: 0.64-0.95).

***Conclusion*:** This study revealedconsiderable differences in injuries of children and adolescents according to their SES, with higher prevalence of home injuries in low SES families and higher prevalence of sport injuries in middle and high SES levels. When implementing injury prevention programs, such differences should be taken into account.

***Key Words*:** Adolescent, Children, Injuries, Socioeconomic status, Iran.

*Please cite this article as: Kelishadi R, Jari M, Qorbani M, Motlagh ME, Djalalinia Sh, Safiri S, et al. Association of Socio-economic Status with Injuries in Children Andadolescents:the CASPIAN-IV Study. Int J Pediatr 2016; 4(5): 1715-24.

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Received date: Dec 11, 2015; Accepted date: Feb 15, 2016

1- INTRODUCTION

Childhood and adolescence injuries are assumed as kind of controversial issue in developing countries (1, 2). The World health system has made logical progression through prevention and control of communicable diseases; however, many people are still afflicted by injuries, which potentially lead to mental and physical disabilities (3, 4).

The prevalence of injuries is affected by different factors including the place of injury occurrence (5). For instance, most injuries arising at homes and schools, mostly consist of dropping, bone fractures, head trauma, burns, cuts, and vehicle accidents (1, 5-10). On the other hand, paternal addiction, death and education, as well as family population, and separation, play an essential role in the prevalence of childhood injuries (1, 5, 11-13). Furthermore, different studies revealed that fatal and nonfatal injuries were inversely associated with family socio-economic status (SES) (13-23), nevertheless, some other studies did not confirm such association (24-28). Home and school injuries are given some levels of disparity, this study aims to assess the injuries occurring in Iranian children and adolescents according to their family SES.

2- MATERIALS AND METHODS

The present nationwide study was conducted in 2011-2012 in Iran as the fourth survey of a National school-based surveillance program entitled "Childhood and Adolescence Surveillance and PreventIon of Adult Non-communicable disease"(CASPIAN-IV) study. The methodology and executive details of the studyare previously reported (28, 29), here in some essential points are briefly reported .

2-1. Study Design and Population

The study population consisted of school students living in rural and urban areas of 30 provinces of Iran. Overall, 14,880 students were selected by multistage, and cluster sampling method. Each province consisted of 48 clusters and every cluster included 10 students. The population of each province was classified in accordance with the student's educational levels and living area (urban vs. rural). The educational levels of students comprised elementary, Junior high-school, and High-school grades. Sampling strategy, in every province, varied according to the proportion of students in different educational levels and living places; the sample size was equally distributed between genders.

2-2. Measuring tools

Information concerning demographic variables, SES, as well as prevalence, types and places of injuries were provided through Persian version of main questionnaire applied by World Health Organization- Global School-based student Health Survey (WHO-GSHS), which was validated in Iranian population (30).
SES categories were based upon the methodology and data derived from the Progress in International Reading Literacy Study (PIRLS) (31). According to the Principle Component Analysis (PCA) method, SES of participants was based upon following criteria:

- parents' education,
- parents' occupation,
- family possessions of private car and personalcomputer,
- school type of children (public/private),
- type of home (rental/ private).

Average of the scores was calculated for every subject whilst each of the above-mentioned criteria was weighted in accordance with their importance. Extracted scores were divided into tertiles. Subjects, whose SES levels were in the first tertile,were allocated in "low SES". Given the extracted score, similarly,

middle and high SES were defined. Furthermore, specific questions concerning the participants' serious injury/injuries were asked regarding the frequency, causes, and type of unintentional injuries. An injury was defined as makes student miss at least one full day of usual activities (such as school, sports, or a job) or requires treatment by a doctor or nurse. The injuries questions in the WHO-GSHS questionnaire are as following:

- During the past 12 months, how many times were you seriously injured? (Response options were from 0= 0 times to 4= ≥ 4 times),
- Where were you seriously injuried in the last serious injury? (Response options were: a) Home . b) School. c) Street, road, parking . d) Sport places and e) Other places (including restaurants, shops, cinemas and outside the city)(30).

2-3. Ethical consideration

Ethical approval was obtained from Tehran and Isfahan University of Medical Sciences. Participation in the present study was voluntarily. After full description of the study goals and methods, written informed consent and oral assent were obtained from parents and students, respectively.

2-4. Statistical analysis

Quantitative variables were expressed as mean and standard deviation(SD), and qualitative data as percentage. Association between existence of injury and different SES categories were analyzed through Chi- squaretest. The association of SES categories with different types of injuries was evaluated through different logistic regression models. Model I, was a crude model while the others were adjusted for different variables. Model II, was adjusted forage, gender, and living area; Model III, was additionally adjusted for family size, smoking, depression, anxiety, physical activity,physical fight, bullying, victimization, and living with parents or other family members. Results of logistic regression model were presented as odds ratio (OR) and 95% confidence interval (CI). Data were analyzed using survey analysis method.

2-5. Data analyses

For statistical analysis, we used STATA package ver. 11.0 (Stata Statistical Software: Release 11. College Station, TX: StataCorp LP. Package). P-value < 0.05 was considered as statistically significant.

3- RESULTS

The study population consisted of 13,486 individuals, i.e. participation rate of 90.6%. They consisted of 50.8% boys, and 75.6% urban residents. The mean age ofparticipants was 12.47 (3.36) years, without significant difference in boys and girls [12.36 (3.40), and 12.58(3.32) years, respectively]. Most of the participants were in the age group of 11-14 years (34.70%) while 32.26% and 33.04% of them were in the 6-10 and 15-18 years age groups, respectively.

33.47% of the participants were allocated tothe low SES group, whereas 33.09% and 33.44% were categorized to middle and high SES groups, respectively.Variables concerning active smoking, getting into fight, as well as number of injuries and injury prevalence as well as being victim or bullywere more frequent in boys, whereas some variables regarding to depression and anxiety were significantly more prevalent in girls (P=0.001) (**Table. 1**). Overall, 13.93% of the subjects had experienced one injury in the last 12-months while records concerning more injuries (two, three, or at least four in a year) were less frequent (3.34%, 1.55%, and1.41%, respectively). Furthermore, 20.25% (n = 2,645) of the participants had experiencedat least one injury in the previous 12- month.

Overall, 38.87% of the children and adolescents were injured at their home or house yard whilst injuries were less frequent in schools (21.9%). Likewise, injuries were less common in places as streets road and parks (16.6%), as well asin restaurants, shops, cinema, outside the city (14.57%).

Table.2 (please see the table, in the end of article) shows the prevalence of injuries in Iranian children and adolescent by gender and living area. The frequency of injuries were not statistically different between urban and rural areas (20.11% vs. 20.69% respectively, P> 0.05). Among boys, the frequency of home and school injuries were significantly higher in urban than in rural residents (P<0.05). On the contrary, the frequency of home injuries was higher in rural than in urban areas among girls (48.02% vs. 45.14%, respectively, P<0.05). Female students living in rural areas were injuried significantly more at school compare to female students in urban areas (30.35% vs. 19.96%) respectively (P> 0.05).

Table.3 (please see the table, in the end of article) shows the prevalence of injuries in Iranian children and adolescent by gender and SES. Boys, who had low SES, experienced more home injuries. In comparison, their peers, who lived in middle to high SES, were more significantly affected by school and sport injuries, which had mostly occurred in street, road, and parks.

Table.4 (please see the table, in the end of article) shows sssociation of SES with the place of injury in logestic regression models. In univariate model (model-I), the middle and high SES groups were more likely to injuried at street and sport places compared to low SES group.

Furthermore, odds of sport injuries were higher in students with middle (OR=1.44; 95%CI: 0.92-2.26) and high SES (OR=1.96; 95%CI: 1.27, 3.01) in the multivariate model (model-III); on the contrary, multivariate model (model-III) analysis demonstrated that in comparison to subjects allocated in low SES, those living in high SES had significantly lower odds of home injury (OR=0.78; 95%CI: 0.64, 0.95).

Table 1. Characteristics and basal information of participants: the CASPIAN-IV study

Frequency (%)	Boys	Girls	Total	P-value
Living area				
Urban	74.89	76.27	75.57	0.505
Rural	25.11	23.73	24.43	
Birth order				
First	40.90	40.86	40.88	0.275
Second	28.43	27.63	28.03	
Third	14.28	13.71	14.00	
Fourth and more	16.39	17.81	17.09	
Family size				
Equal or less than 4 persons	50.17	47.64	48.92	0.064
More than 4 persons	49.83	52.36	51.08	
Living with parents				
None of them	1.41	1.34	1.38	0.543
One of them	4.34	4.80	4.57	
Both of them	94.25	93.86	94.06	
Physical activity				
Mild	28.75	39.61	34.11	0.001
Moderate	35.62	37.97	36.78	
Vigorous	35.62	22.42	29.11	

SES				
Low	33.18	33.77	33.47	
Middle	32.67	33.52	33.09	0.574
High	34.15	32.71	33.44	0.001
Active smoking	3.50	1.66	2.59	
Depression	19.17	22.88	20.99	0.001
Anxiety	21.63	28.87	25.2	0.001
Victim	29.46	25.2	27.36	0.001
Bully	20.72	14.31	17.56	0.001
Physical fight	48.43	31.18	39.94	0.001
Injury	25.74	14.58	20.25	0.001
Number of Injury				
One time	17.53	10.21	13.93	
Two times	4.35	2.32	3.35	0.001
Three times	2.10	1.00	1.56	
Four times	1.78	1.05	1.42	
Place of injury				
Home	34.26	47.25	38.87	
School	21.55	22.53	21.9	
Street, road, parking	19.33	11.63	16.6	0.001
Sport places	10.03	4.47	8.06	
Others[a]	14.82	14.12	14.57	
[a]includingrestaurants, shops, cinemas, outside the city.				

4- DISCUSSION

This study documented significant differences in injuries of children and adolescents according to their SES. Home injuries were more frequent in participants with low SES, whereas sport and school injuries were more frequent in those with middle and high SES. Most of the previous studies documented inverse association of injuries in children and adolescents with the family SES; however this finding is controversial (14-26, 32). The current findings are consistent with some previous studies in showing higher frequency of injuries in boys than in girls, but without significant difference in urban and rural areas. (5, 6, 33-36). Moreover, our findings are in line with some previous studies that showed the home and school were the most frequent places of injuries (1, 5, 6, 33-36). Our results demonstrated that home injuries happened as falls, cuts, as well as direct or indirect burns, whereas most of the school injuries occurred due to having a fall on pitches. Therefore, more attention should be paid to the issues, which concern of home and school safety.

Our findings were in accordance with some of the previous results in showing higher prevalence of injuries in low SES groups (16, 22). In the current study, injuries occurred 1.37 times more frequently in low SES children and adolescents than in their counterparts with middle and high SES families. It seems that children and adolescents fail to take the advantages of opportune and tailored pitches when they live in low SES families (16, 20, 22, 37). However, different studies demonstrated that children and adolescents living in high SES families used more opportune pitches whereas their peers living in middle and low SES did not afford the tailored sports fields (20, 37, 38). On the other hand, leisure sport facilities are less available for low SES groups. Our study, as well as some of the previous reports, demonstrated that prevalence of children and adolescents' injuries arising in streets or parking lots increased in inverse proportion to the subject's SES (18, 21). It seems that the association between traffic injuries and family SES may be induced due to their

life styles, environmental conditions, as well as community culture, and urban structure. Nevertheless, some other studies documented direct association between traffic injuries and the subject's SES (25, 39). This discrepancy might be attributed to methodological approaches:

- data sources, which could be comprised outpatient clinics, hospitals as well as schools and community;
- evaluation of SES; and
- bias occurred due to clinic feasibility for different SES groups.

To elaborate, medical reports hardly concerned mild injuries when the population study was evaluated through clinics and hospitals. On the other hand, access to medical clinics is restricted to those persons living in poor areas. Therefore, these individuals have been reluctant to be treated in the medical clinic unless they had serious injuries (14, 40).

Injuries are assumed as the most important cause of mortality in children and adolescents; they also impose high expenditures, which generally occur due to subject breakdown and basic needs being indispensable for medical care. Fortunately, home and school injuries are preventable. Parents, as well as children and adolescents should be trained how to take wise precaution to prevent unintentional injuries (41, 42). Moreover, opportune and tailored strategies, which aim to encourage the children and adolescents to take part in age-related physical activities, should be adopted. Furthermore, physical activities should be implemented, when medical facilities and enough security as lifeguard are available.

4-1. Study limitations and strengths

The cross-sectional nature of our study and application of self-reported data are the main limitations of the current study. However, the nationwide coverage of the study, the large sample size, and using valid international questionnaire could be mentioned is the main n strengths of this study.

5- CONCLUSIONS

The current findings revealed considerable differences in injuries of children and adolescents according to their SES, with higher prevalence of home injuries in low SES families and higher prevalence of sport injuries in middle and high SES levels. When implementing injury prevention programs, such differences should be taken into account; more appropriate strategies aiming the promotion of tailored interventions should be adopted.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

We would like to thank the staff of the Universities of Medical Sciences who contributed with this nationwide study. We also acknowledge the students, parents, and school staff, who efficiently collaborated in this resaech. This study was conducted as part of a national school-based surveillance program.

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Table 2. Prevalence of injuries in Iranian children and adolescent by gender and living area: the CASPIAN-IV study

Variables		Boys		P-value	Girls		P-value	Total		P-value
		Urban	Rural		Urban	Rural		Urban	Rural	
Injury	No	73.86	75.44	0.37	86.00	83.56	0.10	79.89	79.31	0.64
	Yes	26.14	24.56		14.00	16.44		20.11	20.69	
Place of injury	Home	33.46	36.82	0.001	48.02	45.14	0.003	38.50	39.97	0.001
	School	20.63	24.47		19.69	30.35		20.30	26.70	
	Street, road, parking	18.90	20.67		11.61	11.67		16.38	17.26	
	Sport place	11.18	6.41		5.524	1.556		9.22	4.57	
	Others[a]	15.83	11.64		15.16	11.28		15.60	11.5	
[a]including restaurants, shops, cinemas, outside the city.										

Table 3. Prevalence of injuries in Iranian children and adolescents by gender and socio-economic status: the CASPIAN-IV study

Variables	Injury	Boys SES			P-value	Girls SES			P-value	Total SES			P-value
		Low	Middle	High		Low	Middle	High		Low	Middle	High	
Injury	No	74.35	73.91	75.60	0.49	86.21	83.82	86.51	0.06	80.24	78.86	80.86	0.12
	Yes	25.65	26.09	24.40		13.79	16.18	13.49		19.76	21.14	19.14	
Place of injury	Home	39.92	31.89	32.18	0.001	52.13	47.88	44.07	0.07	44.16	38.01	36.24	0.001
	School	21.28	18.57	24.90		23.05	21.52	22.22		21.89	19.70	23.99	
	Street, road, parking	18.27	24.02	15.52		8.16	14.55	11.11		14.76	20.39	14.02	
	Sport places	6.59	10.13	13.79		2.13	3.93	6.29		5.04	7.76	11.24	
	Others[a]	13.94	15.38	13.60		14.54	12.12	16.30		14.15	14.14	14.52	
[a]including restaurants, shops, cinemas, outside the city													

Table 4. Association of socioeconomic status with the place of injury in Iranian children and adolescents: the CASPIAN-IV study

SES categories		Injury place				
		Home	School	Street, road, parking	Sport places	All places
		OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Middle SES/ Low SES						
Model I[1]	Reference	0.93(0.79,1.10)	0.98(0.78,1.22)	1.50(1.17,1.92)*	1.67(1.10,2.54)*	1.08(0.83,1.42)
Model II[2]	Reference	0.94(0.79,1.11)	1.04(0.82,1.32)	1.52(1.18,1.96)	1.56(1.01,2.40)*	1.00(0.76,1.32)
Model III[3]	Reference	0.91(0.76,1.09)	0.89(0.70,1.13)	1.43(1.10,1.86)	1.44(0.92,2.26)*	1.00(0.75,1.33)
High SES/ Low SES						
Model I[1]	Reference	0.78(0.65,0.94)*	1.05(0.84,1.32)	0.91(0.68,1.21)	2.14(1.45,3.16)*	0.98(0.73,1.31)
Model II[2]	Reference	0.78(0.65,0.94)*	1.15(0.90,1.46)	0.91(0.68,1.22)	1.87(1.25,2.81)*	0.86(0.64,1.17)
Model III[3]	Reference	0.78(0.64,0.95)*	0.97(0.76,1.25)	0.94(0.69,1.29)	1.96(1.27,3.01)*	0.87(0.64,1.20)

[1]Crude models, without adjustment;
[2]Adjusted for age,gender, and living area;
[3]Additionally adjusted for physical activity, birth order, family size, living with parents, smoking, depression, anxiety, victim, bully, physical fight;
*P<0.05