



Home Injury Prevention in Children: Attitude & Awareness of the Caregivers at King Abdul-Aziz Medical City - Pediatric Emergency, Riyadh, KSA

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Authors' contributions

This work was carried out in collaboration between all authors. Author MAM was the principal investigator of the research project, responsible for designing of the entire research work and overall write-up. Author NAH was responsible for computing results. Author AAQ was involved in supervising the fellows and collection of data. Authors SAF, BAZ and REJ were the Pediatric Emergency fellows, King Abdullah Specialist Children Hospital, who were involved in proposal writing and data collection. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Home injuries in children are considered as avoidable events, provided the preventable and risk factors identified. In order to assess the awareness and attitude of the caregivers who visited pediatric emergency department of a quaternary hospital, a survey was conducted regarding caregiver's perception about the risk and preventive factors and its relation to various home injuries in children.

Methodology: A validated self-report questionnaire with 55 close ended questions was distributed to the 579 caregivers, who visited the pediatric emergency department.

Results: Caregivers are well aware about the mortality and morbidity related home injuries in children. Though their knowledge about home injuries in children is considered to be adequate, their attitude towards injury prevention needs to be addressed. The perceptions about incidents like falls at home (33.9%), toxin ingestion (5.7%), burns (15.7%), drowning (8.1%), baby walker

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(19.5%) and television (TV) fall injuries (6.9%) are found to be statistically significant with related preventable and risk factors.

Conclusion and Recommendation: It is concluded that parents and caregivers are willing to be, and need to be, better educated about various preventive and risk factors of home injuries in children. They need to be further educated for attending workshops on injury prevention as 97.4% of the care givers have never been to any workshop. This study also urges the need for injury prevention outreach programs across the country. Educational efforts and preventive measures made at international level for parental awareness of home injuries and safety measures are proved to have a major impact on the caregivers' practice and knowledge toward home safety measures.

Keywords: Home injury; caregivers; children.

1. INTRODUCTION

Healthy children are considered the building block for a nation's development and it follows the responsibility of every parent to contribute by safeguarding their children. The famous Benjamin Franklin axiom "an ounce of prevention is worth a pound of cure" is applicable here when it is about injury prevention in children. Unintentional injuries are the major cause of death in children aged 1 to 19 years and are the fifth notable cause of death amongst infants in USA [1]. In younger children from Brazil, most injuries happen at home, where they spend most of their time [2]. Many home injuries that involve children under 5 years old (Canada) are caused by fall from heights, burns, scalds and poisonings and are preventable by the removal of particular hazards [3]. It was observed from a study of 0-14 years of age group that, 51.9% of injuries took place at home and the younger the child, the higher the frequency of household injuries in Argentinas [4]. The National Safe Kids Campaign in the United States reported that 40% of deaths and 50% of non-fatal unintentional injuries occur in and around the home [5]. Accidents that occur at home are considered as a major cause of mortality and morbid injuries in children (UK) [6,7]. Different type of injuries, thus far reported from Saudi Arabia are traumatic head injuries [8], traumatic injuries [9].

Educational efforts and preventive measures made at international level for parental awareness about home injuries and safety measures are proved to have a major impact on caregivers' practice and knowledge towards home safety measures [10,11]. With a broad approach domestic injuries analysis can reflect the character and lifestyle of people. It was found that home is the most common injury site followed by road traffic accidents in pediatric patients, in those who were presented to Saudi

Arabian emergency departments [12]. Understanding the mechanisms of home injury in children is a key concern for caregivers, there is a dearth of data assessing the knowledge and attitude of caregivers regarding various aspects of home injury. We believe that one of the confounding factor for children's home related injuries include lack of knowledge of caregivers in using home safety measures. Prevention of home injury in children should be considered as a nation's developmental goal.

In order to obtain the level of awareness and attitude of the caregivers who visited pediatric emergency department of King Abdulaziz Medical City (KAMC), we did a survey during last week of January, 2014 to February third week, 2014 that looked caregiver's perception about the risk and preventive factors and its relation to various home injuries in children.

2. METHODOLOGY

Institutional Review Board of King Abdullah International Medical Research Centre, Ministry of National Guard Health Affairs, had given the ethical clearance for the study. This cross sectional survey was conducted in the pediatric emergency department of KAMC, which is a level 1 trauma care center and one of the largest specialized pediatric emergency department in the Arab gulf region. A validated self-report questionnaire was developed to assess parents' awareness and attitude toward home injury prevention. The validation of the questionnaire was done into two steps: (1) Initially we asked two pediatric emergency consultants who were experts in trauma sciences to evaluate the questionnaire relevancy to the outcomes that needed to be measured and also accuracy and clarity of questions. (2) The second step included asking two of the pediatric emergency fellows to read it and assess the simplicity and clarity of

questions and give independent reports. The survey consisted of 55 close ended questions with response of "yes" or "no" for most of the questions (56 percent). It evaluated parents awareness and attitude related to falls at home, toxin ingestion, drowning, baby walker and television (TV) fall injuries and sources for home injury prevention information. Informed consent was obtained from the participating parents. Pediatric emergency physicians (residents, fellows and consultants) distributed the questionnaires to the caregivers of patients of 0 to 14 years of age group, arrived the emergency department. All non-direct caregivers were excluded from the study. The sample size calculated was 566 with a confidence level of 95 percent and confidence interval of 4 percent. 10 percent of the sample size was added to overcome incomplete questionnaires. Statistical Package for the Social Sciences (SPSS) Version 20 was used for statistical analysis. The categorical variables on the questionnaire were presented as frequencies and percentages. Logistic regression analysis was used to predict the outcome variable by the risk factors. Chi square analysis was also done to test the statistical significance of the association between different type of injuries and various factors. A value of less than 0.05 was taken as significant.

3. RESULTS

Out of the 579 respondents, 46.6% of caregivers were parents (both father and mother), 24.5% of the caregivers were fathers, 24% of them were mothers and the remaining 4.9% were grandfathers and other relatives. The demographic characters are detailed in Table 1. Majority of them (77.5%) were aged between 20 to 40 years. Forty one and three tenths percent of them were educated up to high school level and 39.9% of them were university graduates (Fig. 1). Sixty three and seven tenths percent of them had a monthly family income ranging from 3000 Saudi riyals up to 10000 Saudi riyals. The majority of them (53.9%) were residing in apartments and 40.8% of them were in villas. Caregiver's knowledge level about causes of death was analyzed and it was observed that 30.1% of them marked trauma as the leading cause, 23.3% with various illness, 20.4% with congenital diseases and 26.2% of them were not sure about the causes of death in children (Fig. 2). When the respondents awareness level on causes of hospitalization of children was assessed, it was revealed that 48% of the

caregivers responded to fall injuries as the common cause, 25.4% of them responded unintentional poisoning as the reason, 16.2% were not sure about the causes, 6.4% responded burns as the cause and 4% of them reported drowning as the reason for hospitalization (Fig. 3). The survey assessed injury prevention practices by the respondents and observed that 97.4% of the caregivers believe that leaving children alone at home is unsafe, whereas 2.6% do leave them alone. Eleven and six tenths percent of the respondents admitted that their babysitter is younger than 14 years of age, which is not a safe practice. There is no legislative law that stated the youngest age allowed for baby sitting in the country, however; we select this age according to the culture of Saudi Arabia for commitment and capability to do babysitting. Eighty seven and two tenths percent of them visited the hospital for less than 5 times due to injury, whereas 12.8% of them have visited for more than 5 times (Fig. 4). Descriptive statistics of history of various injuries reported at home presented 33.9% with fall injuries, 5.7% with toxic ingestion, 15.7% with burns, 8.1% with drowning injuries, 19.5% with baby walker related injuries and 6.9% with TV fall injuries (Fig. 5).

A logistic regression was performed to ascertain the effect of care giver's age, education, monthly income, type of housing, leaving the child alone at home and babysitters younger than 14 years of age on the likelihood that children have fall injury. The logistic regression model was statistically significant (Chi square= 13.369, p value= 0.003). The care giver's age was associated with the child exhibiting fall injury [p value= 0.009, Odd's Ratio (OR) = 3.3 and Confidence Interval (CI) = (1.341, 7.955)]. Since the majority (75%) of the sample size with fall injury falls in 20-40 years of age group, further risk factors were analyzed and found to be statistically not significant. A Chi square test was performed to assess the relationship between reported history of fall and presence of gates at the entrance to stairways. It was observed that children living in houses with no gates at the entrance to stairways had 2 times more risk for falls than those with gates, which was found to be statistically significant [Chi square= 14.412, p value =0.001, OR= 2, CI = (1.402, 2.919)]. Statistical significance was also found between reported history of fall and presence of window guards. [Chi square= 16.957, p value =0.001, OR= 2, CI = (1.402, 2.919)]. Toxin ingestion was reported in 5.7% of children. Logistic regression

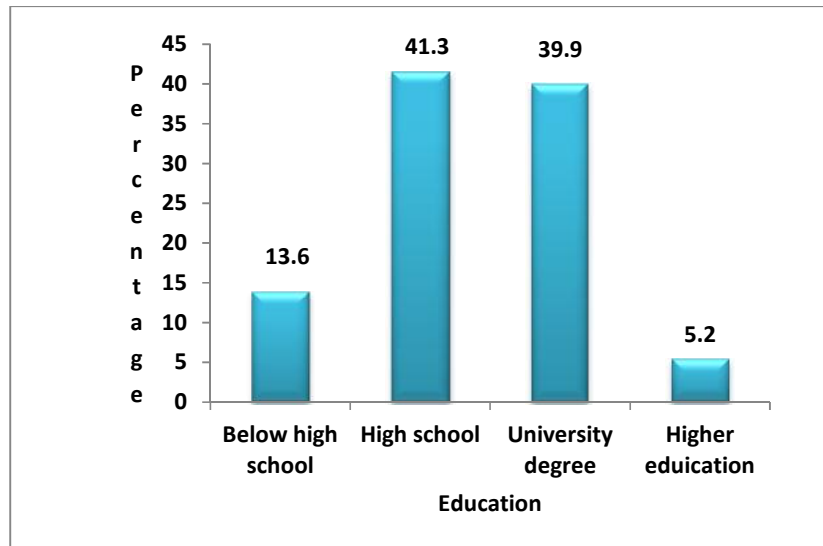


Fig. 1. Bar diagram showing educational status of caregivers

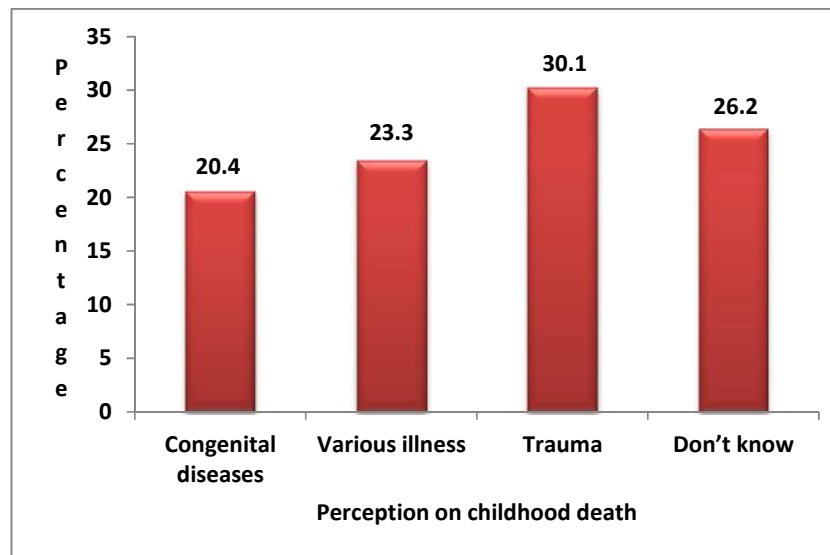


Fig. 2. Bar diagram showing perception of caregivers regarding childhood deaths

analysis showed that children looked after by babysitters of age less than 14 years were at high risk for toxin ingestion [p value= 0.005, OR = 3.2, CI = (1.41,7.49)]. Majority (60.6%) of the toxin ingestion insults happened in villas whereas 30.3% occurred in apartments and 9.1 % in traditional houses which was found to be statistically significant (Chi square= 7.906, p value = 0.019). Seventy eight and eight tenths percent of the children with toxin ingestion had elders at home, taking medicines (Chi square= 6.581, p value = 0.010). Statistical significance was also found between reported toxin ingestion

and not discarding old medicines. Thirty and three tenths percent of the toxin ingestion was due to not discarding the old medicines (Chi square = 21.547, p value = 0.001). Other factors like, chemicals kept at home, whether the toxins are reachable to children and safety caps on bottles of medicine were not statistically significant. Those factors were not considered as risk for toxin ingestion in the responders' view which Contradict the literature proof and mandate more organized prevention educational program. Fifteen and seven tenths percent of the respondents reported the history of burns with

their children. Logistic regression analysis showed that children looked after by babysitters of age less than 14 years are having 2 times more risk to get burns than others. [p value= 0.044, OR = 2, CI = (1.02,3.50)]. Other factors were not statistically significant (p > 0.05). Chi square test was used to find the association between injury due to burns and risk factors. The variables like smokers at home, allowing children less than 6 years in kitchen during cooking, keeping electric equipment out of children's reach and locked were statistically significant (p <0.05). The Chi square test also showed statistical significance between injury due to burns and preventive factors like keeping cigarettes and matches out of children's reach, keeping the handles of pots & pans out of children's reach, checking the temperature of hot

water, and ensuring a closed gas cylinder. Table 2 shows the Chi square value, OR, 95% CI for OR and p value for various risk factors and preventive factors of burns.

Drowning was reported in 8.1% of children. Statistical significance was found between history of drowning and babysitters of age less than 14 years. [p value= 0.039, OR = 2, CI = (1.04, 4.81)]. Factors like presence of bath tub, leaving the child alone in bath tub and lack of supervision were statistically not significant. Although the findings contradict reports available in the literature, our observation might be due to less number of cases available. Nineteen and five tenths percent of the caregivers mentioned baby walker injuries. It was found that 29% (33/113) of the injuries due to baby walker was

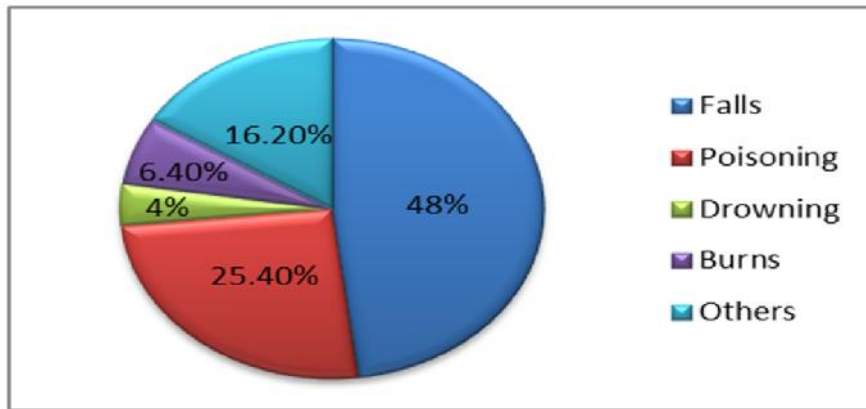


Fig. 3. Pie diagram showing awareness of causes of hospitalizations

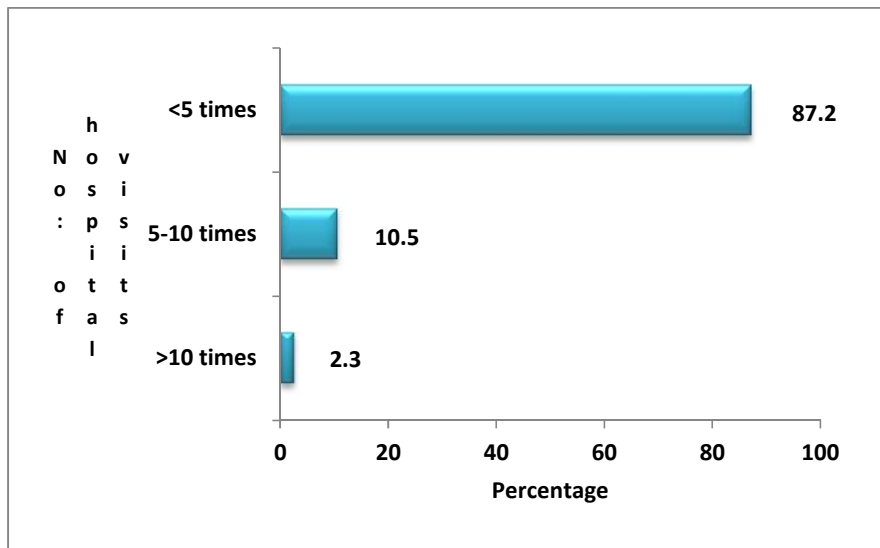


Fig. 4. Bar diagram showing the number of hospital visits of children

associated with lack of supervision which was statistically significant with Chi square = 23.643, p value= 0.001, OR = 3.284 and CI = (1.997, 5.401). TV fall injury was reported in 6.9% of children. Logistic regression analysis showed that those care givers who are poorly educated had an increased likelihood of children injured by TV fall (p value = 0.010) with an OR of 3 and CI (1.139, 4.913). Fifty five percent (22/40) of the TV fall injuries occurred when it was on the stand with Chi square = 5.465 and p value < 0.05 (0.019) which was statistically significant. Significance was also found between type of TV

and injury. Fifty seven and five tenths percent cases reported the fall of old heavy TV (Chi square= 57.616, p value= 0.001). The care givers reported that 54.1% of them received the information about injury prevention through media, 43.5% got the information from physicians and 2.4% gathered information through self-search. Majority (97.4%) of the caregivers have never been to any workshops on injury prevention in children whereas 2.6% of them have attended workshops on injury prevention. Percentage distribution of causes of injury and injury types are shown in Fig. 6.

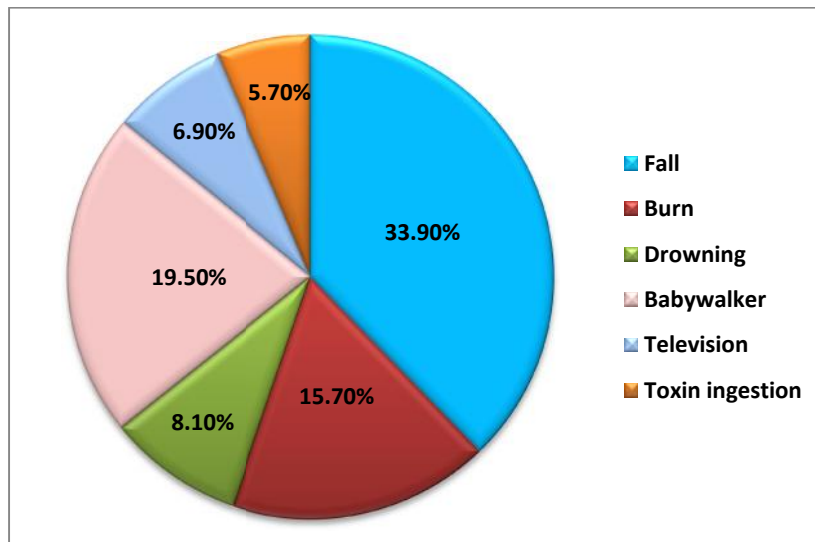


Fig. 5. Pie diagram showing the distribution of unintentional injuries

Table 1. Demographic characteristics of caregivers

| Variable | | Frequency | Percentage |
|-------------------------|-------------------|-----------|------------|
| Age (in years) | Below 20 | 42 | 7.3 |
| | 20-40 | 449 | 77.5 |
| | 40-60 | 85 | 14.7 |
| | Above 60 | 3 | 0.5 |
| Education | Below high school | 79 | 13.6 |
| | High school | 239 | 41.3 |
| | University degree | 231 | 39.9 |
| | Higher education | 30 | 5.2 |
| Monthly income (in SAR) | <3000 | 73 | 12.6 |
| | 3000-10,000 | 369 | 63.7 |
| | 10,000-20,000 | 80 | 13.8 |
| | 20,000-30,000 | 33 | 5.8 |
| | >30,000 | 22 | 3.8 |
| House type | No answer | 2 | 0.3 |
| | Villa | 236 | 40.8 |
| | Apartment | 312 | 53.9 |
| | Traditional house | 31 | 5.3 |
| Total | | 579 | 100.0 |

Table 2. Reported risk and preventive factors of burn injury

| Variable | Burn injury | | | | Total | | Chi square | p value | OR | 95% CI |
|---|-------------|------|-----|------|-------|------|------------|---------|------|-------------|
| | Yes | | No | | No: | % | | | | |
| | No: | % | No: | % | | | | | | |
| Smoker at home | | | | | | | | | | |
| Yes | 40 | 44 | 150 | 30.7 | 190 | 32.8 | 6.078 | 0.014 | 1.7 | (1.12,2.79) |
| No | 51 | 56 | 338 | 69.3 | 389 | 67.2 | | | | |
| Allowing children < 6 years in kitchen during cooking | | | | | | | | | | |
| Yes | 44 | 48.4 | 164 | 33.6 | 208 | 35.9 | 7.244 | 0.007 | 1.8 | (1.17,2.90) |
| No | 47 | 51.6 | 324 | 66.4 | 371 | 64.1 | | | | |
| Iron box reachable to children | | | | | | | | | | |
| Yes | 10 | 11 | 16 | 3.3 | 26 | 4.5 | 10.631 | 0.001 | 3.64 | (1.59,8.31) |
| No | 81 | 89 | 472 | 96.7 | 553 | 95.5 | | | | |
| Keeping electric equipment out of children | | | | | | | | | | |
| Yes | 67 | 73.6 | 410 | 84 | 477 | 82.4 | 5.705 | 0.017 | 1.8 | (1.11,3.18) |
| No | 24 | 26.4 | 78 | 16 | 102 | 17.6 | | | | |
| Keeping cigarettes & lighters out of children | | | | | | | | | | |
| Yes | 74 | 81.3 | 439 | 90 | 513 | 88.6 | 5.669 | 0.017 | 2.05 | (1.12,3.77) |
| No | 17 | 18.7 | 49 | 10 | 66 | 11.4 | | | | |
| Keeping the handles of pots & pans out of children | | | | | | | | | | |
| Yes | 73 | 80.2 | 433 | 88.7 | 506 | 87.4 | 5.041 | 0.025 | 1.94 | (1.08,3.49) |
| No | 18 | 19.8 | 55 | 11.3 | 73 | 12.6 | | | | |
| Checking the temperature of hot water | | | | | | | | | | |
| Never | 29 | 31.9 | 125 | 25.6 | 154 | 26.6 | 7.420 | 0.024 | - | - |
| Sometimes | 50 | 54.9 | 234 | 48 | 284 | 49 | | | | |
| Always | 12 | 13.2 | 129 | 26.4 | 141 | 24.4 | | | | |
| Total | 91 | 100 | 488 | 100 | 579 | 100 | | | | |
| Ensure closing gas cylinder | | | | | | | | | | |
| Yes | 38 | 64.4 | 283 | 85.5 | 321 | 82.3 | 15.297 | 0.001 | 3.3 | (1.76,6.02) |
| No | 21 | 35.6 | 48 | 14.5 | 69 | 17.7 | | | | |
| Total | 59 | 100 | 331 | 100 | 390 | 100 | | | | |

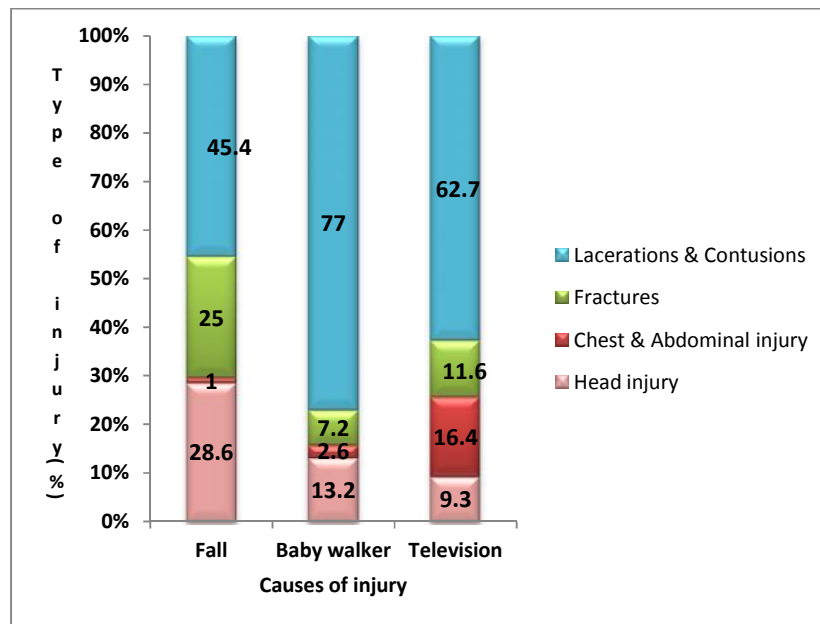


Fig. 6. Percentage bar diagram showing the cause of injury and type of injuries

4. DISCUSSION

This survey was a first of its kind in the Kingdom of Saudi Arabia to assess parents' perceptions about various types of home injury. We looked into the domestic factors like type of caregiver, level of education, monthly income, and type of housing. These domestic factors were related into as risk and preventive factors of injury. Worldwide, falls that occur at home were reported as the most common childhood injury treated at hospitals [13]. This was in accordance with the result of our study, where the majority of the caregivers (48%) correctly identified fall as the primary cause of hospitalization. They also reported that risk of falls is more in houses with no gates at the entrance to stairways, as well as in houses without window guards, which are in association with the findings of Harris et al. [14] and Zielinski et al. [15]. Toxin ingestion was another serious concern that was observed in this survey. The respondents stated that toxin ingestion in children were closely associated with babysitter's age, type of housing, elder persons on medication and disposal of expired medications. The significant association of drug induced toxicity in children that they reported in our survey was on par with the findings of Mutlu M et al. [16] and Werneck G. L et al. [17]. Though no significant toxic ingestion of household chemicals was observed, it could be accountable if they are kept in bathrooms and kitchens, reachable for children. It has to be noted that babysitters need to be educated properly about risk and preventive factors associated with toxic ingestion. Burns are debilitating condition accompanied by severe pain and frequently by long term illness that causes morbidity not just for the child but for the family and community too. In our survey, the respondent's perception was leaving the child with baby sitters of less than 14 years of age carries a high risk towards burn injury, than other factors. The caregivers also believe that, factors like smokers at home, allowing children in kitchen during cooking, irons and other electrical equipment in reach of children carries a high risk for burns in children. They also believe that factors like keeping cigarettes, lighters and hot pans out of children's reach, hot water temperature check and ensuring the closure of gas cylinders considerably prevents the incidence of burns. The caregivers' response about leaving the child with baby sitters of less than 14 years of age and a history of drowning was closely associated. Though factors like presence of bath tub, leaving the child alone in

bath tub and lack of supervision are not closely associated with drowning incidents, parents need to focus on these areas too to avoid unexpected events. Baby walkers are used commonly for small babies, and about quarter of these infants experience an injury related to their use [18]. In our survey, the caregivers perceive a close association between lack of supervision and baby walker injuries and this requires attention because, even with adult supervision the rate of baby walker injuries was very high as reported by Smith et al. [19]. Injuries related to TV falls can lead to significant mortality and morbidity in children. In our survey, the respondents reported their perception that chances of TV fall injuries are more with type of TV and position, if TV is placed on TV stand rather than on wall. This observation is on par with the findings of Rutkoski JD et al. [20], who reported these incidences as a result of poor coordination, while pulling the furniture. Attitude and awareness of parents toward injuries and their preventability in children needs to be considered as a high alert area of this survey. It was observed that majority of the caregivers had an insight about injury prevention in children from either medical professional or from other sources. It was a shocking revelation that almost all of the caregivers have never been to any workshops on injury prevention. This is perhaps due to lack of specific workshops conducted. Hence the need of educational and awareness programs are highly emphasized and is in accordance with Peden M et al. [21], who reported that reductions in child injury mortality have been accomplished in some countries with the application of evidence-based programs based on intensive research and priority-setting, this has no relevance in the local set up. Also the respondents need for educational programs as mentioned is supported by the findings of Rehmani R et al. [22]. Educational efforts and preventive measures made at international level for parental awareness at the about home injuries and safety measures proved to have a major impact on the caregivers practice and knowledge toward home safety measures [10,11].

5. CONCLUSION

Most of the caregivers are well aware about the mortality and morbidity related home injuries in children. Though their knowledge about home injuries in children is considered to be adequate, their attitude towards injury prevention can be improved by extensive lectures. The knowledge

of the speakers in the workshop will have influence on addressing attitude and change in behavior. It can be concluded from this study that the parents and caregivers are willing to be, and need to be, better educated about various preventive and risk factors of home injuries in children. It can also be concluded that to reduce the incidence of home injuries there is a need for injury prevention outreach programs across the country. Comprehensive awareness campaigns, along with governmental and non-governmental organizations for a healthy public policy for child safety environment would foster the development of a culture of safety for children in Saudi Arabia. Educational efforts and preventive measures made at international level for parental awareness about home injuries and safety measures proved to have a major impact on the caregivers practice and knowledge toward home safety measures [10,11].

6. RECOMMENDATION

Child safety and injury prevention is not the sole responsibility of parents and families, because, we cannot exclude the role of elder brothers and sisters, maids in sharing the responsibility of parents equally. We recommend a national home injury prevention program supported by various organizations and government to be involved, that focus on the awareness and attitudes toward improving home safety measures.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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