

Pattern and Proportion of Unintentional Injuries Mortality among Children: A Surveillance Data Analysis from the National Trauma Database

Siti Farhanah Hasnan¹, Nadiah Wan-Arfah², Nyi Nyi Naing^{2*}, Sabariah Faizah Jamaluddin³, Nik Hisamuddin Nik Abdul Rahman⁴ and Siti Azrin Ab Hamid¹

¹Unit of Biostatistics and Research Methodology, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, 16150 USM, Kelantan, Malaysia

²Institute for Community (Health) Development, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia

³Department of Emergency and Trauma, Hospital Sungai Buloh, 47000 Selangor, Malaysia

⁴Department of Emergency and Trauma, Hospital Universiti Sains Malaysia, 16150 Kelantan, Malaysia

ABSTRACT

Unintentional injuries cause huge economic and social burden for the country. To further prevent unintentional injury by different age groups, it is crucial to identify the recent pattern of paediatric mortality. For a start, this study included a retrospective record review of 334 paediatric trauma patients (0-18 years) who were hospitalized due to unintentional injuries. The patient's medical records from the period 2007 to 2010 were obtained from the National Trauma Database (NTrD). The patients were categorized into <1, 1-4, 5-9, 10-14 and 15-18 years of age. Data entry and analysis were accomplished using IBM SPSS version 22. Most of the patients were Malay (78.4%), male (82.9%), died in hospital (33.2%) and total fatality by unintentional injuries for four years rose by nearly 59.5%.

Death occurred with some monthly variance demonstrated with three mortality peaks in March, April and December. The proportion of unintentional injuries death was 33.0% (95% CI 0.28, 0.38). Malay male patients

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E-mail addresses:

ctfarhanah90@gmail.com (Siti Farhanah Hasnan)

wanwaj_85@yahoo.com (Nadiah Wan-Arfah)

syedhatim@unisza.edu.my (Nyi Nyi Naing)

drsabariah@fj@moh.gov.my (Sabariah Faizah Jamaluddin)

hisamuddin@usm.my (Nik Hisamuddin Nik Abdul Rahman)

ctazrin@usm.my (Siti Azrin Ab Hamid)

* Corresponding author

Current affiliation

Nyi Nyi Naing

Faculty of Medicine,

Universiti Sultan Zainal Abidin,

Medical Campus, Jalan Sultan Mahmud,

20400 Kuala Terengganu, Terengganu, Malaysia

Nadiah Wan-Arfah

Faculty of Health Sciences,

Universiti Sultan Zainal Abidin,

Gong Badak Campus,

21300 Kuala Nerus, Terengganu, Malaysia

had higher risk of death compared to female patients. Effective program and preventive measures should be implemented to reduce mortality.

Keywords: Adolescent, children, paediatric, pattern, proportion, unintentional injury

INTRODUCTION

Injury is a major cause of death among children throughout the world which is responsible for about 950,000 deaths in children under the age of 18 years each year (Mathers et al., 2008). The number of unintentional injury keeps rising and what is more worrying is that, the children would suffer the consequences of the injury sustained during their childhood. Previous studies have shown that approximately 60% of the injuries were attributed to unintentional causes compared to intentional causes (Peden et al., 2008; Mendes et al., 2011).

Globally about 3.9 million people (61 per 100,000 population) died every year resulting from unintentional injuries and these injuries caused 6.6% of the global mortality burden of disease (Chandran et al., 2010). Unintentional injury had been accounted for burden of injury related to death and disability (Krug et al., 2000; Al-Abed et al., 2014). Every year tens of millions more were taken to hospitals with injuries that often leave them with lifelong disabilities, as well as significant psychosocial and financial consequences (UNICEF Malaysia Centre, 2006).

Based on Global School-based Student Health Survey (GSHS) Factsheets (2007 to 2012), the proportion of unintentional injuries and violence had increased each year. The percentages of students who were injured during the past 30 days were reported as 50% in Indonesia, 47.7% in Philippines, 27.2% in Thailand and 20.9% in Malaysia (Faisal & Karunan, 2013). For unintentional injuries, approximately 9% of children aged 0-18 years were injured (Otters et al., 2005).

The purpose of this study was to analyse the pattern of unintentional injuries mortality among children aged 0 to 18 years and also to identify how much current injuries require immediate urgent action.

MATERIALS AND METHODS

This retrospective record review study was designed to answer our objective. Participation of the study was limited to those who met the following criteria: (1) Malaysian patients who were admitted to hospital, (2) age 18 and below, (3) injury severity score of more than fifteen, (4) average rate of Glasgow Coma Scale was three to eight, and (5) urgent surgery within twenty-four hours for intracranial, intrathoracic, intraabdominal or fixation for pelvic or spinal injuries and admitted to Intensive Care Units (ICUs) or High Dependency Wards

(HDWs) for more than 24 hours or died from injuries after admission. The reason why severe cases of trauma paediatric patients with poor GCS score were included because it is in line with the objective of our study which is the pattern of paediatric mortality resulted from trauma.

The study was conducted in eight participating hospitals (Hospital Selayang, Hospital Kuala Lumpur, Hospital Sultanah Bahiyah, Hospital Pulau Pinang, Hospital Sultanah Aminah and Hospital Sungai Buloh which contributed the data to National Trauma Database (NTrD). The recruitment and data collection was done concurrently from January 2007 to December 2010.

The sample size calculation was performed using G*Power 3.1 Software (Buchner et al., 2007). Sample size was calculated using a Poisson regression formula. Z test in the test family was selected, followed by Poisson regression. All the information was entered inside the input parameters after selecting 'A priori' for type of power analysis. The parameters included risk assessment $Exp(\beta_1)$ from previous literature, level of significance $\alpha=0.05$, power 0.8 and intercept β_0 . After addition of possible 20% missing data, the final sample size needed was 334. Simple random sampling was applied from the list of all major trauma cases of paediatric unintentional injuries mortality who met the criteria. Sampling was performed in order to ensure that eligible patients were selected by chance and fair enough.

The study was approved by the Human Ethics Committee of Universiti Sains Malaysia (USM/JEPeM/14090315) and Malaysia Research & Ethics Committee (NMRR-15-157-23974).

During the data collection, the registration number of all patients who were admitted to Emergency and Trauma Department were coded and kept separately to safeguard the confidentiality of privacy. Respondents were assured of the anonymity and confidentiality of the information. The data was analysed using IBM SPSS Statistics Version 22. The variables were presented in frequency and percentage. The 95% confidence interval was also reported to estimate the unintentional injuries mortality proportion.

RESULTS

A total of 334 paediatric trauma patients of unintentional injuries were sampled from computerized trauma registration system of National Trauma Database (NTrD). Table 1 showed descriptive statistics of children who experienced unintentional injuries. The total unintentional injuries decreased over four years (Figure 1).

Table 1
Demographic and injury characteristics of respondents (n=334)

Variable	Mortality	
	Alive n (%)	Dead n (%)
Age (years)		
< 1	15 (6.7)	4 (3.6)
1-4	32 (14.3)	11 (9.9)
5-9	34 (15.2)	10 (9.0)
10-14	47 (21.1)	20 (18.0)
15-18	95 (42.6)	66 (59.5)
Gender		
Female	74 (33.2)	19 (17.1)
Male	149 (66.8)	92 (82.9)
Race		
Malay	125 (56.1)	87 (78.4)
Chinese	56 (25.1)	11 (9.9)
Indian	42 (18.8)	13 (11.7)
Time injury (Hours)		
6am-12pm	41 (18.4)	18 (16.2)
12pm-6pm	56 (25.1)	27 (24.3)
6pm-12am	78 (35.0)	41 (36.9)
12am-6am	48 (21.5)	25 (22.5)
Scene injury		
Road	118 (52.9)	91 (82.0)
Home	56 (25.1)	10 (9.0)
Construction Area	6 (2.7)	0 (0.0)
School/Kindergarten/ Nursery	13 (5.8)	2 (1.8)
Recreational area		
Trade area	9 (4.0)	0 (0.0)
Residential institution	5 (2.2)	0 (0.0)
Others	8 (3.6)	4 (3.6)
	8 (3.6)	4 (3.6)

No particular peak hour of the day when deaths occurred was found. The total fatal unintentional injuries for four years rise by nearly 59.5%. Over this period, number of fatal injuries among females increased more than males at age of 5 to 9 years (Figure 2).

Death occurred with some monthly variance demonstrated with three mortality peaks in March, April and December in year 2010 (Figure 3). The proportion of unintentional injuries death was 33.0% (95% CI 0.28, 0.38) (Table 2).

Pattern and Proportion of Unintentional Injuries Mortality

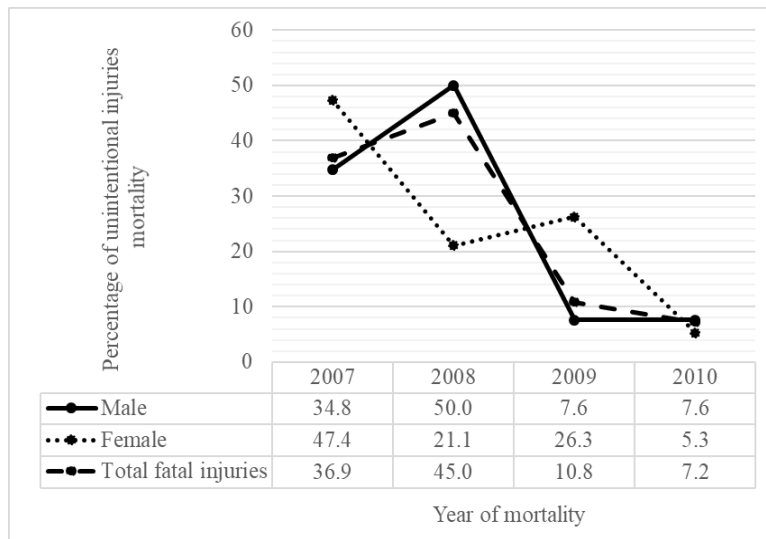


Figure 1. Percentage of unintentional injuries death among children age 0-18 years by year (2007 till 2010)

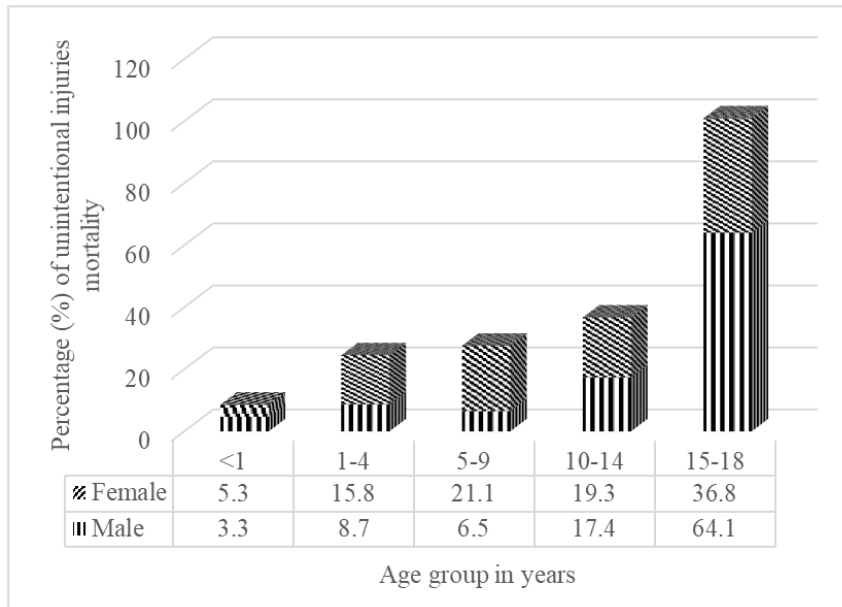


Figure 2. Percentage of unintentional injuries death among children age 0-18 years by age group and gender (2007 till 2010)

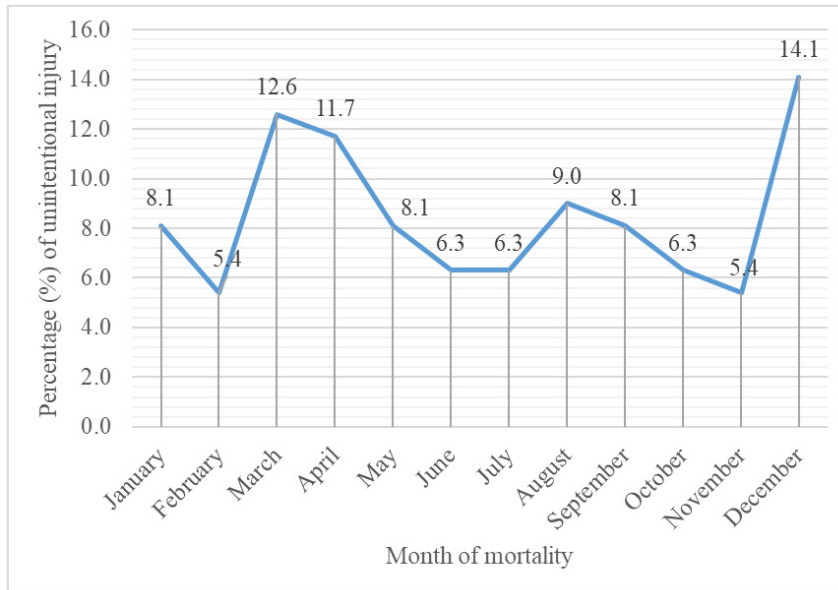


Figure 3. Percentage of unintentional injury mortality among pediatric patients based on month in year 2010

Table 2

Proportion of unintentional injuries mortality based on count data (n=334)

Unintentional Injuries Mortality	p ^a (95%CI)
Death	0.331 (0.28,0.38)

^aproportion

DISCUSSION

This study focused on the descriptive data to see the pattern of unintentional injuries mortality among paediatric patients. Based on the National Registry of Diseases Office Singapore (2014), about 70% of the trauma deaths admitted in the hospitals were males while females only accounted for 31%. In the current study, it showed no specific pattern of unintentional injuries deaths during the study period. The total fatal injuries reached climax state in 2008, in which male accounted for over 50.0% and female was 47.4%.

Meanwhile, the Child Trends Data Bank (2014) presented that there was 25% decline over three years (2007 to 2010) but after 2010 the number of death still continued to decline. The percentage of decline was approximately equal in both gender. However, the current study stated that the number of death due to injuries among all children at birth through 18 years of age had risen by nearly 59.5%. Over this period, a number of fatal injuries among females increased more than males at age group of 5 to 9 years.

The descriptive prospective study by Chalya et al. (2013) analyzed the mortality data for 2010 to 2012 with time-series analysis. They found that patients' road and home accident as the leading cause of unintentional injuries death accounted for 60.7% and 35.3% respectively. The current study also showed similar results in which road-related injuries was the highest and followed by home-related injuries. However, the National Registry of Diseases Office Singapore (2014) report was different from our finding, in which home was the top scene injury (39%) and road was the second rank (30%).

The total fatal injuries reached its climax in 2008 (36.9%), in which the male was accounted for over 50.0% and female was 47.4%. Meanwhile, the Child Trend Data Bank (2014) presented that there was a 25% of decline over three years (2007 to 2010). However, after 2010, the number of death still continued to decline. The percentage of decline was approximately equal in both gender. However, this study stated that the number of death due to injuries among all children age birth through 18 had risen by nearly 59.5%. Based on the data from this study, it was revealed that males had higher mortality than females at age group of 15 to 18 years. The possible reason being the adolescent boys may have been more involved in road-accident especially motorcycle which could have led to higher mortality.

A study of seven-year period was done in Canada in 2013. The study was conducted to investigate the distribution patterns and time trends of overall and cause-specific for unintentional injuries mortality. The study also identified the proportion of death based on mortality data from Canadian Vital Statistics Death Database. The current study showed slightly higher proportion of unintentional injuries which was 33.0% compared to a study done in Canada which was 4.7% (Chen et al., 2013).

Another study conducted by Sekii et al. (2013) showed a relatively higher proportion of unintentional injuries (46.2%) as compared to current study (33.0%). That study in Japan explained the changes of mortality and trend in some variables of interest, which were sex, age and cause of death. It was involved a total of 933 children of unintentional injuries in recent 10 years. Nevertheless, this study involved children with all types of unintentional injuries for only four years.

It was reported by this study that mortality was higher during the months of December, followed by March and April. It could have been contributed by coinciding with school holidays in Malaysia during which unintentional injuries may have occurred with higher incidence.

CONCLUSION

Overall, the injury involves individual's emotional and financial damage, including long or short-term disability, hospitalization and even death. Future studies should involve conducting a prospective cohort study in order to obtain the required data in patients'

behaviour and also the behaviour of patient's family. Such information would increase higher chance of getting the eligible patients to participate.

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