The Changes of Trend and Distribution of Childhood Injury Related Mortality in Tianjin, China, 1999-2011

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The aim of the study was to address the trend and distribution of injury related mortality among childhood in order to identify priority issues with childhood injury in Tianjin.

This retrospective study analyzed the annual all-cause of death records for 1999–2011 provided provincial data of injury mortality including cause, sex, age, and geography. Trend analyses were conducted using Poisson regression.

From 1999–2011, the injury related death was the first leading cause of childhood mortality. The injury mortality rates of children remained around 10-15/100,000 while death rates of male and rural were two- four times more than that in female and urban, also much higher than the total. The unintentional injury was up to over 75% in total. Traffic mortality of age 5-15 had a significant decline trend during the study period.

Traffic mortality decreased in school-age children due to comprehensive traffic safety measures had been implemented and enforced in Tianjin. It is testify that injury death is preventable. More similar efforts will be required to diminish the burden of other injury and the entire population, such as safety education, risk warning, regulation enforcement and facility installation.

Childhood injury; Surveillance; Mortality; Trend

Introduction

Injury is the leading cause of childhood death and a signifcant contributor to childhood morbidity, mortality, long term disability, and healthcare costs worldwide [1,2]. Around 830 000 children die from injuries every year, nearly 2300 each day. Injury is responsible for about 950 000 deaths in children under the age of 18 years each year. Unintentional injuries account for almost 90% of these cases. It is said that more than 1000 of these children could be saved if proven injury prevention measures were applied worldwide [3]. China is a developing country with large population of childhood under 20 years old. Childhood injury has also been a serious public health problem in recent several decades in China [4]. It is estimated that the numbers of child deaths caused by injuries were over 50 thousand per year, and drowning is the frst leading cause of injury mortality among 1-14 childhood [5]. Tianjin is the third largest provincial city of China that is located in the northeast of the North China Plain with the Bohai Sea to its east and Yanshan Mountain to its north, and covers an area of 11,920 square km. T e resident population was over 10 million with 40% urban population and 60% rural population and the proportion of child under 20 is about 22% of the total. T e Tianjin Bureau of Public Health's report shows that over 75% annual childhood injury death was caused by unintentional injury [6]. More children lives could be saved if proven methods is implemented in Tianjin.

T is retrospective descriptive study aimed to identify di ferences and disparities in injury mortality among sexes, ages and geographic with the data collected by the Tianjin All-Cause of Death Reporting System, the epidemiological transitical-ḡg

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Disease Control and Prevention (CDC), which monitors the entire residential population in Tianjin. It has been granted by Tianjin CDC

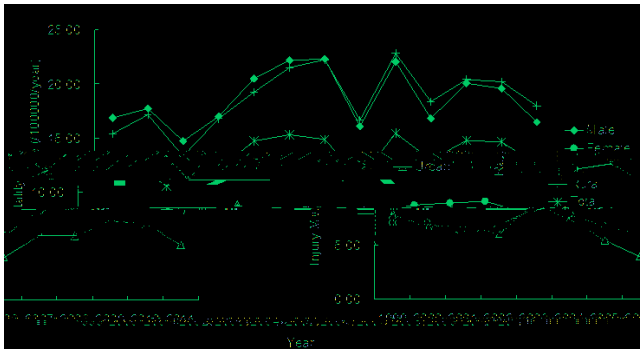

Figure 1: Children injury mortality rate by sex and urban/rural areas, Tianjin 1999-2011. Poisson regression for trend Male $\chi2=0.17$ P=0.6764 Female $\chi2=0.77$ P=0.3814 Urban $\chi2=0.41$ P=0.5232 Rural $\chi2=1.30$ P=0.2550 Total $\chi2=0.35$ P=0.5534.

Regarding injury mechanism, the distribution of five leading causes was addressed in Figure 2, the rank was according to its proportion of all injury death every year. The most injury death over 80% attributed to such five leading causes. The traffic was the first leading cause and the proportions increased from 34% to over 40%, even was up to 51% in year 2007 then there was a decline trend during the 2008-2011. The drowning was the second cause of injury death. The third top reason was poisoning followed by suicide and assault. The average proportion of unintentional injury was up to 75% of the total childhood injury death. The others included 20 causes followed the five leading causes with miner proportions, respectively.

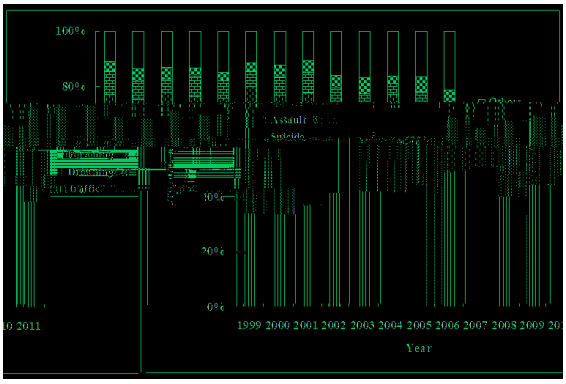

Figure 2: Children Injury mortality proportion of 5 leading causes of death, Tianjin 1999-2011.

From 1999 to 2011, there were obvious disparities in the epidemiology distribution of five leading deaths of injury by sexes and urban/rural. Figure 3 described that the demographic tendency of top five ranks of injury mortality. The rural had the top proportion of the five leading causes of the injury death. Particularly, it had the highest proportions with the traffic, drowning and poisoning. Comparatively, the male had the top level with assault and suicide, the second higher proportions of the traffic, drowning and poisoning.

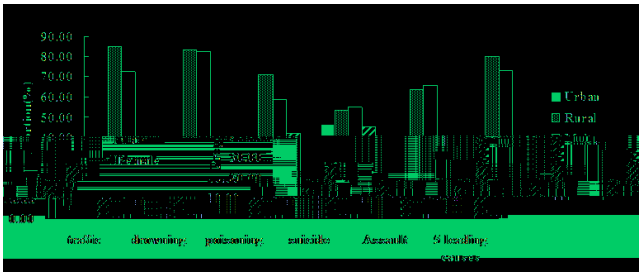

Figure 3: The distribution of five leading causes by sexs and urban / rural areas.

Discussion

The injury is the first leading cause of death in childhood age under 20 in Tianjin from 1999-2011, then followed by the perinatal causes, congenital malformation, malignant neoplasm and diseases of the nervous system. This retrospective study analyzed the 3382 injury death cases and addressed the secular trend, demography distribution, priority causes so that the pertinent strategies of injury prevention would be developed in Tianjin, even more child lives could be saved, and more disables could be prevented [7,8].

The major finding of this study is that the five leading reasons of injury death were traffic, drowning, poisoning, suicide and assault, which were up to over 80% of the total children injury death. The top two causes were same as the global rank of childhood injury mortality [3]. However, it was different with our national rank that drowning was the first leading cause of injury mortality of childhood in China [9]. The obvious disparities existed between sexes, ages and urban/ rural areas in Tianjin. The serious burden of injury death was in the male and rural childhood with 2-4 times higher mortality rates compare to the female and urban. There was a rising tendency of injury mortality in the children age over 15. Similarly, in most regions and countries, the gender gap for fatal injuries increases with age. At the global level in children aged 5–9 years, male death rates over a third higher than female rates, a discrepancy that increases to 60% among those aged 10–14 years [10-12]. However, adolescents aged 15–17 years show an adult profile, with males in that age group accounting for more than 86% of all injury deaths [12-14]. The phenomena reminded the injury should be an emphasis of prevention along with the child growing up. The proportion and mortality rates of traffic were climbing significantly in Tianjin during the study period. It is very common that motor vehicle drivers did not seal the safe belt and people did not wear headpiece with the auto bike and bicycle which induced the traffic accidents to be the first leading cause of injury death in urban and rural areas [12-15]. The serious burden in the rural area caused by poor road condition, no pedestrian lanes, motor vehicle bicycle mixed road and less signal light at intersection [16]. Also, the male child has higher mortality rate since the boys are more active and naughty than girls in the daily life, particularly in physical activity [17,18]. Consequently, the boys and rural children became the target population of injury prevention in Tianjin [19-21].

A majority of injury is preventable and the death rate can be reduced over 20% by effective methods. The valuable finding of our study is that the traffic mortality had a significant declined tendency in the population age from 5-15 years old in Tianjin in the recent years,

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