Increasing Road Traffic Injuries in Underage Motorcyclists

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Purpose: *Traffic accident is the second most common pediatric injury in Thailand. Children aged less than 15 years old are not allowed to get a motorcycle driving license. But the number of underage motorcyclists is still high. The purpose of this study is to evaluate the number of traffic injuries in underage motorcyclists and the trend of this problem.*

Methods: *A retrospective review of traffic accident cases at Maharat Nakhon Ratchasima Hospital from October 2009 to September 2013 was performed. Motorcyclists aged less than 15 years old were included in the study. The number of patients per year, risk behaviors, the diagnosis, complications and incidence rate were collected from the traffic injury surveillance database.*

Results: *In total, 44,335 patients were referred to Maharat Nakhon Ratchasima Hospital. There were 5,320 injured children, 1,373 (25.81%) patients were underage motorcyclists. There were 291, 318, 391 and 373 underage motorcyclists each year, respectively. Only 225 (16.54%) were wearing a helmet, 55 cases (4.04%) had consumed alcohol before the accident. The number of severe cases, such as head injuries, abdominal injuries, or fractures increased year on year, especially the fractures; the incident rate ratio of the fracture case was 10.23% per year (P=0.005). Death cases per year were 2, 4, 7 and 6, respectively. The most common cause of death was head injury.*

Conclusion: *Traffic accidents involving an underage motorcyclist are high and increasing every year. If we can strictly control underage motorcyclists not to ride motorcycles, the accidents may decrease.*

Keywords: *Pediatric, Road traffic accident, Motorcycle, Thailand, Injury, Underage motorcyclist*

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Introduction

In Thailand, motorcycles are the most popular form of transportation because of their affordability. The number of motorcyclists is increasing every year and the number of accidents is also increasing. In 2004, traffic accidents caused 567,000 victims in Thailand. There were 24,800 deaths or 40 deaths per 100,000 populations[1]. In children, traffic accidents are the second most common unintentional injury and there are over 20,000 hospital admissions each year[2].

The injur**ies** from traffic accident**s** cause mortality and long term disability that increase the national burden. Thailand loses over 600,000 disability-adjusted life years (DALYs) from road traffic injuries every year. The majority (88%) of DALYs lost were due to premature mortality[3]. If a child's accident results in long-term disability, a large burden will be placed on their family, and as a bigger picture, the country.

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Children aged less than 15 years old do not have permission to obtain a motorcycle driving license, but it is common to see these underage motorcyclists on the road.

The purposes of this study are to show the number of traffic injuries among underage motorcyclists and the trend of this problem.

Patients and Methods

A retrospective analysis study was conducted at the Maharat Nakhon Ratchasima Hospital, the referral trauma center in the Northeast of Thailand that covers 32 amphoes in Nakhon Ratchasima and 3 surrounding provinces; Chaiyaphum, Surin and Buriram. The traffic injury surveillance database (IS database) from October 2009 to September 2013 at Maharat Nakhon Ratchasima Hospital was reviewed. Maharat Nakhon Ratchasima Hospital established the injury surveillance system in 1995 according to the model of Epidemiology Division, Ministry of Public Health. Surveillance data include demographic data, cause of injuries and risk behaviors such as alcohol consumption, helmet use, and psychoactive drugs. The IS database was recorded by well-trained nurses at the emergency room.

From the IS database, we collected the data of children under 15 years old who came to the emergency room as a result of traffic accidents. The passengers, pedestrians and incomplete data were excluded. The demographic data and details of injury were reviewed.

Statistical analysis was performed using STATA, version 12.0 (College Station, TX). The number of underage motorcyclists per year, risk behaviors, diagnosis, complications, and mortality patients per year were summarized. The Poisson regression analysis was used to determine the incidence rate ratio of underage motorcyclist patients adjusted with Nakhon Ratchasima children population data[4]. The incidence rate ratios of severe cases; extremity fractures, head injuries, intra-abdominal injuries and spine fractures, are also reported. A *P*-value of less than 0.05 was considered statistically significant. This study was approved by the Institutional Review Board of Maharat Nakhon Ratchasima Hospital.

Results

During the study period, 44,335 traffic accident patients were treated at Maharat Nakhon Ratchasima Hospital in which 5,320 of them were age less than 15 years old. 1,373 (25.81%) patients were classified as a rider, 3,559 (66.9%) as passenger or pedestrian and 388 (7.29%) patients were unable to be classified. The proportions of underage motorcyclists related to pediatric populations of the same geographic area are demonstrated in Table 1.

Table 1 Underage motorcyclist patients at Maharat Nakhon Ratchasima Hospital from October 2009 to September 2013.

Year	No. of traffic accident patients	No. of underage motorcyclists	Nakhon Ratchasima children population*	Rate of underage motorcyclist patients per 100,000 population
2009-10	10,233	291	506,078	58
2010-11	11,057	318	497,769	64
2011-12	11,753	391	489,645	80
2012-13	11,292	373	481,574	77
Total	**44,335**	**1,371**		

* Annual epidemiology surveillance report 2013, Bureau of Epidemiology, Ministry of Public Health, Thailand[4].

A Poisson regression model showed that the prevalence of underage motorcyclists per 100,000 population being treated increased over the study period by an average of 11.53% per year (95% CI, 0.36%-23.95%; *P*=0.04). The trend of road traffic injuries among underage motorcyclists and the children population is shown in Fig. 1.

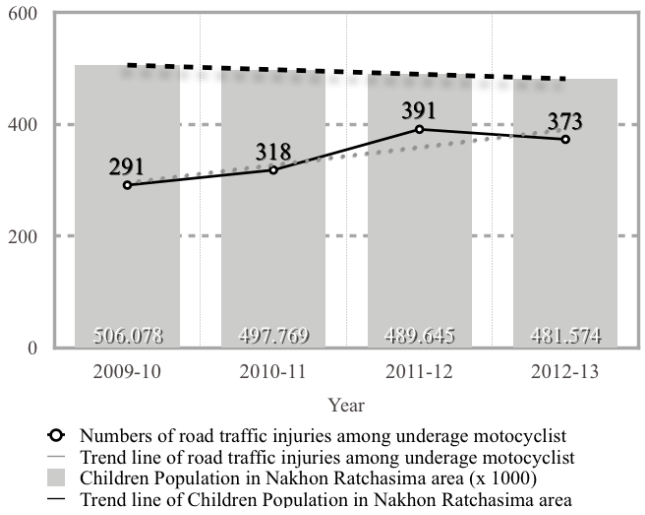

Fig. 1 Trend of road traffic injuries among underage motorcyclists and the children population in Nakhon Ratchasima area

Patient demographic data are shown in Table 2. The majority of the patients were from Nakhon Ratchasima. Fifty-five patients (4.04%) consumed alcohol before the accident, 1,135 patients (83.46%) did not wear a helmet, and one case used psychoactive drugs.

A number of cases with associated severe injuries are shown in Table 3. Concomitant extremity fractures increased every year over the study period with an incidence rate ratio of 10.23% per year (P=0.005). Mortality cases per year were 2, 4, 7 and 6, respectively. The most common cause of death was head injury.

Table 2 Demographic data of the underage motorcyclists at Maharat Nakhon Ratchasima Hospital.

Characteristic	No. of underage motorcyclists
Boy (%)	978(71.23)
Girl (%)	395(28.77)
Age (years)	
Mean (SD)	13.23(1.01)
Range	8-14
Place of the accident	
Nakhon Ratchasima (%)	1,336(97.31)
Chaiyaphum (%)	29(2.11)
Buriram (%)	6(0.44)
Others (%)	2(0.14)
Total	**1,373**

Table 3 Numbers of underage motorcyclist accidents associated with severe injuries by year

	2009-10	2010-11	2011-12	2012-13	Total	IRR*(%)	*P*-value
Extremity fractures	141	151	189	182	663	10.23	0.005
Head injuries	84	79	86	106	355	8.59	0.08
Intra-abdominal injuries	10	11	9	17	47	17.69	0.21
Spine fractures	1	0	2	3	6	79.15	0.14
Death	2	4	7	6	19	38.42	0.12

*IRR = Incidence rate ratio from Poisson regression analysis over the study period.

Discussion

Traffic accidents, the second most common cause of unintentional injury in children, are a major public health problem in Thailand. According to our results conducted at the tertiary trauma care center there were over five thousand traffic-injured children and a quarter of these patients were underage motorcyclists.

Although the size of the population aged less than 15 years old has decreased, the incidences of injuries in an underage motorcyclist group have been increasing by over 11% per year. This problem is also of concern in other countries such as Australia and the USA[1,5]. The severity of an associated injury is also increasing, nearly half of underage motorcyclist patients suffered from extremity fractures with an increasing average of 10.23% every year.

Due to inconvenient public transportation in Nakhon Ratchasima, motorcycle is the best available option for most children. From this study, we found that the most motorcyclists were adolescents, approximately 15 years old which is below the legal age of 18 years old to obtain a motorcycle driving license. Physically, this age group might be able to handle a motorcycle and thus their parents or guardians allowed them to ride. On the other hand, many studies have confirmed that young age and poor riding skills contribute to motorcycle accidents[6-9]. Moreover, we found that only 16.54% of patients wore a helmet and 4% of patients consumed alcohol before the accident. These factors have previously been associated with morbidity and mortality in road traffic injuries[10-15]. So the government's policy must be strictly enforced in the underage motorcyclist group and promote the use of helmets to reduce the severity of

injuries. Furthermore, a good public transportation and school bus system must be established in order to provide affordable transportation so that children do not need to use a motorcycle before an appropriate age.

This study has several limitations. First, data included only patients referred to Maharat Nakhon Ratchasima Hospital. The incidence reported could be lower due to the fact that some patients were treated at a local hospital or were cases with fatality. Second, some information in the IS database was provided by parents or witnesses at the scene, such as the details of injury, riding person, and helmet use from which information bias could have occurred.

We conducted this study not only to report the information but also to reflect this issue to all related parties such as parents, the government, and organizations enforcing the law. We believe that collaborating with each other to solve the problem will help many children who will be the future of the nation.

Conclusion

The number of traffic accidents involving underage motorcyclists is high and increasing every year. If we can strictly control underage motorcyclists not to ride motorcycles, the accidents may decrease.

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ปัญหาการเพิ่มขึ้นของการบาดเจ็บจากอุบัติเหตุจราจรของเด็กก่อนวัยที่อนุญาตให้มีใบขับขี่

อุรวิศ ปิยะพรมดี, พบ, วรินธร อดุลยานุโกศล, พบ, ศุภมาส ลิ่วศิริรัตน์, พบ

วัตถุประสงค์: *อุบัติเหตุจราจรเป็นปัญหาที่พบได้บ่อยในประเทศไทยซึ่งถูกจัดเป็นอันดับที่สองของสาเหตุของอุบัติเหตุ ในเด็กไทย ปัญหาอุบัติเหตุจราจรในเด็กที่ขับขี่รถจักรยานยนต์ในขณะที่ยังไม่ถึงวัยที่สามารถมีใบขับขี่ได้ ก็เป็นปัญหาหนึ่งที่ยังพบได้ทั่วไป แม้กฎหมายไทยห้ามเด็กที่มีอายุต่ำกว่า 15 ปีขับขี่จักรยานยนต์ การศึกษานี้มีจุดมุ่งหมายเพื่อแสดงถึงปริมาณและแนวโน้มของการเพิ่มขึ้นของการบาดเจ็บจากอุบัติเหตุจราจรของเด็ก ที่ขับขี่รถจักรยานยนต์ในขณะที่ยังไม่มีใบขับขี่*

วิธีการศึกษา: *การศึกษารวบรวมข้อมูลย้อนหลังจากฐานข้อมูลผู้ป่วยอุบัติเหตุที่มารักษาที่โรงพยาบาลมหาราชนครราชสีมา ระหว่าง เดือนตุลาคม พ.ศ. 2552 ถึง เดือน กันยายน พ.ศ. 2556 ผู้ป่วยเด็กที่อายุต่ำกว่า 15 ปี และได้รับการบาดเจ็บขณะเป็นผู้ขับขี่จักรยานยนต์ถูกเก็บข้อมูล เพื่อวิเคราะห์จำนวนการบาดเจ็บ คำวินิจฉัยโรค ผลข้างเคียงขณะรักษา จำนวนผู้ป่วยที่เสียชีวิต ปัจจัยร่วมที่ก่อให้เกิดอุบัติเหตุ และแนวโน้มการเพิ่มขึ้นของปัญหานี้ในอนาคต*

ผลการศึกษา: *จากผู้ป่วยอุบัติเหตุ 44,335 รายที่มารักษาที่ โรงพยาบาลมหาราชนครราชสีมา พบว่ามีอุบัติเหตุจราจรที่เกิดในเด็ก (อายุต่ำกว่า 15 ปี) 5,320 ราย และพบว่า 1,373 ราย หรือคิดเป็นร้อยละ 25.81 เป็นการบาดเจ็บจากอุบัติเหตุจราจรจากการขับขี่รถจักรยานยนต์ในขณะที่ยังไม่มีใบขับขี่ เมื่อเปรียบเทียบรายปีพบว่า มีการบาดเจ็บ 291, 318, 391 และ 373 ราย ตามลำดับ ในจำนวนนี้พบว่า มีเพียงร้อยละ 16.54 ที่สวมหมวกนิรภัย และ ร้อยละ 4.04 ดื่มสุราก่อนเกิดเหตุ จำนวนผู้ป่วยที่ได้รับบาดเจ็บรุนแรง เช่นการบาดเจ็บที่ศีรษะ การบาดเจ็บในช่องท้อง และกระดูกหักมีจำนวนที่เพิ่มมากขึ้น โดยเฉพาะผู้ป่วยที่มีกระดูกหักมีอัตราส่วนร้อยละการเพิ่มขึ้นถึง 10.23 (P=0.005) และมีผู้ป่วยที่เสียชีวิต 2, 4, 7 และ 6 รายต่อปี ตามลำดับซึ่งสาเหตุหลักของการเสียชีวิตคือ การบาดเจ็บที่ศีรษะ*

สรุป: *ปัญหาอุบัติเหตุจราจรของเด็ก ที่ขับขี่รถจักรยานยนต์ในขณะที่ยังไม่มีใบขับขี่ยังเป็นปัญหาที่มีแนวโน้มเพิ่มมากขึ้นอย่างต่อเนื่อง ส่งผลให้มีผู้ที่ได้รับบาดเจ็บ พิการและเสียชีวิตเพิ่มขึ้นทุกปี หากมีมาตรการที่เหมาะสมเพื่อลดการขับขี่รถจักรยานยนต์ในขณะที่ยังไม่มีใบขับขี่ของเด็กอายุต่ำกว่า 15 ปี ก็จะสามารถลดการเกิดอุบัติเหตุในผู้ป่วยกลุ่มนี้ได้*