Road Traffic Injuries (RTIs) Resulting in Early Death in the Emergency Room at Khon Kaen Hospital During the COVID-19 Pandemic: A Descriptive Study

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ABSTRACT

Objectives: To define the epidemiologic characteristics and results of early RTI death during COVID-19 era

Methods: This retrospective, descriptive study was conducted from Khon Kaen hospital injury surveillance (IS) online trauma registry during 2018 and 2022. The inclusion criteria were victims who survived from scene and were sent to emergency room (ER) and died at ER.

Results: There were 99 total death. Most common vehicle crash was motorcycles (82.95%). Scene time was 41 minutes.

Conclusions: COVID-19 era affects in gradually increasing scene time

Keywords for indexing: road-traffic injuries, early death, emergency room, transfer, COVID-19

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INTRODUCTION

Road-traffic injuries (RTIs) has been one of the leading causes of death around the world especially in working age (1). It results in socioeconomic burden even up to one-year post traumatic events (2). Thailand has been one of the world's highest death among road users (3). This impact the national financial status.

The coronavirus disease 2019 (COVID-19) pandemic that emerged during these years has brought challenges to global healthcare system including emergency response services and outcomes of emergency cares. Prevention program was also disrupted (4). In Thailand, the COVID-19 pandemic was defined by the year of 2020(5).

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RTI prevention and post-crash response management were also interfered. Interestingly, it has declined in number of acute trauma referral and admission (6). However, outcomes of the RTIs victims during COVID-19 era is unknown in Southeast Asian countries with high demands of motorcycle use (7). This study aimed to explore the effect of COVID-19 pandemic to emergency medical service (EMS) response to RTI victims by assessing death from RTIs at emergency room (ER).

METHODS

This descriptive study was retrospectively review from Khon Kaen Hospital trauma registry collected via national-and-hospital-based Injury Surveillance (IS) online program. All trauma victims who survived from immediate post-crash death were sent to resuscitation zone at ER, Khon Kaen Hospital from 1st January 2018 to 31st December 2022. The inclusion criteria were all patients who survived from prehospital scene but finally dead at ER. The demographic data including age, sex, common vehicles, and pre-injury risk factors. Total deaths, scene time, and ER time were stratified in years with line graphs. Final diagnosis was made by physical examination and plain chest film. None of them performed further investigations.

Categorical data were described using frequency and percentage and tested using Fisher's exact probability test. Normally distributed continuous data were described using means and standard deviations, and were tested using independent t-tests. Non-normally distributed continuous data were described using the medians and interquartile ranges.

RESULTS

The data on deaths from RTIs in the emergency room at Khon Kaen Hospital were collected from 1st January 2018 to 31st December 2022. There was a total of 99 deaths. The majority was male (77.3%). The median age was 35 [23, 54] years old. Most common vehicles are motorcycles (82.95%), followed by pickup trucks (6.82%), and sedan (5.68%), respectively. The demographics were shown in (*Table 1).*

Table 1
The demographic characteristics of the deaths from road-traffic injuries in the ER

Demopraphic characteristics	Missing data, %	Amount, n (%)
Total deaths	0 (0)	99 (100)
Age, years [Median, IQR]	0 (0)	35 [23, 54]
Male sex, n (%)	18 (18.18)	63 (77.78)
Common vehicles:	11 (11.11)	88 (100)
- Motorcycles	-	73 (82.95)
- Pickup trucks	-	6 (6.82)
- Sedans	-	5 (5.68)
- Others	-	4 (4.56)
ISS [median, IQR]	10 (10.10)	75 [25, 75]
RTS [median, IQR]	14 (14.14)	0 [0, 0]
PS [median, IQR]	21 (21.21)	0.01 [0.00, 0.04]

ER = emergency room; IQR = interquartile range; ISS = injury severity score; RTS = revised trauma score; PS = probability of survival

Median injury severity score (ISS) was 75 [25, 75]. Median revised trauma score (RTS) was 0 [0, 0]. Median TRISS probability of survival was 0.01 [0.00, 0.04]. Pre-injury risk factors were alcohol drinking (8.08%), not fastening the seat belts (46.46%), and not wearing the helmet (47.95%). Most significant organ injuries resulting in death at ER were head and neck (69.79%), thorax (18.75%), and abdomen (8.33%), respectively. The injury characteristics were shown in (*Table 2).*

Table 2
Risk factors and organ-specific injuries characteristics

Demographic characteristics	Missing data, %	Amount, n (%)
Pre-injury risk factors:		
- Alcohol drinking	64 (64.65)	8 (8.08)
- Not fastening the seat belts	6 (46.15)	6 (46.15)
- Not wearing the helmets	36 (49.32)	35 (47.95)
Organ-specific injuries resulting in deaths	3 (3.03)	-
- Head and neck	-	(69.79)
- Thorax	-	(18.75)
- Abdomen	-	(8.33)

When the analysis was separated by years, we found that the deaths were 21, 18, 27, 20, 13 deaths, respectively between 2018 and 2022 shown in (*Figure 1).*

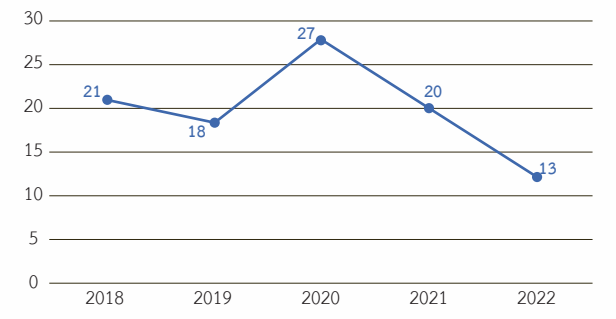

Figure 1- *Deaths among years*

The scene transportation time from accidental occurrence to reach ER door was increased with the median time of 41 [29, 51] minutes. The graph was shown in (*Figure 2).*

The time spent at ER was not significantly different between years as shown in (*Figure 3).*

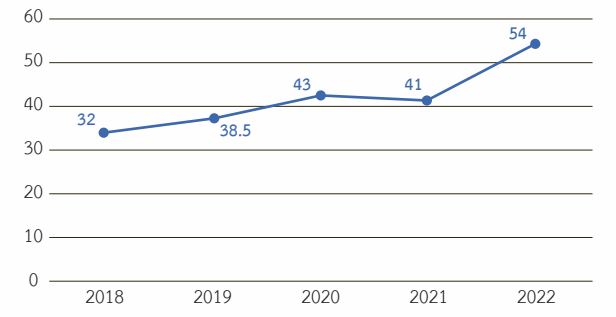

Figure 2- *The median time from scene transportation to ER (minutes)*

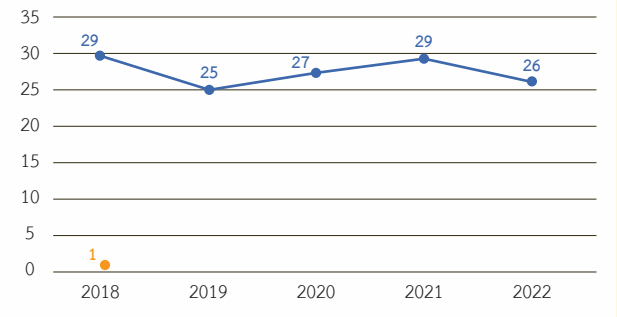

Figure 3- *Time spent at ER (minutes)*

DISCUSSION

Thailand has been one of the highest deaths from RTIs. The deaths were still high and problematic despite of declining in number and ranking as the result of active injury prevention program (3). The fatality still impacts gross domestic product. The disability in the survivors also individually causes economic and productivity losses (8).

After survived from the crashes, survivors were sent to the hospitals with basic resuscitation and stabilization (9). Early deaths reflects the local's post-crash emergency response system and the emergency room management quality including how fast the emergency medical services (EMS) can get into the scene, basic stabilization at scene (platinum ten), and how the emergency room personnel can resuscitate the victim (golden hour or golden period) (10). During the COVID-19 pandemic, traffic accident was decreased but the scene time arrival and total rescue time were increased (11,12). This could be from the inconvenience in working with the powered air purifying respirator (PAPR) suites or regional protocol modifications during the pandemic (13). The personnel used national protocol. These findings were concordant with our study. The median time from transportation to ER was gradually increased by years. Surprisingly, the findings did not affect the mortality which was still unpredictable.

The ER time was still favorable with less than 30 minutes spent. The communication with the in-house well-prepared team could be the reason.

The most common vehicle was still the motorcycles for 80 percent as same as the previous years. According to the global market for motorcycles, Thailand has steady demands despite of active injury prevention promotion (7) .The most common cause of death was also severe traumatic brain injury. We did not get the safety status from the victims so we could not analyze what the risk factors of death were.

This study is the one that tells us about the effects of COVID-19 era, defined as the year of 2020, in a low-to-middle income and high prevalence of road-traffic injuries country. It shows that despite of the fatal spreading, it does not affect people's daily activities. The study also shows the missing data which facilitates the readers whether the results of the study was acceptable. One of the concerns were why mortality rate still high despite of lock down protocol. The hypothesis was delayed arrival time due to safety inconvenience.

This study also has limitations. From retrospective descriptive in nature, it does not show the power and trend of the outcome. Some missing data were high in proportion. These might lead to selection bias. Lastly, the ISS could not be accurately estimated due to missing in the definite diagnosis. The total score of 75 means nonsurvivable status. If the final ISS was precise, it would tell us how post-crash response systems had some improvements.

According to retrospective study in nature, it is generalizable to other low-to-middle socio-economic regions and should help the policy makers to design the injury prevention program and EMS system for severe trauma patients.

CONCLUSION

There are still some concurrent results during COVID-19 pandemic: total death and epidemiology of early mortality of the road-traffic accident victims. The scene time is gradually increased during years but ER time is still plateau.

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