

# Effect of COVID-19 on Epidemiological Characteristics of Road Traffic Injuries in Suzhou:A Retrospective Study

Wenjuan Huang

First Affiliated Hospital of Soochow University

Qi Lin

Suzhou Emergency Center, Suzhou, Jiangsu, China

Feng Xu

First Affiliated Hospital of Soochow University

Du Chen (✉ [sdfyycd@suda.edu.cn](mailto:sdfyycd@suda.edu.cn))

the First Affiliated Hospital of Suzhou University <https://orcid.org/0000-0001-6990-3310>

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## Research article

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## Abstract

**Background:** To present the new trends in epidemiology of road traffic injuries (RTIs) in Suzhou under the impact of Coronavirus disease 2019 (COVID-19) and control measures.

**Methods:** Pre-hospital care records of RTIs in January-May 2020 and January-May 2019 were collected from the database of Suzhou emergency center, Jiangsu, China and relevant clinical data were extracted for a retrospective study. RTIs in 2020 and 2019 were defined as observation group and control group respectively.

**Results:** There were 7288 RTIs in the observation group, accounting for 82.17% of the control group. The number of RTIs per month from January to May in the observation group were 79.72%, 47.69%, 79.30%, 85.72% and 99.39% of the control group, respectively. Subgroup analysis showed that the number and composition ratio of electric bicycle related RTIs in the observation group were significantly higher than those in the control group (2641, 36.24% vs 2380, 26.84%, P<0.001). We observed a statistically significant increase in proportion of RTIs with consciousness disorder in the observation group compared to the control group (7.22% vs 6.13%, P = 0.006).

**Conclusions:** Under the impact of COVID-19, the total number of RTIs in Suzhou from January to May 2020 decreased obviously. Nevertheless, there was an obvious rise in electric bicycle related RTIs, and the proportion of RTIs with consciousness disorder also increased. It is necessary for electric bicycle riders to wear helmets.

## Background

Road traffic deaths have reached 1.35 million each year, that's nearly 3 700 people dying on the world's roads everyday [1]. RTIs now represent the eighth leading cause of death for people of all ages [2]. And RTIs are now the leading cause of death for children and young adults aged 5–29 years [3]. Low- and middle-income countries bear the greatest burden of road traffic fatalities and injuries [2].

In China, RTIs are the second cause of all types of injuries that lead to emergency department visits, constituting 21% of all injuries, and have become the leading cause of injury deaths [4]. The highest mortality of RTIs occurred among young adults aged 20–45 years, particularly males, and in rural areas [4].

COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has spread quickly around the world [5]. The impact of COVID-19 on all aspects of social life is profound, but there is a lack of research on exactly how it affects the epidemiological characteristics of RTIs.

The present study is devoted to explore the new trends in epidemiology of RTIs in Suzhou during the COVID-19 outbreak, under control and prevention, so as to provide a scientific basis for the prevention and treatment of RTIs in the context of COVID-19.

## **Methods**

### **Study design**

The pre-hospital care records of RTIs in January-May 2020 and January-May 2019 were obtained from the database of Suzhou Emergency Center, Jiangsu province, China. Data were compiled from the pre-hospital care records including patient demographics, vital signs, transport and injuries. A retrospective analysis was performed. The RTIs in 2020 were included in the observation group while the ones in 2019 were included in the control group.

Vital signs were obtained from pre-hospital care records, and the shock index (pulse rate /systolic blood pressure) $>1$  was defined as shock. GCS  $< 15$  points is defined as consciousness disorder.

### **Statistical analysis**

Categorical data were expressed as frequency (percentage), and compared using chi-square test. Continuous variables were tested for normality using Shapiro–Wilk test. All of the continuous variables failed to conform to normality were expressed as median (IQR) and compared using Mann-Whitney test. Statistical analyses and graphics were completed with STATA 15.0. Two-tailed P  $< 0.05$  was considered to be statistically significant.

## **Results**

There were 7288 RTIs in the observation group, while 8,869 in the control group, with a 17.83% declination in total number over the same time period (Table 1). The number of RTIs in each month from January to May in the observation group was 79.72%, 47.69%, 79.30%, 85.72% and 99.39% of the control group, respectively. From January to April 2020, the number showed varying degrees of decline, which in February fell by 52.31%. The number of RTIs in May 2020 was roughly the same as that in May 2019. Daily incidence of RTIs in Suzhou in January-May 2020 and January-May 2019 were respectively showed in Fig. 1.

Table 1  
Baseline characteristics of RTIs in Suzhou in January-May 2020 and January-May 2019

	Control group (2019)	Observation group (2020)	P value
<b>Number of RTIs n (%)</b>	<b>&lt; 0.001</b>		
Jan.	1834(20.68)	1462(20.06)	
Feb.	996(11.23)	475(6.52)	
Mar.	1831(20.65)	1452(19.92)	
Apr.	2073(23.37)	1777(24.38)	
May	2135(24.07)	2122(29.12)	
Total	8869(100)	7288(100)	
<b>Electric bicycle related RTIs n (%)</b>	2380(26.84)	2641(36.24)	<b>&lt; 0.001</b>
<b>Gender</b>	<b>0.050</b>		
Female n (%)	4088(46.09)	3247(44.55)	
Male n (%)	4781(53.91)	4041(55.45)	
<b>Age (years)</b>	47(27)	48(27)	<b>0.045</b>
<b>Vital signs</b>			
PR (bpm)	83(14)	82(15)	0.025
RR (bpm)	18(3)	18(2)	0.385
SBP (mmHg)	133(28)	134(28)	0.436
DBP (mmHg)	82(17)	81(17)	0.248
<b>Injuries</b>			
Shock n (%)	245(2.76)	214(2.94)	0.508
Consciousness disorder n (%)	544(6.13)	526(7.22)	0.006
Death n (%)	91(1.03)	79(1.08)	0.720

Subgroup analysis showed that the number and composition ratio of electric bicycle related RTIs in the observation group were significantly higher than those in the control group (2641, 36.24% vs 2380, 26.84%, P < 0.001). Accordingly, the proportion of RTIs with consciousness disorder in the observation group was also significantly higher than that in the control group (7.22% vs 6.13%, P = 0.006).

Compared with the control group, the median age of the observation group was one year older (P = 0.045), there was no significant difference in gender composition (P = 0.05). In terms of injuries, there were no significant difference in the proportion of shock (P = 0.508) and death (P = 0.720).

## Discussion

The outbreak of COVID-19 has caused global concerns. Currently, the therapeutics for COVID-19 including supporting treatment, drugs, vaccines, while control and prevention are other strategies to reduce the transmission within China and elsewhere [6, 7]. The local government in Wuhan announced the suspension of public transportation, including the closure of railway stations, highways and airports on January 23, 2020, to prevent further disease spread [8]. Consequently, Hubei province was placed under lockdown approximately 3 weeks after the start of COVID-19 outbreak [9]. The Chinese government made great efforts to control the flow of people. Shopping malls and other entertainment activities were closed, in-person classes were replaced by online ones, public transport was restricted, public gatherings were banned and routine health checks were carried out in order to prevent the spread of SAR-CoV2 right after Wuhan shutdown [10].

Due to the impact of COVID-19 and relevant control measures, the way people travel has also undergone subtle changes. Indeed, some new trends have emerged in the epidemiology of RTIs in Suzhou. Compared to the same period in 2019, the number of cases involved in road traffic accidents from January to May 2020 decreased significantly, but both the absolute number and proportion of electric bicycle related RTIs increased significantly. In terms of the characteristics of injury, the proportion of patients with consciousness disorder also increased.

To reduce the risk of infection and prevent the spread of disease, the government introduced corresponding control and prevention measures, including encouraging people to stay at home. As a result, fewer people went out and the roads were empty, which directly leaded to a reduction in the number of RTIs, especially in late January and February, when the epidemic situation was the most severe and the control measures were the most stringent. As the epidemic abated and more people traveled, the number of RTIs began to rise, and the incidence of RTIs in May was basically the same as that in May 2019.

In the subgroup analysis, we found that the incidence of electric bicycle related RTIs increased significantly, as did the proportion of patients with consciousness disorder.

Those may be related to the following factors. The COVID-19 epidemic has a subtle impact on all aspects of social life, including how people choose to travel. To reduce the direct contact between human, people try to avoid using public transportsations such as taxis, buses and subways, and prefer to travel with electric bicycles that are convenient and having lower risk of infection, which directly leads to a growing number of electric bicycle related RTIs.

However, in the event of electric bicycle traffic accidents, the injured without helmet are easy to be combined with craniocerebral trauma. During the study period, electric bicycle riders in Suzhou generally did not wear helmets, which resulted in a significant increase in the proportion of patients with consciousness disorder in RTIs. Therefore, Suzhou traffic police department has carried out the "helmet-belt" safety protection activity to further help electric bicycle riders establish the safety awareness of

consciously wearing helmets, which is very necessary to reduce the electric bicycle related RTIs and prevent craniocerebral trauma.

Although this study obtained new epidemiological characteristics of RTIs in Suzhou under the influence of COVID-19 epidemic and control measures through detailed historical data, there are still some limitations. First, only the data of the five months from January to May were analyzed, but the medium - and long-term impacts of COVID-19 epidemic on RTIs were not clear. Second, there are many factors affecting RTIs in reality, the influence of other confounding factors cannot be completely excluded from the historical data only.

## **Conclusions**

Under the impact of COVID-19, the total number of RTIs in Suzhou from January to May 2020 decreased obviously. Nevertheless, there was an obvious rise in electric bicycle related RTIs, and the proportion of RTIs with consciousness disorder also increased. It is necessary for electric bicycle riders to wear helmets.

## **Abbreviations**

RTIs: road traffic injuries; COVID-19: Coronavirus disease 2019; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2

## **Declarations**

### **Ethics approval and consent to participate:**

This study was approved by the Ethics Committee of the First Affiliated Hospital of Soochow University. The approval number is 2020226. All patient records were anonymized and de-identified and the Ethics Committee waived the need for informed consent before analysis due to the retrospective nature of the data. This study conforms to the principles outlined in the Declaration of Helsinki.

### **Consent for publication:**

Not applicable.

### **Availability of data and materials:**

All data generated or analysed during this study are included in this article and its supplementary information files.

## **Competing interests:**

The authors declare that they have no competing interests.

## **Funding:**

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## **Authors' contributions:**

DC conceived the study, and designed the protocol. QL and DC collected and analysed the data. WJH drafted the manuscript. WJH and DC contributed substantially to its revision. FX supervised the conduct of the study and data collection. All authors read and approved the final manuscript.

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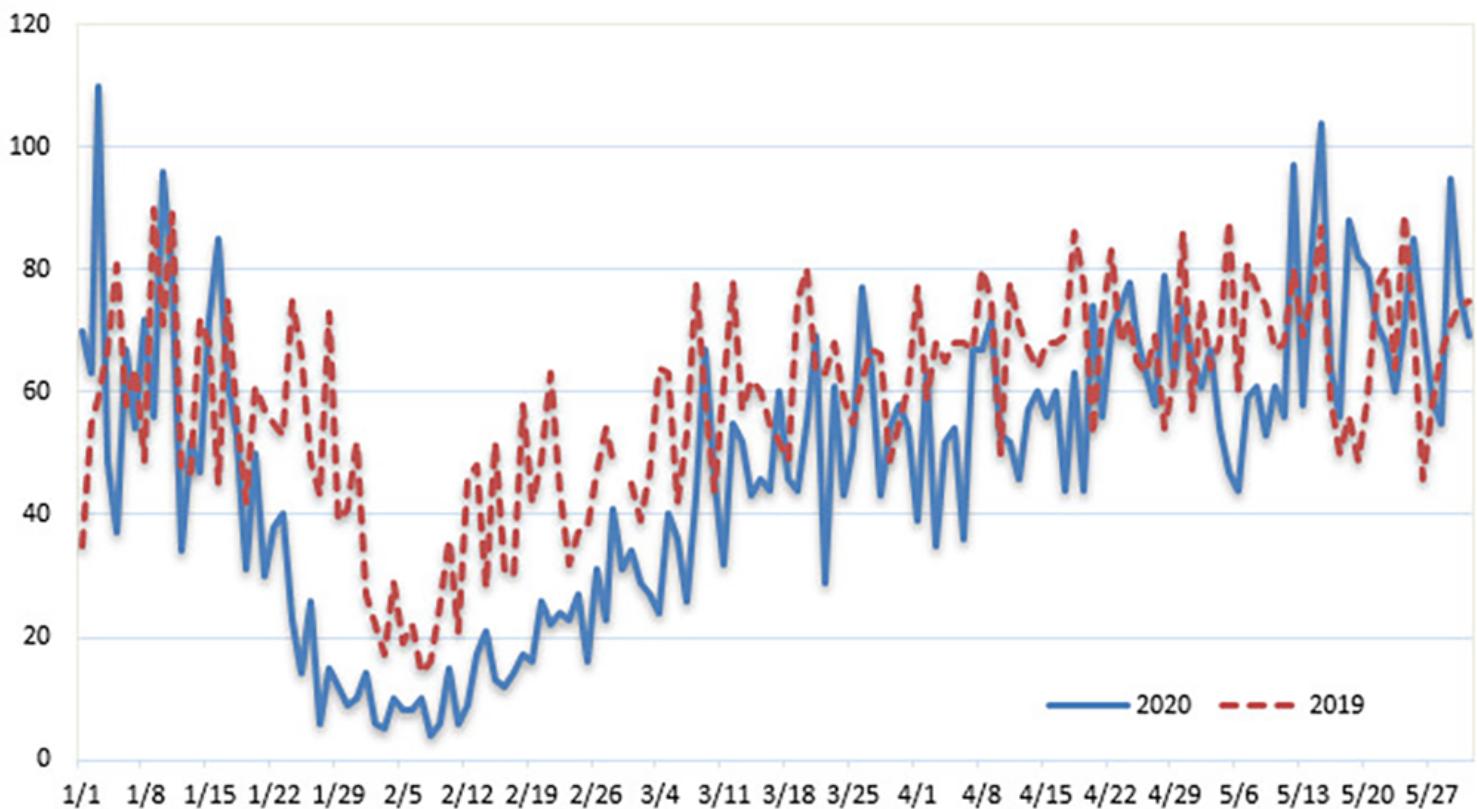
Not applicable.

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## Figures



**Figure 1**

Daily incidence of RTIs in Suzhou in January-May 2020 and January-May 2019 were respectively showed in Figure 1.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [rawdata.xls](#)