RESEARCH ARTICLE

Road traffic injuries in Nepal during COVID-19 lockdown [version 1; peer review: 2 approved with reservations]

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Abstract

Background: As the world is busy addressing COVID-19, road traffic injuries, another major cause of deaths is continuously killing people on the roads. In Nepal, there were frequent media reports of occurrences of road crashes, injuries, and deaths despite nationwide lockdown. This paper aims to describe the situation of road traffic crashes and casualties during the period of complete lockdown.
Methods: This study used secondary data from two sources: Nepal Police and media reports between 24 March and 14 June 2020 (because the government lifted the nationwide lockdown from 15 June 2020). Available details of crashes, deaths, and injuries for this period were extracted from media reports and the summary data that was obtained from the Police. Narrative comparison is done between the data for the same period from both the sources, where possible.
Results: Nepal Police recorded 1,801 incidents of road crashes during the 82 days of the COVID-19 lockdown with 256 deaths (on average 3.1 deaths daily) and 1,824 injuries (on average 22.2 injuries daily). Motorcycles comprised over 21% of all vehicles involved in crashes. Ambulances and other vehicles for essential services were also found to be involved in crashes. Speeding itself was the cause for almost a quarter of the incidents during the lockdown.
Conclusions: Even when the movement restrictions were imposed in Nepal, the number of road crashes was not substantially reduced. Media reports were mainly found to be reporting the crashes where deaths occurred, but police records also included nonfatal injuries. The incidence of crashes in this period shows that it is important to work for road safety to save lives from road traffic crashes in Nepal.

Keywords

COVID-19, Lockdown, Road Traffic Crashes, Injuries, Deaths

Open Peer Review

Reviewer Status ? ?

	Invited Reviewers	
	1	**2**
version 1 08 Oct 2020	? report	? report

1. **Kulanthayan KC Mani**, University Putra Malaysia (UPM), Serdang, Malaysia

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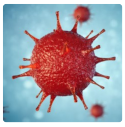
Any reports and responses or comments on the article can be found at the end of the article.



This article is included in the Disease Outbreaks gateway.

This article is included in the Coronavirus collection.

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Background

The world experienced a series of unprecedented events since December 2019 after the detection of the novel coronavirus disease 2019 (COVID-19) (Asian Development Bank, 2020). The World Health Organisation (WHO) declared it a worldwide pandemic on 11 March 2020 (World Health Organization, 2020). During this period, social-distancing and lockdown were implemented throughout the world. As of 14 June 2020, the spread of COVID-19 has reached all countries and territories around the globe with 282,733 deaths (Worldometer, 2020)

The concept of restrained movement and physical distancing is believed to support the breaking of the chain of infection (World Health Organization, 2014) and slowing the spread of the virus by limiting contact with infected people and contaminated surfaces. In many countries, everyone but essential workers have been instructed to stay at home and work from home. Consequently, transportation through all means has reduced in an unprecedented manner. There are also reports of improvement in air quality (Wang *et al.*, 2020) and reduced bed occupancy for road crash trauma in emergency departments (Zhu *et al.*, 2020), which might have enabled health service systems to prepare and cope with a sudden rise in the number of COVID-19 hospitalisation. However, keeping people at home was not an easy job; governments had to impose notices with strict provisions – including fines and potential imprison if their decisions were violated.

Nepal has also joined the global practice for the prevention of the spread of COVID-19 and declared a ban on long-distance public travels from 22 March 2020 through the Prime Minister's statement to the nation. "All international flights coming to Nepal have been suspended effective from March 22 until 31. Effective from March 22, long-distance passenger vehicles will be suspended throughout Nepal for some time. Crowded places like cinema halls have been shut down for the time being." Prime Minister KP Sharma Oli, 20 March 2020 (Embassy of Nepal, 2020).

Within the window of the partial lockdown, an estimated 1.5 million residents left the capital Kathmandu for different parts of the country. Similarly, about half a million migrant workers from India also returned to their homes in the wake of the government's decision to lock down the country (Pokhrel & Awale, 2020). This resulted in a sudden rise in the use of motorised vehicles during the 21st, 22nd, and 23rd of March. Meanwhile, the second case of COVID-19 was detected on 23 March. Only then did the Government decided to impose countrywide complete lockdown, from 24 March 2020 (Budhathoki, 2020). Hence, the country's efforts and resources converged towards the prevention of coronavirus transmission.

However, the government authorised a special pass-permit to use private vehicles and motorcycles in case of an emergency. Only vehicles required for essential services, i.e. ambulances, police, fire service, milk-tankers, water-tankers, and food deliveries, were allowed on the road without the pass. Due to these activities, a suddendecline in vehicular movement was observed in Nepal. Subsequently, a large reduction in the number of crashes and casualty was expected during this lockdown. Unfortunately, there were frequent media reports of road crashes occurrences, injuries, and deaths despite of nationwide lockdown.

This paper aims to describe the situation of road traffic crashes and the subsequent casualties during the period of COVID-19 lockdown using secondary sources of data. Similarly, it also aims to relate relevant lessons learned from prevention measures for coronavirus to harness prevention from road crashes in the post-lockdown period.

Methods

This study utilised two secondary data sources, i.e. media reports, and published or unpublished police records. Data collection was done in two ways: 1) a daily online search of media reports for vehicle crash incidents on Google, it was done using search terms in Nepali language in order to capture most of the reports across the country. The search terms were on "deaths or injuries" due to "road crash" "car crash" "motorcycle crash" "vehicle crash" "pedestrian hit by" "bicyclist hit by" "ambulance crash" "tractor crash" "truck crashes" or "crashes or collisions occurred during lockdown;" and 2) through contacting the police to obtain road crash records. From both these data sources, only limited number of variables were available. The location of crash, vehicles involved in crashes and their counterparts (animal, people, or objects etc.), resultant number of deaths & injuries, and the age and gender of victims were extracted from media reports into an Excel spreadsheet. The total number crashes, deaths and injuries occurring in districts and provinces were taken from police records. This paper includes the road crashes information for 82 days of the lockdown (24 March to 14 June 2020) from media reports and police records. The exact location and types of vehicles involved in fatal crashes were not available from the Police data, therefore the exact detail of the vehicles and the location of crashes were extracted from the media reporting. With the available information of location, *Palika* level – (local government unit) for fatal crashes, the cases were nationally mapped. Similarly, comparisons have been made between the data for the same period for both the sources, where needed.

Results

Altogether, there were 1,801 incidents of road crashes recorded by the traffic police in 82 days (24 March to 14 June 2020) of lockdown from all seven provinces of Nepal, which included 2,602 vehicles (96% motorized) that claimed 256 lives and led to a further 1,824 injuries (among which 32% were severely injured). However, the media mostly reported fatal crashes, as 200 deaths and 322 injuries were extracted through media reports for the same period. The number of deaths and injuries reported by local media and taken from police records are given in the Underlying data (Sedain & Pant, 2020).

In this lockdown, no vehicles were allowed to operate without a government-issued pass for essential services. Police records show that in 82 days of full lockdown, an average of

3.1 people died and 22.2 people were injured daily as a result of road crashes. The media reporting of fatal road crashes was 21.8% less than the police record, and very few injuries and vehicle crashes were reported (Table 1).

Kathmandu Valley comprises of three districts, namely Kathmandu, Bhaktapur, and Lalitpur. Nepal Police has not recorded the road traffic deaths separately for these three districts and the records of the crashes were presented for Kathmandu Valley as a whole. Therefore, by including the three districts of Kathmandu Valley, Table 2 displays road traffic deaths from the 12 districts. In the lockdown period, 12 districts comprised more than half (53.4%) of the total deaths in Nepal. The largest number of people were killed in Kathmandu Valley's roads, followed by Kailali. Furthermore, Province 5 has the highest proportion (20.3%) of road traffic deaths, followed by Bagmati province (13.6%).

The information on fatal crashes by location extracted from media reports has been visualized (Figure 1) to show the crash-prone areas of Nepal. The visualization has shown that fatal crashes were concentrated more in the middle and lower region of country. Regarding provinces, the fatal crashes were higher in various locations of Bagmati Province and Province 5. The visualization additionally demonstrates that a large number of fatal crashes have occurred in local units in the junction of national highways of different local government units (or Palikas).

Table 3 shows the type of vehicles that instigated crashes and their counterparts involved in it. Motorcycles were the most common vehicles involved in fatal crashes, as usual. Among the total vehicles involved in the crashes, more than one-fifth (22.1%) were motorcycles followed by jeeps, tractors, and trucks. Along with other vehicles, 20 ambulances were found to have instigated road crashes which either hit other vehicles, people animals or roadside objects. The majority of the vehicles involved in the crashes were, reportedly went out of driver's control (52.2%) due to speeding. Similarly, 37 pedestrians were hit by the vehicles in these 82 days.

Discussion

Since testing for COVID-19 cases commenced in Nepal, 5,760 positive cases (as of 14 June 2020) and 19 deaths have been identified (Worldometer, 2020). On the contrary, 256 deaths and 1,824 injuries from road crashes were recorded between 24 March to 14 June 2020.

Road traffic injuries are the leading cause of death for the people aged 5–29 years worldwide (World Health Organization, 2018). It is also the leading cause of death and disabilities among people aged between 15 and 49 years in Nepal (Pant *et al.*, 2020). Regardless of the figures, which may vary from source to source, we aim to highlight road safety measures and their importance for the essential-service vehicles during adversity.

Table 1. Distribution of the road crashes incidents, vehicle involved in crashes, deaths and injuries during national level COVID-19, 82 days lockdown from police record and media reporting in Nepal.

Places	Vehicle involved in crashes	Incidents	Deaths	Injuries
Province 1	179 (6.9%)	137 (7.6%)	36 (14.1%)	186 (10.2%)
Province 2	337 (13.0%)	261 (14.5%)	44 (17.2%)	332 (18.2%)
Bagmati	130 (5.0%)	112 (6.2%)	26 (10.2%)	186 (10.2%)
Gandaki	58 (2.2%)	57 (3.2%)	15 (5.9%)	70 (3.8%)
Province5	308 (11.8%)	289 (16.0%)	68 (26.6%)	359 (19.7%)
Karnali	27 (1.0%)	25 (1.4%)	15 (5.9%)	50 (2.7%)
Sudurpaschim	66 (2.5%)	45 (2.5%)	25 (9.8%)	61 (3.3%)
Kathmandu Valley	1497 (57.5%)	875 (48.6%)	27 (10.5%)	580 (31.8%)
Total of Nepal Police	**2602 (100%)**	**1801(100%)**	**256 (100%)**	**1824(100%)**
Daily average	***31.7 vehicles***	***22.0 incidents***	***3.1 deaths***	***22.2 injuries***
Media reported	**544**	**272**	**200**	**322**

Source: Nepal Police Province 1, 2, Bagmati, Gandaki, 5, Karnali and Sudurpaschim headquarters, Metropolitan Traffic Police Office and media reports of road crashes reported

Table 2. Distribution of the top 12 districts by the road traffic deaths during national level COVID-19 lockdown in Nepal.

District	Province	Number of deaths	Percentage
Kathmandu Valley*	Bagmati	27	10.5
Kailali	Sudurpaschim	20	7.8
Banke	Province 5	19	7.4
Nawalparasi West	Province 5	13	5.1
Morang	Province 1	11	4.3
Siraha	Province 2	11	4.3
Dang	Province 5	11	4.3
Rautahat	Province 2	9	3.5
Rupandehi	Province 5	9	3.5
Sindhuli	Bagmati	8	3.1
Subtotal of deaths in 12 districts		138	53.9
Total deaths in Nepal		256	100.0

Source: Nepal Police Province 1, 2, Bagmati, 5 and Sudurpaschim headquarters record for road crashes incidents.

*Kathmandu Valley comprise three districts (Kathmandu, Bhaktapur and Lalitpur)

The total burden of road traffic injuries in Nepal is calculated to be approximately 123 million USD, and 90% of this amount comprised of indirect costs (Banstola *et al.*, 2020). Two-wheeled motorized vehicles (motorcycles and scooters) were most frequently involved in crashes and are found to be putting the largest burden on the economy directly and indirectly (Sapkota *et al.*, 2016). Tractors and jeeps were the second-most frequently involved vehicles in road crashes, which is shown by both the police and media records. An incident of injury tends to become a matter of interest to the media even in an adverse situation. Therefore, not all incidents of road crashes are covered by media. From our data, it is also apparent that the fatal cases are consistently reported in police records and media reports but cases of injuries are much less reported by the media.

From police records, an average of 154 incidents of road crashes takes place weekly, killing 22 people and causing 156 injuries during the period of lockdown. In the normal situation 7.6 people die in the road crashes (Nepal Police, 2019) and in this lockdown with the minimal transport mobility about 40% (3.1) people die per day in Nepal. Similarly, the ratio of deaths and injuries - a number that has surged from 1 death per 22.8 injuries during the non-lockdown period (Karkee & Lee, 2016), to 1 death per 7.1 injuries in lockdown. Perhaps the injured individuals were involved in more severe crashes during lockdown due to people's tendency to maintain higher speeds on the road. Drivers want to drive their vehicles at high speeds for different reasons (Gabany *et al.*, 1997), and when the roads are empty, speeding might

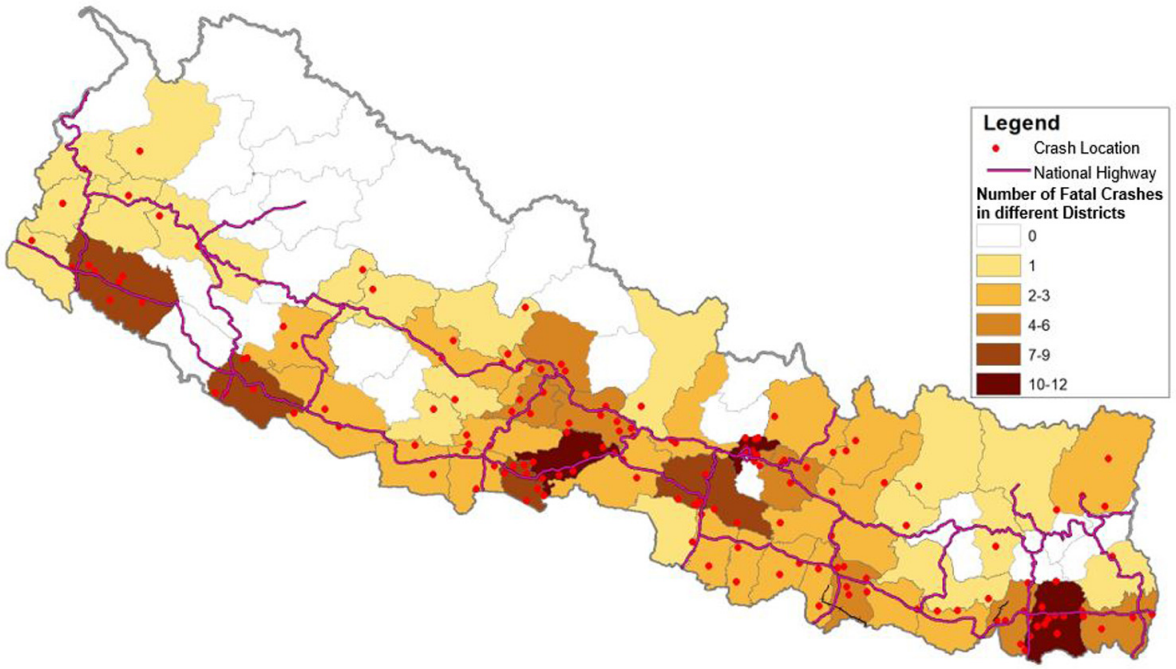

Figure 1. Visualization of road crashes deaths during COVID-19 lockdown reported in the media by Palika and national highway. Source: Locations of road crashes and fatalities from media reports. Map reproduced with the permission of the Survey Department of Nepal (2020) (Nepal Government Survey Department, 2020).

Table 3. Distribution of types of vehicle hit the other vehicle and vehicles hit by in the road crashes during national level COVID-19 lockdown in Nepal. Source: Media reporting of road crashes for the lockdown period (24 March to 14 June, 2020).

Vehicle hit the other vehicle	Number	Percent	Counterpart of the crash	Number	Percent
Ambulance	20	7.4	Animal	1	0.4
Cyclist	3	1.1	Auto tempo	1	0.4
Bus	10	3.7	Cyclist	9	3.3
Excavator	1	0.4	Car	3	1.1
HDV	1	0.4	Jeep	4	1.5
Jeep	54	19.9	Motorcycle	40	14.7
Motorcycle	76	27.9	Lamppost	3	1.1
Power trailer	2	0.7	Pedestrian	37	13.6
Tanker	2	0.7	Tractor	4	1.5
Tipper	10	3.7	Tanker	1	0.4
Tractor	52	19.1	Tree	2	0.7
Truck	34	12.5	Truck	6	2.2
Unidentified	5	1.8	Uncontrolled	142	52.2
Van	2	0.7	Unidentified	19	7.0
Total	**272**	**100.0**	**Total**	**272**	**100.0**

become obvious if there are no measures in place for speed control.

What do the data indicate?

The casualty data indicate that the burden of road crashes remains high in the lockdown period, a discovery that is different from a popular belief that causality or crashes have decreased substantially. In the absence of evidence-based practice of road safety, people incorrectly assume that reduced vehicular movement automatically reduces the risks of a crash. Given the small number of vehicles in operation, the problem is rather big. The number of deaths and injuries during the lockdown in Nepal would account for an entire year's road deaths for countries and territories such as Fiji, Suriname, Estonia, Montenegro, Saint Lucia, Cyprus and a further 17 countries (World Health Organization, 2018).

These crash and casualty figures worryingly indicating the magnitude of the problem when regular transportation will eventually resume in Nepal. In rural areas, the use of tractors on unsafe roads increases the risks of crashes. Further, our findings also indicate the lack of a safety culture among the operators of the essential services (including ambulances and the vehicles used by law enforcers). The current focus of the government is to improve roads, but free roads encourage drivers to speed, which is dangerous in terms of road crashes. Therefore, a system of speed monitoring must also be integrated.

Conclusion

Roadways are the major means of transport in Nepal. In this lockdown, large number of people had to make journeys to their homes by roads; many of those were exposed to the risks of unsafe roads transportation which led to their deaths and injuries. Therefore, this lockdown has reinforced how important the management of safer mobility issue is in Nepal. Interestingly, some of the preventative measures that have been proven effective to decelerate the spread of coronavirus apply in the context of road safety as these measures can teach us something for the road safety epidemic as well (Job, 2020). Therefore, for better road safety, unnecessary travels must be avoided and a safe distance should be maintained between the vehicles on the move. Likewise, the use of helmets, seat-belts, and child restraints are similar to the use of PPE, whereas the regular testing of vehicles, like COVID testing, is a must. In cities, traffic congestion was eased during the lockdown which consequently resulted higher speed, increasing the chances and impact of crashes. Therefore, awareness of safety and taking into account road and weather conditions when deciding to take a journey would help to keep people safe on the roads. The Government of Nepal has mobilised

unprecedented amount of resources in terms of human resources, budget and materials to address COVID-19 which has kept the rates of infection and deaths at minimum. If similar efforts and investments are done to address the problem of road traffic injuries, it would be possible to reverse the trend of ever-increasing burden of road injuries.

Data availability

Underlying data

Figshare: Road Traffic Injuries in Nepal during COVID-19 Lockdown_ Media reporting and Police record (24 March to 14 June, 2020).csv. https://doi.org/10.6084/m9.figshare.12958373.v3 (Sedain & Pant, 2020).

This project contains the following underlying data:

- Road Traffic Injuries in Nepal during COVID-19 Lockdown_Media reporting (24 March to 14 June, 2020).csv. (Road traffic injuries and deaths reported by local media.)
- Road Traffic Injuries in Nepal during COVID-19 Lockdown_Police records (24 March to 14 June, 2020). xlsx.csv. (Road traffic injuries and deaths taken form police records.)

Author contributions

Ms. Bhagabati Sedain conceptualised the study and prepared the first draft of the article with suggestions and critical comments from Dr. Puspa Raj Pant. Both the authors approved the final manuscript.

Acknowledgments

We would like to thank Mr. Santosh Sapkota, Metro Traffic FM, Nepal Police Human Resource and Administration Department for their valuable support. Similarly, I would like to thank Mr. Abhasha Joshi of Department of Survey for his technical support in plotting the locations of road crashes on the map of Nepal.

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Open Peer Review

Current Peer Review Status: ? ?

Version 1

Reviewer Report 10 November 2020

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Felix Wilhelm Siebert
Friedrich Schiller University Jena, Jena, Germany

The study presents secondary source road traffic injury and fatality data from Nepal for the time frame of the recent COVID-19 related lockdown between March and June 2020.
I understood the study as follows: The authors used Nepal Traffic Police data to extract numbers of fatalities and injuries (distinguished between heavy and non-heavy injuries) for the timeframe between March and June 2020. In addition, news articles were analyzed and reports on injuries and fatalities were collected for the same timeframe. Both datasets are then compared, and the authors find that not all fatal crashes are reported on, while even less of a percentage of crashes that "only" result in injuries are reported in the news. The authors list potential factors related to accident causes and hypothesize that speeding might play a larger role in crashes during the lockdown, as the road system is less crowded.
The article is very easy to read and all data is presented in a concise and clear way. I have two major comments before going through the manuscript in detail.

Comparison to pre-lockdown data
Before reading the manuscript, I expected that the authors would compare injury and fatality data during the lockdown to data collected outside of the lockdown period, e.g. to the same days in 2019. This would give an indication if the lockdown has led to a general increase in fatalities and injuries (this would be expected). The authors report non-lockdown data in the discussion section of the article (p.5 "In the normal situation 7.6 people die in the road crashes [...]") but I would have expected this comparison sooner, i.e. in the results section.
In addition, the comparison of the ratio of injuries to deaths should be presented sooner than in the discussion. The ratio named for the non-lockdown period ("Similarly, the ratio of deaths and injuries - a number that has surged from 1 death per 22.8 injuries during the non-lockdown period (Karkee & Lee, 2016), to 1 death per 7.1 injuries in lockdown.") is old, as the data used in the Karkee & Lee (2016) paper is from 2013.
Furthermore, it's unclear if the correct data from the Karkee and Lee paper is used to arrive at the death/injury ratio. It appears that the ratio of 1 death per 22.8 injuries is calculated from Table 1 in the cited article, but erroneously only injury and fatality data for Kathmandu is used. Calculating the death/injury ratio from the correct column (listing the "total" number for the last year of

available data) results in a death/injury ratio of 6.6. Hence, I advise that the authors either make it more clear which data is used for the calculation of the ratio, or (preferably) calculate the more current ratio for the whole year 2019 and for the exact same time frame as the 2020 lockdown, using 2019 data.

Timely distribution of fatalities and injuries within the lockdown time frame
The authors do a great job in describing outside factors that have influenced traffic density during the lockdown, i.e. especially before the lockdown there seems to have been higher traffic as people left for their home villages / home countries. While reading, I was wondering if this potential uneven distribution of traffic within the observed time frame would be visible in the distribution of injuries and fatalities, e.g. more injuries and fatalities in the beginning of the lockdown than in the middle/end. This could be visualized easily by plotting the percentage of registered injuries and fatalities over the lockdown time frame. This could also be presented alongside the same data for the same time frame in 2019.

Other comments:

- The title omits the analysis of fatalities during the lockdown, the authors should consider revising the title “Road traffic injuries and fatalities during [...]”
- I understand the urge to contrast numbers of road related fatalities with COVID-19 numbers, but they are very different things, mainly as they have completely different potential for exponential increases. Hence, I would suggest the authors revise the first sentence of the abstract to make road safety and COVID less contrastive.
- The results section of the abstract should present comparative data to the same time frame from a non-lockdown period.
- The conclusion part of the abstract is not supported by the results part of the abstract. The sentence “Even when the movement restrictions were imposed in Nepal, the number of road crashes was not substantially reduced.” needs to be supported by additional analyses in the manuscript, which will need to be mentioned in the results part of the abstract.
- “Within the window of the partial lockdown” please list clear time frames (i.e. dates).
- “Meanwhile, the second case of COVID-19 was detected on 23 March.” when was the first case detected? The authors should consider adding a timeline of COVID-related events in Nepal (e.g. First case, partial lockdown, lockdown, opening up, analyzed time frame).
- Do the authors have any information on the number of special “pass-permits” handed out during the lockdown? This could be related to the number of registered vehicles in Nepal, to get an idea of how much the traffic was reduced through the lockdown (hypothetically).
- In the discussion section, I would suggest the authors do not directly contrast COVID-19 and road related fatalities (same argument as before). It might be enough to change “On the contrary [...]” to a different wording.
- The second and third section in the discussion (“Road traffic injuries are the leading cause of death for [...]”) are quite general and do not directly relate to the results found in the study. I

think they are better suited to frame road safety challenges (global and in Nepal), and would be better placed in the introduction.

- For the sentence “Similarly, the ratio of deaths and injuries - a number that has surged from 1 death per 22.8 injuries during the non-lockdown period (Karkee & Lee, 2016), to 1 death per 7.1 injuries in lockdown.” Please revise for grammar. (and please also see my first major comment above).

- The section “What do the data indicate? The casualty data indicate that the burden of road crashes remains high in the lockdown period [...]” is not well supported by the results section of the paper (see my first major comment).

- In the conclusion, the authors write “Roadways are the major means of transport in Nepal. In this lockdown, large number of people had to make journeys to their homes by roads [...]”. But the authors earlier state, that the main movement of people happened during partial lockdown, i.e. before the time frame analyzed in this study. One could assume that during the early days of lockdown, some people used their vehicles illegally (without the special pass-permit), but this would need to be stated more clearly. The authors should clear this up (see also my second major comment).

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Traffic psychology

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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1. Abstract – For the methods sections, usage of secondary data from Police is fine and acceptable, but not from the media reports. Media reports does not cover all crashes and there could also be duplication of a single case is being reported by various media. Also it's the reporter and editor view. No one to verify it. Not recommended for scientific article unless no other options.

2. Methods – is it possible to do away with the media reports and completely rely on the police data (secondary data)? What kind of information we can get from police? If that is sufficient, then go ahead with police data only.

3. Results. Table 1. The paragraph tend to indicate as though the article is trying to compare two reporting system police vs media which is not the case as I believe you are using media to complement and close the gap for info not available from police source. Intention good, however the mechanism to address it is questionable since its unverified and its individually done by reporters.

4. Table 2. Purpose of it? My understanding is based on the title, there could be two options of story flow: 1. Before and during covid: RTC and RTI status. Option 2: study RTC and RTI during covid (there must be a purpose and benefit of doing one). Till this stage not clear yet.

5. Figure 1. Purpose of it? Does it tell us during covid the mapping of RTC and RTI are different compared to non-covid time. Therefore this are the areas to be targeted and focused by the government towards addressing the problem. Is this what you intend to?

6. Table 3. Purpose of it? Any different on its distribution / patterns from normal day which warrants attention? How best can we use this info towards our next move in terms of strategies or policy change with an aim to reduce RTC and RTI during covid.

7. Did we learn anything during covid which we can put to use after this which can give us better results in terms of managing RTC and RTI – example physical distancing, reducing exposure, lower ridership in vehicle etc. Effect of covid could be shift in travel mode to private vehicles or single rider vehicles to avoid crowd. Vehicle speed increases as more space with lower vehicle. There could be reductions in RTC, but RTI Fatal may not drop much.

8. Discussion para 3. USD123 million is for which year estimates? Interestingly 90% is based on indirect cost. Compared to other country studies, what are their range of % for indirect cost? Is it as high as this 90%?

9. What do the data indicate? RTC and RTI during covid should be compared during normal day within Nepal also. That is the right comparison and not against other countries like Fiji, Estonia, Cyprus etc.

10. Interesting to note on crashes involving ambulances during covid in comparison to normal day. Are they at more risk? If yes, what need to be done next? Increase in tractor usage does it adds to more crash? Any police data to show increase? Generally tractor as low speed vehicle pose less harm. Its only risk is when it shares the roadway with mixed traffic and the other traffic speed is very high and huge difference with the tractor speed.

11. Conclusion – the content in conclusion is very much different compared to the text inside the article. Many aspects not touched in the article is being concluded here example of using PPE, safety helmet, seat belts and CRS. Prefer conclusion strictly based on this study findings.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
No

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Injury prevention and safety promotion

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.