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An Overview of the Trends of Road Accidents and Indices in Nepal

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ABSTRACT
This paper discusses the current state of accidents with reference to variety of factors. Of years 2068 to 2076, secondary data was picked up from Kathmandu's metropolitan traffic police division. Trend and Statistical Analysis has been used. Seasonal indices has been calculated to examine time-effect on accidents rate. Numerous element were responsible to road accidents that contributes to the occurrence of accidents in its own way, and there may be many additional situation-specific factors untapped. However, the bulk of road traffic accidents have been seen in drivers age between 21 to 40, types of vehicles reported on accidents were motorcycles, scooters, tractors, and tempos, and , time between the hours of 6 p.m. and 12 a.m. Similarly, male pedestrians and motorcyclists/scooters had a higher rate of fatality. The hours of 12 p.m. to 6 p.m. had 17.8 percent *more accidents than average, and the hours of 6 p.m. to 12 a.m. had a 68.15 percent higher chance of an accident.*

Key words: Injury, Road Safety, Seasonal Indices, Traffic Road Accident, Vehicles

Introduction

Road traffic accidents are the eighth leading cause of death worldwide, with projections that they will rise to the top five by 2030. Countries in the WHO's Western Pacific and South-East Asia Regions (WHO, 2004), in particular, account for more than half of all road traffic accident-related deaths worldwide. The South-East Asia region's mortality rate is 18.5 per 100,000 people, with motorized two- and three-wheelers accounting for one-third of all deaths. Around 30 % of the countries in this region have policies encouraging people to walk and cycle.

In Nepal, the population expanded by 15 % from 23.2 million in 2001 to 26.6 million in 2011, while vehicle registration increased by 325 percent from 317284 in fiscal year 2000–2001 to 1,348,995 in fiscal year 2011–2012. By July 2015, Nepal had about 2 million automobiles registered across the country (MGoN, 2013). Two-wheelers (motorcycles) account for over 80 % of these vehicles, followed by light vehicles such as sedans, jeeps, and pickup vans.

Despite the surge in road traffic accidents observed in recent years and spurred in number of vehicles registered, a few attempt has been done to explore situation, cause and remedies regarding the road accidents in Nepal. Expansion of road connectivity and increase in vehicles have been a cause of uptick in road accident deaths. The injuries and fatality have been a burden to society in many ways, so more academic focus is needed to address to mitigate the effect of road accidents. The paper, thus, endeavors

to peek through to examine status and causes of road accidents using the secondary data.

A review of the effect of traffic and weather characteristics on road safety was presented by Yannis (2014). Despite the fact that evidence on the effect of traffic parameters is generally mixed, a few patterns can be observed. For instance, traffic flow seems to have a non-linear relationship with accident rates, even though some studies suggest linear relationship with accidents. Regarding weather effects, the effect of precipitation is quite consistent and leads generally to increased accident frequency but does not seem to have a consistent effect on severity. The impact of other weather parameters on safety, such as visibility, wind speed and temperature is not found straightforward so far.

A review of the road traffic accident in Kathmandu valley was presented by Dhakal (2018), using data from the years 2069 to 2074 for the analysis. Despite being Nepal's capital, the Kathmandu valley has the highest number of road accidents when compared to the rest of the country. In the first case, he discovered that the accident and death of the passengers occurred in bike riders, while the second case involved car and jeep accidents.

An analysis of accidents on National Highway-3 from Indore to Dhamnod was presented by Meshram and Goliya (2013). The data for this study was gathered from September 2009 to September 2011. Faulty road geometry caused more accidents in the Manpur region. Accidents in the urban area of the country (Indore) account for more than 35% of all accidents each year. This could be due to higher speeds and increased vehicle traffic. In the current study area, fatal accidents occur twice a week, while minor accidents occur six times a week. There are more accidents between the hours of 6 p.m. and 8 p.m. because more buses go between villages and the city at that time. In the research region, one fatality and five casualties occur per km per year. The number of trucks moving through the study corridor is growing year after year.

Mehar and Agarwal (2013) highlighted the deficiencies in the present state of the art and also presents some basic concepts so that systematic approach for formulation of a road safety improvement program in India can be developed. The study presents basic concepts to develop an accident record system, for ranking of Safety hazardous locations, for identification of safety improvement measures and to determine priorities of safety measures. It is expected that this study will provide a systematic approach for development of road safety improvement program in India and thus pave the way for improving safety on Indian roads.

A review of the epidemiology of road injuries in Nepal was presented by Karkee and Andy (2015). The data for this study was gathered from 2001 to September 2013. Over a 12-year period from 2001 to 2013, Traffic Police registered 95 902 crashes, 100 499 injuries, and 14 512 deaths. The death rate climbed from 4 per 100,000 in 2001–2002 to 7 per 100,000 in 2011–2012. The majority of RTAs were reported to happen to motorcyclists and pedestrians, men, and those in their 20s and 40s. Pedestrian road behavior, alcohol consumption, and poor bus driving are all potential causes of accidents. This research will provide a systematic approach to road traffic accident safety.

According to Bishnu Prasad Chaulagai and Krishna Prasad Adhikary, the male to female victim ratio was 2.3:1. Around 75 % of the victims were between the ages of 15 and 49. The most vulnerable were pedestrians (33 percent), followed by riders on motorized 2-3 wheelers. RTAs using two-wheeled motorized vehicles were the most common (67.2 percent).

Numerous attempts in this area has been limited to presenting the percentages of accidents. The paper

aims to tracking the factors responsible in road accidents, their association with time factor using method of seasonal indices which is less practiced method in this field.

Material and Methods

Between the years 2068/2069 and 2075/2076, data was collected from the Police Headquarter, Operation Department, Traffic Directorate, Naxal, and Metropolitan Traffic Police Division, Kathmandu. Trends and analytical statistical approaches were used to analyze the data. Within a 24-hour period, seasonal indices have been calculated for various time periods.

Result and Discussion

The trends analysis of various characteristics related to road traffic accident has been presented in this section graphically occurred between 2068/69 to 2075/76 year.

Trends of road accident with conditions of injury over time

Graph 1 depicts the state of injury cases from the years 2068 to 2076. From 2068 to 2071, the number of road accident cases gradually fell before significantly increasing until 2076. The maximum number of accidents (8,511) occurred in 2075/76, while the lowest number (4672) occurred in 2070/71. Similarly, the maximum number of deaths (254) occurred in 2075/76, while the lowest number (133) occurred in 2071/72. Similarly, the highest number of badly injured (396) was discovered in 2068/69 and the lowest number (201) in 2073/74. The majority of minor injury cases (5890) occurred in 2075/76, whereas the minority of minor injury cases (3317) occurred in 2068/69.

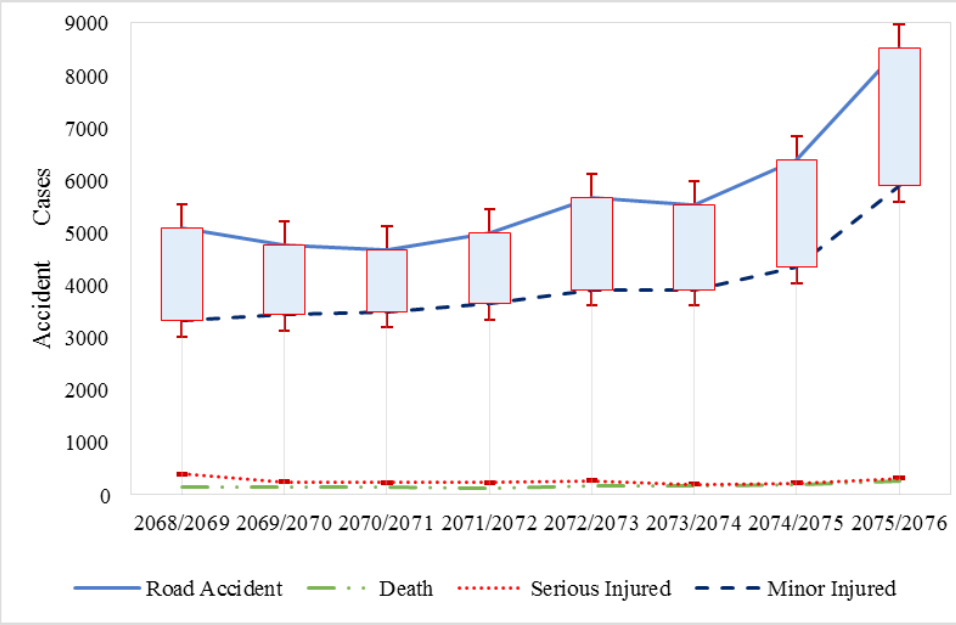

Figure 1: Trends of Road Accident

Trends of traffic road accident by vehicle across fiscal year

The vehicles were divided into six groups. Figure 2 depicts the trends in accident rates over time and for different types of vehicles. Every year, the bulk of accidents occurred in tempo/tractor and motorcycle/scooter, followed by car/van/jeep, and this trends has continued.

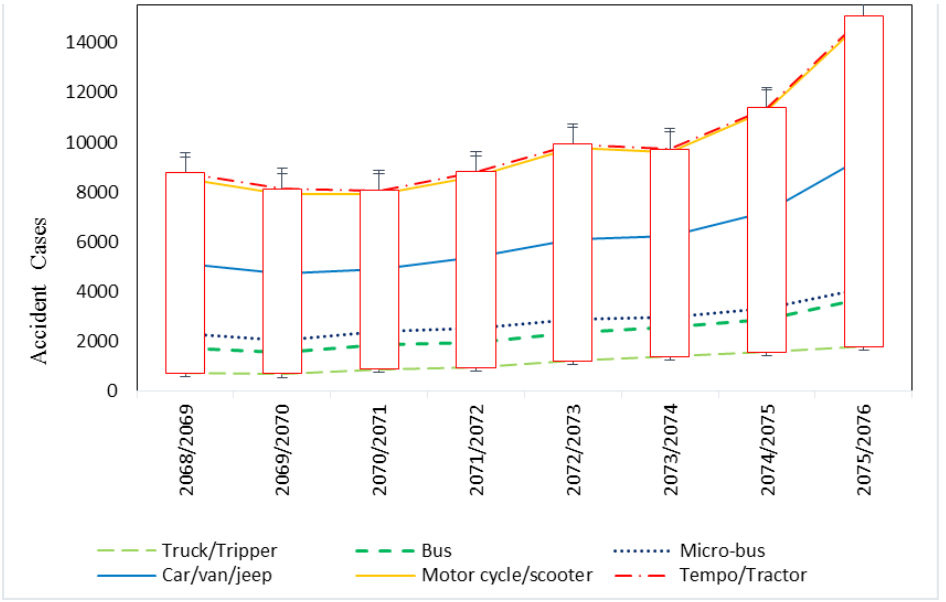

Figure 2: Trends of vehicles involved in road accident

Trends of road accident over 24-hour time

Throughout this slice, 24 hours of daily time were divided into four sections**:** accident time **(**12PM-6PM**)**, 6PM-12AM, 12AM-6AM, and 6AM-12PM**.** The majority of accidents occurred between the hours of 6 p.m**.** and 12 a.m**.**, and the least occurred between the hours of 6 a.m**.** and 12 a.m**.**, as shown in Figure 3**.**

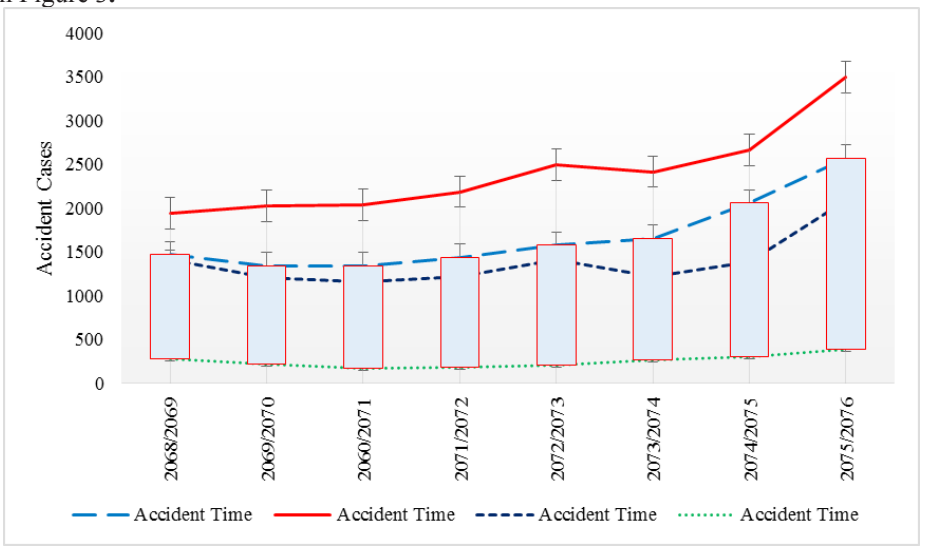

Figure 3: Trends of average road accident based on time period

Trends of death party involved in road accident

From the years 2068 to 2076, a death party due to an accident has been observed. The number of pedestrian and motorcycle/scooter deaths was high and increasing year after year. Other causes of death, such as buses, trucks, bicycles, and micro, were few and immobile in recent years, as illustrated in Figure 4.

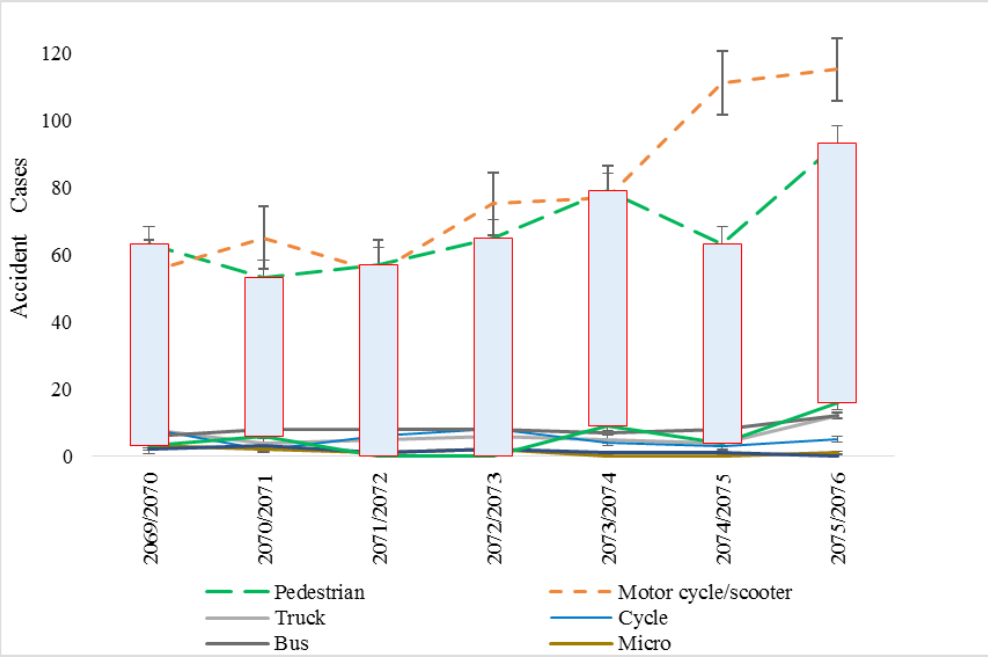

Figure 4: Trends analysis of death party involved in accident

Trends of death party by their sex

Every year, the number of male deaths was higher than female deaths. Over the last eight years, the average number of male and female deaths was 129 and 41, respectively. Male death rates have been swiftly rising, whereas female death rates have been steadily rising.

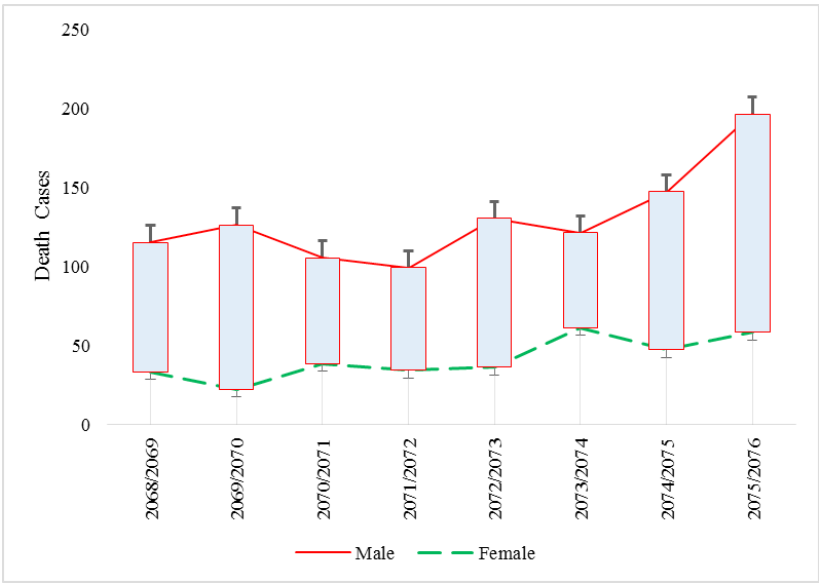

Figure 5: Trends analysis of death of male and female

Trends of death party by their age

The age of death party is divided into three categories: under 16 years, 17-35 years, and 36 years and up. The total number of deaths among those aged 17 to 35 years was high as compared to other age groups, and the trends continued. In the year 2076, the average number of deaths for those under the age of 16, those aged 17 to 35, and those aged 36 and up were 14, 147, and 92, respectively.

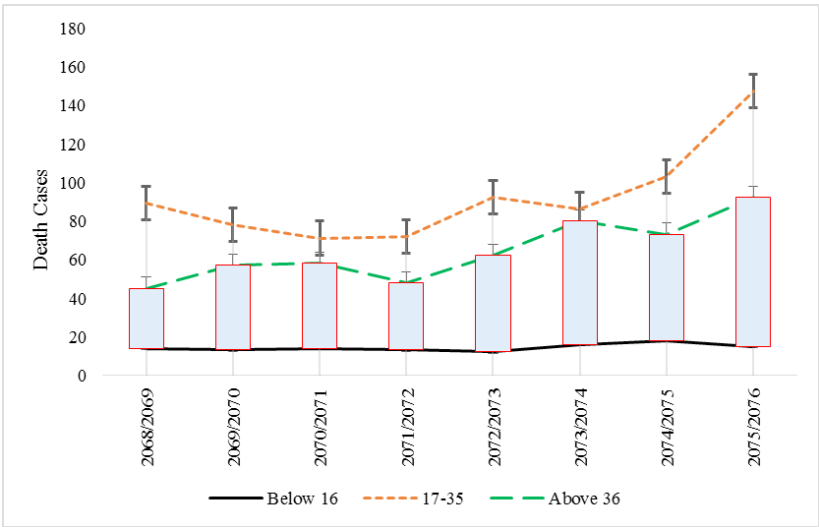

Figure 6 Trends analysis of death on the basis of age

Trends analysis of road accident and its causes.

The causes of accidents can be divided into four categories**.** The leading cause of accidents has been identified as driver negligence, which is on the rise every year**.**

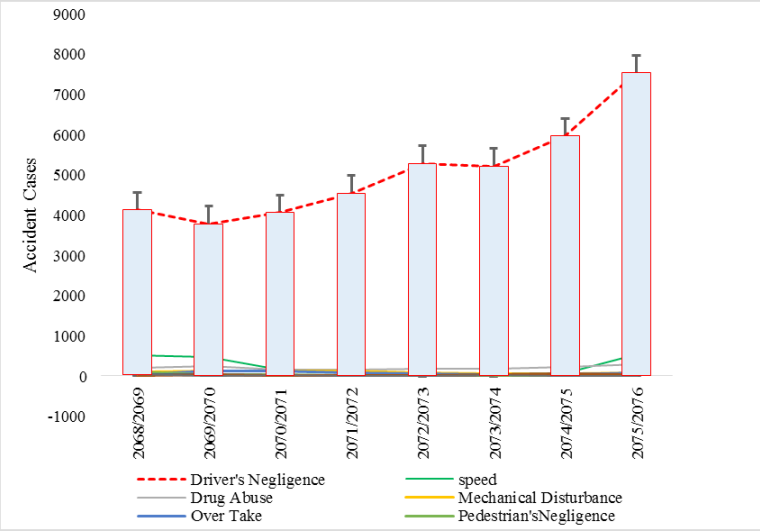

Figure 7: Trends analysis of cause of road accident

Trends on accidents by age of driver

One of the most common causes of accidents is driver negligence**.** As a result, it was required to identify the age group of drivers who played a significant part in the collision**.** Except for fiscal year 2069/70, the accident rate was high among drivers aged 21–40 years, and it subsequently increased**.**

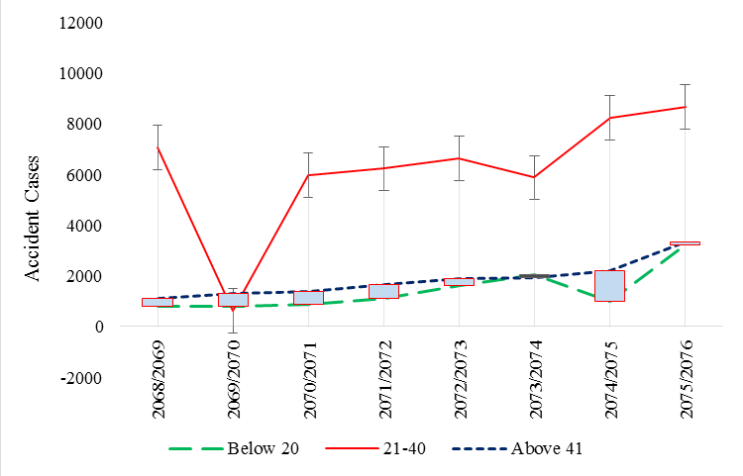

Figure 8: Trends analysis of Road Accident based on age of driver

Seasonal indices for time period within 24 hours

Seasonal indices (SI) were generated in this section for four separate time periods within a 24-hour period. The SI's are shown in table 1.

Table 1. Seasonal Indices

Time	12PM- 6PM	6PM - 12AM	12AM - 6AM	6AM - 12PM
Time Indices	117.80	168.15	96.68	17.37

The SI for the time period 12PM-6PM is 117.80 indicating that 17.8 % of the accidents occurred more frequently than the average. Similarly, compared to normal incidents, the nighttime 6PM-12AM had a 68.15 % higher likelihood of occurrence of an accidents. As compared to the average accident, there were 3.32 % fewer accidents in the morning 12AM-6Am and 83.63 % less in the morning 6AM-12 PM. It has been determined that there is a very high chance of being involved in an accident between the hours of 6 p.m. and 12 a.m.

Conclusion

We demonstrated in this research that various factor involved in road accidents and contributes to the occurrence of accidents in its own way, and that there may be many more situation-specific elements that are unexplored. However, the majority of road traffic incidents have been documented in drivers aged 21 to 40, with motorcycles, scooters, tractors, and tempos being the most common vehicles involved, with accidents occurring between the hours of 6 p.m. and 12 a.m. Likewise, male pedestrians and motorcyclists/scooters also had a higher fatality rate. There were 17.8 percent more accidents between 12 p.m. and 6 p.m., and a 68.15 percent higher likelihood of an accident between 6 p.m. and 12 a.m.

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