

# A Bayesian Structural Time Series Model for Assessing Road Traffic Accidents during COVID-19 Period

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**Abstract** - This is a systematic study to understand the effect of the implementation and removal of restrictive measures on road accidents statistics, using newspaper-based database. The time frame of data is between 1st January 2020 to 31st December 2020. In this period, 26th of March was the first day of official lockdown and 30th of May was the day of lockdown withdrawal in Bangladesh. However, the first COVID-19 affected case was identified on 8th of March followed by the closure of educational institutions on 18th of March of the same year. In the selected time frame, the total number of accidents was recorded 3,069 with total injuries and fatalities being 593 and 3,570 respectively. The new confirmed cases, death and recovered cases of Coronavirus affected people were collected from Humanitarian Data Exchange, 2020 to understand their correlations with accident statistics. This study considered two interventions: starting of lockdown and reopening. Results suggest that the number of daily traffic accidents and related fatalities increased by about the same amount after the reopening as they had decreased due to the lockdown. This study also conducted the two-sample t-tests to find variations of mean in overall incident cases, casualties, and injuries on a daily basis before, during, and after the mandatory lockdown. It is found that there is a significant reduction in total road traffic accidents in the lockdown period than pre-lockdown period, followed by a slight increase in the post lockdown period. In case of fatalities, before and during the lockdown, a drastic reduction has been observed from 13.94 to 5.80 with p-value  $< 2.2e-16$ , followed by an increase. Finally, statistics of mean injuries have also experienced a steep drop during the lockdown period and rise after the lockdown. The effect size of the obtained means is also evaluated using Cohen's d test.

**Keywords:** Road Accident, Time Series Model, Lockdown, COVID-19, Bangladesh.