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PhD Dissertation Defense

Entitled

Factors affecting changes in road traffic collision related injuries and deaths over time: the global and the United Arab Emirates perspectives

by

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Abstract:

Introduction: Road traffic collisions (RTCs) cause 1.35 million deaths per year worldwide.

Approximately 50% of these deaths were among pedestrians and motorized 2-3-wheeler users. In the United Arab Emirates (UAE), RTC deaths were higher compared to other high-income countries (HICs). The United Nations (UN) Decade of Action for road safety 2011-2020, aimed to reduce road traffic deaths by 50% by the year 2020. The aim of this dissertation was to investigate factors affecting changes in RTC-related injuries and deaths over time at global and UAE levels.

Material and Methods: Multiple research methods were used to investigate the research questions. Global data on pedestrian and motorized 2-3-wheeler users were retrieved from World Health Organization (WHO) Global Status Reports on Road Safety, published from 2009 to 2018. The primary data on the impact of the COVID-19 pandemic on RTCs for the UAE and the data on the impact of trauma system development on motorcycle-related deaths were obtained from the trauma registries of the two major hospitals in Al-Ain: Al-Ain and Tawam hospitals. A mixed linear model and univariate and multivariate regression analysis were performed.

Results: Global pedestrian mortality decreased by 28% over the 10-year period of the study. Factors that reduced pedestrian death rates included time, gross national income (GNI), and vehicle/person ratio. There was a significant drop over time in both HICs and middle-income countries (MICs), but not in low-income countries (LICs). In contrast, the global mean motorized 2-3-wheeler-related death rates increased from 2.37/100,000 population to 3.23/100,000 population during the same period (a relative ratio of 1.36) which was not statistically significant. Factors that affected motorized 2-3-wheeler-related mortality included GNI, motorized 2-3-wheelers/person ratio, helmet wearing rate, and the interaction between vehicle/person ratio and motorized 2-3-wheelers/person ratio. A significant increase in motorized 2-3-wheeler-related death rates was observed over time in LICs and MICs, compared to a significant decrease in the rate in HICs. The incidence of hospitalized RTC trauma patients was significantly reduced by 33.5% during the COVID-19 pandemic. Nevertheless, mortality from RTCs increased significantly during the pandemic. The factors that predicted mortality were low Glasgow Coma Scale (GCS), admission to the Intensive Care Unit (ICU), and high Injury Severity Score (ISS). The COVID-19 pandemic had a strong impact for increases in mortality due to RTC. The trauma system development in Al-Ain has reduced the incidence of motorcycle injuries by 37% over 15 years. It has significantly decreased mortality in Al-Ain.

Significant Contributions: This is the first attempt to identify potential factors and conditions

– including previously unknown ones (such as the COVID-19 pandemic) that change RTC-related injuries and deaths at the global and UAE levels over time, mainly during the Decade of Action for Road Safety 2011-2020. Our findings can serve as a baseline for future evaluations of RTCs and for improvements in road traffic-related injury prevention and intervention strategies during both normal and pandemic periods.

Gap filled: The economic disparities between countries, the maturity of the trauma system, and the COVID-19 pandemic restriction measures, along with the obtained results are consistent to give a clearer picture in understanding the difference in RTC-related deaths and injuries locally and globally over time, both during normal times and pandemic periods.

Keywords: Global, Pedestrian, 2–3-wheelers, Motorcycle, COVID-19, Death, Trauma, Road traffic collision, United Arab Emirates, UAE