Doi:

The Intra-city/Extra-city Paradox in Iran's Road Safety: Disparities in Accident Frequency and Fatality Rates

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Original Article

Abstract

INTRODUCTION: Road traffic accidents represent a significant public health challenge globally, and Iran continues to experience disproportionately high rates of traffic-related morbidity and mortality. This study presents a provincial-level analysis of road traffic accidents in Iran during the 2022–2023 period.

METHODS: A retrospective analysis was conducted using data from the Statistical Center of Iran, encompassing all recorded road traffic accidents across 31 provinces during the March 2022 to March 2023. Descriptive statistics, accident and fatality rate calculations, independent-samples t-tests, and Pearson correlation analyses were performed to compare intra-city and extra-city patterns. Statistical significance was defined as $p<0.05$. Data processing and statistical analyses were carried out using Excel 2019 and SPSS 26, while geographic visualizations were developed using Datawrapper.

FINDINGS: In 2022, a total of 2,119,406 road traffic accidents occurred in Iran, leading to 18,799 deaths and 379,020 injuries. Although intra-city areas accounted for the majority of accidents (81.8%; n = 1,733,200), extra-city crashes were markedly more severe. The fatality rate in extra-city areas was 37.48 per 1,000 accidents, compared with 2.5 per 1,000 in intra-city areas ($p < 0.001$), indicating that extra-city crashes are approximately 15 times more likely to result in death. Significant regional heterogeneity was also observed: Tehran Province reported the highest number of accidents (514,498), whereas Sistan and Baluchistan exhibited the highest fatality rate (167.76 per 1,000 accidents). A negative correlation was identified between total accidents and fatality rates across provinces ($r = -0.42$, $p = 0.018$), suggesting that provinces with fewer accidents often experience more severe outcomes when crashes occur.

CONCLUSION: The results reveal a pronounced intra-city/extra-city divide, where extra-city crashes are 15 times more fatal, alongside severe provincial disparities and highlight the need for differentiated prevention strategies, emphasizing improvements in extra-city infrastructure, enforcement, and emergency response capacity—particularly in high-risk regions.

Keywords: Road Traffic Accidents; Injury Prevention; Mortality; Public Health; Intra-city/Extra-city Disparities; Geographical Analysis; Epidemiology.

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Introduction

Road traffic injuries remain a critical global public health concern and a leading cause of mortality and long-term disability. According to the most recent international estimates, approximately 1.35 million people die each year due to road traffic crashes, and tens of millions sustain non-fatal injuries requiring medical care or resulting in lifelong impairment (1).

The burden falls disproportionately on low- and middle-income countries, where rapid motorization, heterogeneous vehicle fleets, and limitations in road safety management systems contribute to elevated injury and fatality risks (1, 2). Beyond their human toll, road traffic injuries impose substantial economic losses due to medical

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