EPIDEMIOLOGY, PATTERNS AND TRENDS OF ROAD TRAFFIC ACCIDENTS IN GHANA: AN IMPLICATION FOR ORGAN DONATION

INTERNATIONAL SOCIETY OF GEOGRAPHICAL & EPIDEMIOLOGICAL OPHTHALMOLOGY
SOCIETE INTERNATIONALE D'OPHTALMOLOGIE GEOGRAPHIQUE ET EPIDEMIOLOGIQUE

ID 65

Fordjuor G,[1] Lartey S,[2] Bonsaana GB,[3] Amoah K,[4] Abaidoo B,[5] Tetteh J,[6] Berzack S,[7]
All Ophthalmology Residents at participating centers who are members of the organ donation study.[1,2,3,4]

[1]Eye Department, Korle Bu Teaching Hospital, Accra, [2]Eye Department, Komfo Anokye Teaching Hospital, Kumasi, [3]Department of Ophthalmology, School of Medicine, University for Development Studies, Tamale, Ghana, [4]Eye Department, Cape Coast Teaching Hospital, Cape Coast, [5]Ophthalmology Unit, Department of Surgery, University of Ghana Medical School, Accra, [6]Department of Community Health, University of Ghana Medical School, Accra, [7]Herbert Wertheim College of Medicine, Florida International University, Miami, Florida, United States of America

INTRODUCTION

Road traffic accidents (RTAs) are a major socioeconomic and public health concern worldwide, accounting for 90% of injuries and fatalities in low- and middle-income countries (LMICs), including Ghana [1]. RTAs have a big impact on people in several ways, affecting individuals, families and communities. An estimated 1.4 million persons worldwide die in RTAs annually with the majority of these victims being young people residing in developing nations [2]. Globally, about 50% of all fatal RTAs results in brain death which is an indication for a potential pool of organ donors [3]. However, this option has not been explored in Ghana even though mortalities from RTAs keep increasing. More so, there is a significant discrepancy between the needed and actual quantity of organ donations in Ghana. With this background, this study was planned to determine the epidemiology, patterns and trends of RTA in Ghana from 2012 to 2023 hypothesizing that an increased rate of RTAs could serve as a potential source for harvesting corneal tissues in the country for eye banking.

AIM

This study examines the epidemiology, patterns, and trends of RTAs in Ghana from 2012 to 2023 and explores their implications for organ donation.

METHODS

This was a retrospective study with secondary data on RTAs in Ghana from the Ghana Police Service, from 2012 to 2023, to determine the potential donor pool of corneal tissues in the country from RTA. Data collected were recorded in a Microsoft excel spreadsheet and exported to the SPSS software version 25 for analysis. Data collected include; the year RTA occurred, the region where the RTA occurred, total number of cases in each year, the sex distribution, number of vehicles involved, fatality, serious, minor, persons killed and persons injured, corresponding population, number of mortalities. Data analyses was performed using BM SPSS Statistics Version 25. Descriptive analysis and cross-tabulations were done. A linear regression model was fitted for the population and the total number of RTAs. P-values less than 0.05 were considered statistically significant.

Ethical clearance was obtained from the institutional Review Board of the Korle Bu Teaching Hospital (with IRB number: KBTH-STC/IRB/000148/2023). We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline in reporting the outcome of the study. To protect human subjects in medical research, we adhered to the official declaration of ethical principles released by the World Medical Association (WMA).

RESULTS

A total of 166,327 accident cases occurred in Ghana involving 268,705 vehicles from 2012 to 2023 with an average of 13860.58±1401.35 accidents. There were 21,944 fatal accidents, 52,035 serious accidents, and 92,348 minor injuries. A total of 26,942(16.2%) persons were killed with an average of 2,245±323 deaths. The overall case-fatality rate was 16.2%. An increase in population corresponded with an increase in the number of RTAs (Y = 6963.74+225.9X).

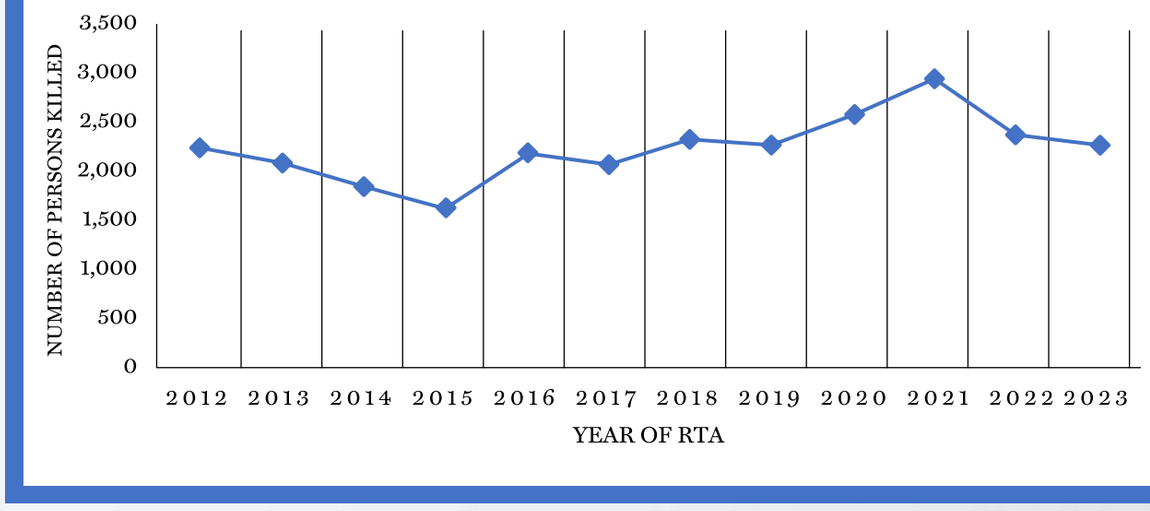

Figure 1: Number of persons killed.

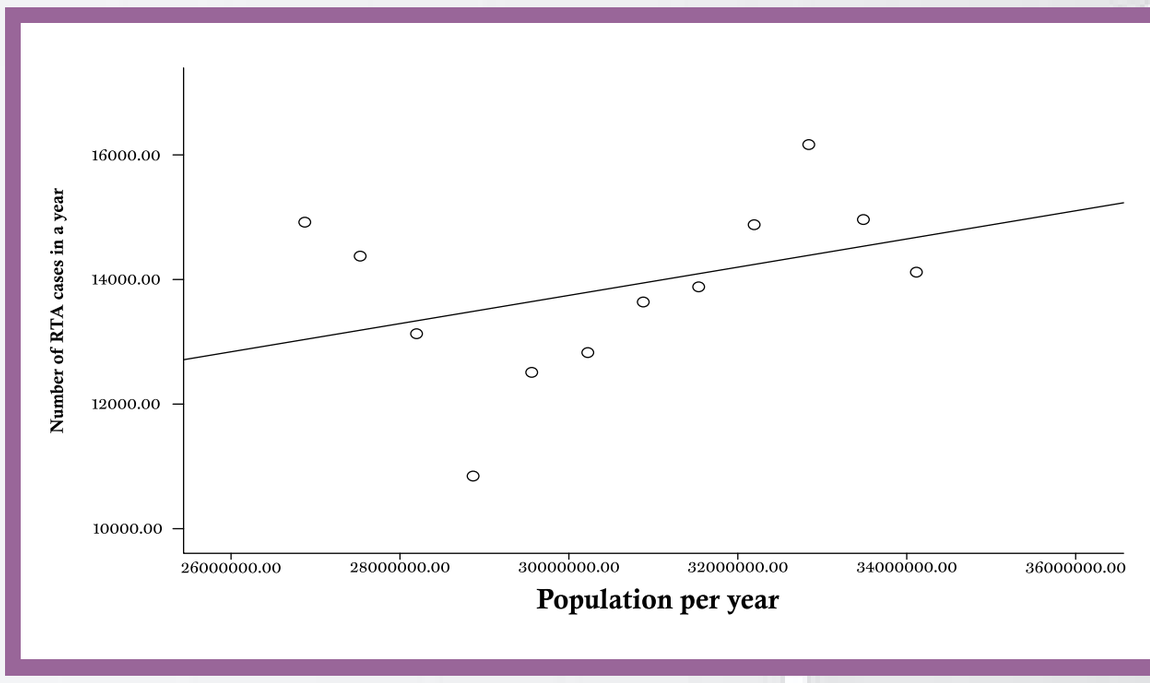

Figure 2: Scatter plot of number of RTAs in a year per population

Table 1: Demographic profile of accident cases in Ghana (2012 to 2023)

Year	Total number of cases	Total Persons killed (%)	Males killed (%)	Females killed (%)
2012	14,914	2,249(15.1)	1,746(77.6)	503(22.4)
2013	14,390	2,096(14.6)	1,558(74.3)	538(25.7)
2014	13,133	1,856(14.1)	1,427(76.9)	429(23.1)
2015	10,852	1,634(15.1)	1,249(76.4)	385(23.6)
2016	12510	2198(17.6)	1,701(77.4)	497(22.6)
2017	12843	2076(16.2)	1562(75.2)	514(24.8)
2018	13645	2341(17.2)	1796(76.7)	545(23.3)
2019	13877	2284(16.5)	1760(77.1)	524(22.9)
2020	14886	2589(17.4)	2117(81.8)	472(18.2)
2021	16182	2970(18.4)	2423(81.6)	547(18.4)
2022	14960	2373(15.9)	1860(78.4)	513(21.6)
2023	14135	2276(16.1)	1806(79.3)	470(20.7)
Total	166,327	26,942(16.2)	21,005(78.0)	5,937(22.0)

Table 2: Case-fatality rates for RTAs in Ghana (2012-2023)

Year	Total number of cases	Total Persons killed	Case fatality Rate (%)
2012	14,914	2,249	15.1
2013	14,390	2,096	14.6
2014	13,133	1,856	14.1
2015	10,852	1,634	15.1
2016	12510	2198	17.6
2017	12843	2076	16.2
2018	13645	2341	17.2
2019	13877	2284	16.5
2020	14886	2589	17.4
2021	16182	2970	18.4
2022	14960	2373	15.9
2023	14135	2276	16.1
Total	166,327	26,942	16.2

Table 3: Extent of RTA case from 2012-2023 in Ghana

Year	Total number of cases	Vehicles involved	Fatal	Serious	Minor	Persons killed	Persons injured
2012	14,914	21,817	1,790	4,224	8,900	2,249	14,181
2013	14,390	22,208	1,645	4,100	8,645	2,096	12,655
2014	13,133	20,442	1,459	3,741	7,933	1,856	11,328
2015	10,852	16,958	1,373	3,225	6,254	1,634	9,186
2016	12510	19495	1785	3968	6757	2198	11293
2017	12843	20444	1747	4193	6903	2076	12166
2018	13645	22032	1885	4268	7492	2341	13677
2019	13877	22789	1832	4402	7643	2284	14397
2020	14886	25152	2148	4919	7819	2589	15517
2021	16182	27616	2468	5215	8499	2970	15935
2022	14960	25754	1939	5037	7984	2373	15690
2023	14135	23998	1873	4743	7519	2276	15409
Total	**166,327**	**268,705**	**21,944**	**52,035**	**92,348**	**26,942**	**161,434**

Table 4: Summary of the regression co-efficient for the model

Predictor	Co-efficient	Standard of co-efficient	P-value	Adjusted R Square
Constant	6963.7	5263.8	0.215	0.062
Population	225.9	172.0		

IMPLICATIONS

The increasing trend of RTAs and associated fatalities in Ghana poses a significant healthcare challenge. This highlights the dual need for enhanced road safety measures and the development of a sustainable organ donation system which will effectively utilize this organ donor pool. Addressing cultural and systemic barriers to organ donation could save lives whilst reducing the burden of RTA-related fatalities

ACKNOWLEDGEMENT

Our appreciation to the Director-General, Motor Traffic and Transport Department, Ghana Police Service, Police Headquarters, Accra and all Police Officers who assisted in gathering this data.

REFERENCES

1. WHO, Global Status Report on Road Safety 2018, WHO, Geneva, Switzerland, 2018, https://apps.who.int/iris/ bitstream/handle/10665/276462/9789241565684-eng.pdf.
2. Ivers R, Brown K, Norton R, Stevenson M. Road Traffic Injuries. International Encyclopedia of Public Health. 2016:393–400.
3. Kumar A, Lalwani S, Agrawal D, Rautji R, Dogra TD. Fatal road traffic accidents and their relationship with head injuries: An epidemiological survey of five years Indian J Neurotrauma. 2008; 5:63–7.

AFFILIATE LOGOS