FACTORS ASSOCIATED WITH HELMET USE AMONG MOTORCYCLISTS PRESENTING WITH MAXILLOFACIAL INJURIES TO A TERTIARY HOSPITAL IN GHANA

Boateng Y.A[1,2], Blankson P.K[2,4], Mensah E.N.L[1], Gyau-Darko B[1], Ketemepi G.D.K[1,3], Arhin F.K[1], Bosompem-Acheampong K[1], Alhassan M[1], Yeboah-Agyapong M.K[1], Salifu H.A[1].

[1] Dental Division, 37 Military Hospital, Accra, Ghana.
[2] University of Ghana Dental School, Accra, Ghana.
[3] University of Health and Allied Sciences, Ho, Ghana.
[4] Korle Bu Teaching Hospital, Accra, Ghana.

Correspondence author: Boateng YA, Dental Division, 37 Military Hospital, Accra, Ghana.University of Ghana Dental School, Accra, Ghana.
Correspondence e-mail: amanboat95@gmail.com

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ABSTRACT

Background: Although mandatory helmet laws exist in many countries, compliance has been reported to be poor in some countries in Sub-Saharan Africa. The success of programs aimed at increasing the use of helmets by motorcyclists depends on the identification of the factors associated with helmet usage. Sociodemographic factors have been reported to differ between motorcyclists who consistently wear a helmet and those who do not. The identification of the factors associated with helmet usage would enable the institution of targeted measures to enhance compliance with mandatory helmet laws.

Methods: The study examined factors associated with wearing helmets by motorcyclists to inform policies geared towards reducing the burden of motorcycle-related road traffic crashes. This analytical cross-sectional study was conducted at the 37 Military Hospital, Accra, Ghana. Demographic data of patients presenting with maxillofacial injuries secondary to motorcycle crashes were consecutively collected and analyzed. The use of a helmet was compared among sex, age category, occupation, and patient role. Statistical significance was inferred at an alpha level of 0.05.

Results: There was no statistically significant difference in the use of helmet by male and female motorcyclists. (P=0.537). Middle-aged adults were more likely to wear a helmet as compared with young adults and minors. (P=0.043). Also, 62% of formally employed participants wore helmets, while a disparate 46% and 30% of informally employed and unemployed participants wore helmets at the time of injury. The difference was statistically significant (P=0.019), likewise the comparison of helmet wearing between riders and pillion passengers (P=0.002).

Conclusion: The use of helmets by motorcyclists is associated with age, occupation, and role of the motorcyclists. The implementation of mandatory helmet laws needs to consider the attitude of particular population groups to ensure its success.

Keywords: Motorcyclists, Maxillofacial, Helmet.

INTRODUCTION

Appropriately using a certified motorcycle helmet has been considered the most important global measure in reducing the morbidity and mortality associated with motorcycle usage[1]. A systematic review and meta-analysis on the economic impact of helmet use on motorcycle crashes reported that non-helmeted riders required $12,239 more on hospital care, more post-discharge care, and higher severity of injury compared to the helmeted population[2]. Although mandatory helmet laws exist in many countries, compliance has been reported to be poor in some countries in Sub-Saharan Africa[3]. The success of programs aimed at increasing the use of helmets by motorcyclists depends on identifying the factors associated with helmet usage.

Research conducted in Northern Ghana reported that only 30% of motorcyclists wear a protective helmet regularly, while another 25% wear it when there is an ongoing Police Operation to arrest offenders. However, an Act of Parliament, Act 761 (Road Traffic Act, 2008 amended), reduced the penalty units of at least 100 penalty units and, at most, 200 penalty units by 90%, making them 10 penalty units and 20 penalty units, respectively[4]. This means the laws have instead been relaxed for the mandatory wearing of protective helmets. This worsens the already low numbers of motorcyclists wearing the safety helmet. Meanwhile, most motorcycle crash-related fatalities are reportedly due to head injuries preventable by wearing a protective helmet[4].

Statistically significant differences have been reported between motorcyclists who consistently wear a helmet and those who do not, including their socio-demographic factors, types of motorcycle, and psychological variables such as the perception of helmet wearing and the danger of not doing so. Among the psychological variables, the attitude toward helmet use was found to be the most influential parameter[5]. Determining factors associated with helmet-wearing would enable the institution of targeted measures to enhance compliance with mandatory helmet laws. Hence, this study sought to examine the factors associated with wearing of helmet by patients presenting to a tertiary hospital in Ghana with motorcycle-related maxillofacial injuries.

MATERIALS AND METHODS

The study population comprised patients presenting to the 37 Military Hospital, Ghana, with motorcycle crash-related maxillofacial injuries between October 1, 2019, and September 30, 2020. This included both walk-in and emergency cases. In a study done to estimate the burden of injuries in a similar facility in Accra, the crude prevalence of motorcycle-related injuries was found by Blankson et al.[12] to be 9.8%. Assuming this prevalence, 'd' of 0.05 at a 95% confidence level, the sample size was estimated to be 135.83, approximating 136. A total of 142 participants were consecutively selected and included in this study.

Demographic data of patients presenting with maxillofacial injuries secondary to motorcycle crashes

were consecutively collected. The use of a helmet and the participants' role (rider or pillion passenger) at the time of the motorcycle crash were ascertained. The data were entered in Microsoft Excel 2007 and analyzed using Stata 14 software (StataCorp. College Station, TX). The use of the helmet as an outcome variable was cross-tabulated among sex, age category, occupation, and patient role. A Chi-square test and binary logistic regression analysis were done, reporting the odds ratio. All tests were done at 95% confidence, assuming an alpha level of 0.05.

Informed consent was obtained from all patients. The study was thoroughly explained to the patients before recruitment, and participants were given the option of declining without affecting the quality of care offered. To further assure the safety of study participants, Ethical approval was sought from the Institutional Review Board of the 37 Military Hospital.

RESULTS

The use of a helmet was compared among the sex, age category, occupation, and role of the patient (Table 1). The difference in helmet-wearing distribution among males and females did not yield statistical significance (P=0.537). While more young adults and minors were without a helmet, more middle-aged adults, on the contrary, wore helmets. This difference was observed to be statistically significant (P=0.043). Also, 62% of formally employed participants wore helmets, while a disparate 70% and 54% of unemployed and informally employed study participants did not have helmets on at the time of injury. This difference was also found to be statistically significant (P=0.019), likewise the role (rider or pillion passenger) of the injured participant (P=0.002).

Table 1: Distribution of the use of helmet

Variable	With helmet	Without helmet	X	P-value
Sex				
Male	69	73	0.537	0.380
Female	2	4		
Age category				
Minor (<18yrs)	1	4	7.468	0.043*
Young adults (18-35yrs)	50	64		
Middle-aged adults(35-55yrs)	18	8		
Older adults (>55yrs)	2	1		
Occupation				
Formally employed	24	15	7.898	0.019*
Informal employment	41	48		
Unemployed	6	14		
Role				
Rider	69	58	9.981	0.002*
Passenger	2	19		

Further exploring the factors associated with not wearing a helmet, the odds of males not wearing a helmet was 1.9 times that of females. However, this association was not statistically significant (Table 2). With the same outcome variable, the odds of middle-aged and older adults not wearing helmets were 2.9 and 2.6 respectively, compared to young adults. Furthermore, the unemployed and pillion passengers were less likely to wear helmets among the study population, as this relationship was statistically significant (Table 2).

Table 2: Factors influencing helmet use

Variable	OR	P-value	CI
Sex			
Female	Ref		
Male	1.9	0.470	0.34-10.65
Age category			
Young adults(18 -35yrs)	Ref		
Middle-aged adults(35 -55yrs)	2.9	0.023	1.16-7.16
Older adults(>55yrs)	2.6	0.448	0.23-29.04
Occupation			
Formally employed	Ref		
Informal employment	0.4	0.059	0.19-1.03
Unemployed	0.2	0.008	0.05-0.65
Role			
Rider	Ref		
Passenger	0.1	0.012	0.01-0.55

DISCUSSION

The difference in helmet-wearing distribution among males and females did not yield statistical significance (P=0.380). In Ghana, most motorcyclists are men, so only a few women were recorded in this study. While more young adults (56%) and minors (80%) were without a helmet, more middle-aged adults (69%) and older adults (66.7%) wore helmets. This difference was observed to be statistically significant (P=0.043). Similar findings were reported by Ackaah et al[6]. in a study in Tamale, Ghana, where helmet use among motorcycle riders was highest among the elderly (49.6%), followed by adults (34.3%). In comparison, it was low among young people (21.9%).6 Other studies have also reported a lower likelihood of young people wearing helmets than adults.5 Social or peer pressure is known to be common amongst young people, and it is known to play a role in people's attitudes towards helmet use[5]. The normative social influence theory may also apply to the rider's behaviour towards helmet use. When riders observe that many other riders are not wearing a helmet, there is a likelihood that they will also not wear the helmet[5]. Maturity and rationality among older riders may also influence their attitude towards helmet use.

Also, 62% of formally employed participants wore helmets, while a disparate 30% and 46% of unemployed and informally employed study participants had helmets on at the time of injury. This difference was also statistically significant (p- 0.019). People in formal employment are more likely to have a predetermined work schedule which may make them less likely to overspeed to meet unforeseen deadlines. The unemployed rider may have other competing demands beyond purchasing a crash helmet. The stress associated with unemployment may also force people to engage in risky behaviours. The findings in this study differ from that of Tarigan and Sukor, where no statistically significant association was found between the rider's occupation and consistent use of the helmet.[5]

Significant differences have been found in compliance with helmet use between riders and pillion passengers. More than half (54.3%) of motorcycle riders wore their helmets at the time of the collision, while only 9.5% of passengers had their helmets on. The difference was statistically significant (p- 0.002). Riders are more likely to own a comfortably fitting helmet, which may encourage them to wear it consistently. Conversely, pillion

passengers, especially commercial motorcyclists, are usually given a one-size-fit-all helmet which is likely uncomfortable to wear. The pillion passengers may also disagree with sharing the same helmet with other passengers. This has implications for discussing legalizing motorcycles for commercial transportation in developing countries like Ghana.

It has been observed that the enactment of universal helmet laws leads to an increase in the use of helmets, its repeal results in a reduction in usage, and a re-enactment promotes helmet usage[7]. Helmet law opponents argue that mandatory helmet laws infringe on individual human rights and claim that the safety helmet impedes the wearer's vision and hearing[8]. Contrary to the assertions by opponents of the motorcycle helmet, Lam et al. reported that both full coverage and partial coverage helmets reduce the risk of cervical spine injury compared with unhelmeted riders[9]. The commonest cause of death from motorcycle crashes has been reported to be an intracranial injury preventable by wearing a helmet[10]. Other studies have also indicated that most motorcyclists involved in RTC sustain injuries to the head[11,12]. The refusal to use helmets has been blamed on poor attitudes towards the use of helmets and inadequate law enforcement. Heightened public education on the relevance of the crash helmet, with particular attention on young riders, informal sector employees, and the unemployed, as well as pillion passengers, could enhance compliance with mandatory helmet laws. The small number of female participants in the study limits the analysis of helmet use among different gender. The attitude of motorcyclists towards helmet use may be affected by confounders not assessed in this study.

CONCLUSION

The use of helmets by motorcyclists in Ghana is associated with the motorcyclists' age, occupation, and role. Young adults, informal sector employees, the unemployed, and pillion passengers are more likely to ride without a helmet. The successful implementation of mandatory helmet laws can be realized by considering the factors associated with helmet use among various population groups and instituting targeted measures.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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