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Precipitating Factors to the Non-Use of Crash Helmets among Motorcycle Riders in the Bolgatanga East District of Ghana

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ABSTRACT

Thousands of motorcycle riders annually die globally from head and neck injuries sustained from the non-use of crash helmets. The wearing of proper crash helmets by riders in Ghana receives low patronage despite an over 800% increase in biker fatalities between the years 2001 and 2016; with the figure rising to 1220% by 2019 (581 deaths) using 2001 (44 deaths) as base year. This study assessed the rates and precipitating factors to the non-use of crash helmets among riders in the motorcycle-dominant Bolgatanga East District of Ghana. Leveraging the simple random sample technique, inputs for the study were solicited from questionnaires administered to 428 riders in the district. Based on the analysis, this article established with 95% confidence level that, less than 40% of riders wear crash helmets. Further to this, the helmet wearing levels were very low (17%) among female riders but had an appreciable frequency (42%) among male riders. Two factors were identified as major causes (40%) to the non-use of crash helmets. These were refusal of riders to use helmets because they (riders) were on short (intra-urban) trips, and the motorcycles were not theirs. Other reasons resulted from head and hair discomforts, vision obstruction, forgetfulness, lack of enforcement and apathy; factors found congruent to similar studies. This research found that helmet wearing rates can be improved particularly among older adults and higher lever education riders. It is expected that education can be enhanced by concerned authorities to develop riders' understanding of the casualty situation and the importance of wearing a helmet.

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1. Introduction

A motorcycle crash helmet is a type of protection to protect the head in the instance of a crash or collision. They could come in different types with varying degrees of regulatory acceptance pertaining to the state or country of use. Basic types of helmets that are widely recognized are full-face, half-face, off-road and half-shell. The world over, the instance of motor rider deaths as a result of the non-use of crash helmets have been ascertained. This forms part of the general road traffic casualties accounting for thousands of deaths annually. Globally, road traffic injuries are the eighth leading cause of death and the first for children and young adults aged between 5 to 29 years old (WHO, 2018).

The problem seems worse in low-and middle-income countries where motorcycles increasingly form an easy and major means of transport for individuals. For instance, in India, 69% of motorized vehicles are two-wheelers (motorcycles) (Mohan, 2002). In terms of casualty, the low-and middle-income countries bear the brunt of motorcycle fatalities. In Thailand, 70% to 90% of road fatalities involve motorcyclists and about 60% in Malaysia (Suriyawongpaisal & Kanchanusut, 2003). Recent records in Ghana indicate that fatalities from two-wheelers jumped an extraordinary 893% from year 2000 to 2016; and when compared to year 1991, a rise of 2631% in 2016 (NRSC, 2017).

The World Health Organisation (2018) indicates that road traffic death is the principal killer for persons aged 5 to 29 years old. Most of them among victims of two and three -wheeled vehicles. Shao-Hsun (2005) and Fitzharris et al. (2009) identify head and neck injuries as the largest contributors to rider fatalities. If appropriate crash helmets could be used, up to 40% of fatalities would be avoided in motorcycle crashes (NHTSA, 1996). The WHO (2018) further intimates that it could lead to a 69% reduction in head injuries. After enforcing helmet Act in Thailand for instance, helmet users increased by 50% while head injuries decreased by 41.4% and deaths decreased by 20.8% (Ichikawa et al., 2003).

Nevertheless, despite the empirical evidences to the impact of crash helmets to rider injuries and death, barriers limit the practice. According Skalkidou et al. (1999) and Zamani-Alavije et al. (2011), physiological factors such as rider discomfort and obstruction to their vision and hearing prevent riders from wearing their crash helmets. Similarly, summarising on a study in Tamale, a city approximately 160 km north of the Bolgatanga East District and sharing similar climatic conditions, Iddrisu et al. (2017) discomfort due to hot weather, visual disturbance and hearing impairment as the reasons for riders not wearing their crash helmets; 63% of riders not wearing their

crash helmets asserting to these factors. On the other hand, the core facilitating factor for helmet use among riders in Tamale was protection (62.2%), followed by respondent's awareness to mandatory use of crash helmet (19.7%), and the presence of police on the streets (15%), a revealing output (Iddrisu et al., 2017). As early as 1995, Kraus, Peek, and Willaims had identified enforcement able to push helmet use compliance rate to almost 100% among riders; with a rate below 50% where lax enforcement. Enforcement is often seen as deterring factor to the non-use of crash helmets by riders (Iddrisu et al., 2017).

Road fatalities among riders in the northern parts of Ghana have often mentioned (Iddrisu et al., 2017; Kudebong et al., 2011). For instance, at the newly formed Bolgatanga East District, the concern for the non-use of helmets by riders very much exists despite provision in the laws of Ghana on crash helmet requirement for motorcyclists (Section 16 of Road Traffic Act 683 & Regulation 84 of Road Traffic Regulations-Legislative Instrument 2180). Experts attribute majority road accident fatalities among riders due to not wearing crash helmets (Iddrisu et al., 2017; Shao-Hsun, 2005; Zhang, 2004). This article briefly looks at dynamics of helmet wearing among main riders. However, more significantly the corresponding dynamic rates and accompanying varying reasons why motorcyclists do not wear crash helmets to ride in the Bolgatanga East District.

The Bolgatanga East District isrecently a carved zone from the Bolgatanga Municipality, capital of the Upper East Region of Ghana (1 of the 16 administrative regions). The district formed by Legislative Instrument (L.I. 2350) very much maintains the characteristics of the economic and socio-cultural patterns (including traffic behaviours) of its parent municipality albeit falling to the eastern part of the latter.

2. Method

2.1. Data Source

This study involved 428 respondents sampled randomly over 2 months across 5 public places (fuel stations, rest zones and restaurants) in the district by 7 well trained field staff. This was sufficient for 356 sample size that was determined by the sample size formula (Krejcie & Morgan, 1970). This size was premised on a 95% confidence level with a 5% margin of error suited against adult population of the district as recorded by the latest data (Parliament of Ghana, 2017).

2.1.1. Sample size determination

A sample size for this study was determined using the formula by Krejcie and Morgan (1970) as depicted below;

(n) from the population which is given by:

$n = Z^2 \times P(1-P) / m^2$

where;

n = Sample size for infinite population (> 50,000)
Z = Z value (example 1.96 for 95% confidence level)
P = Population proportion (expressed as decimal) (assumed to be 0.5 (50%)
m = Margin of error at 5% (0.05)

Population Proportion (P) is the ratio of adult population to the total population which is given by

P = (Economically active population/Total population) x 100%

According to Section 1 of the Local Government Act of Ghana (Act 462), a district is created when the population of a demarcated zone reaches 75,000. This study focused on riders, and the Road Traffic Regulations of Ghana (L.I. 2180) further stipulates or legalizes riding for persons of 18 years and above, an age requirement for adult suffrage by the Electoral Commission of Ghana. Therefore, based on these constitutional requirements and information obtained for adult (suffrage), the estimated figures for the study are inputted below to determine the sample size for the study in the Bolgatanga East District;

= (28087 / 75000) × 100
= 37.4% in ratio is 0.374

Population Proportion (P) = 0.374

To determine the required sample size (n), the Population Proportion (P) is put back into the Krejcie and Morgan formula given above:

$n = (1.96)^2 \times 3.74 (1-0.374) / (0.05)^2$

$= (3.8416 \times 0.2341) / 0.0025$

$= 0.9293/0.0025$

$= 355.9$

Thus, adequate sample size is 356 respondents.

2.2 Research Approach

This study used mixed method approach where quantitative and qualitative techniques were employed in a descriptive case-study to meet the objective of the research. Tool used were mostly open ended-questionnaire and interview schedules for certain respondents.

2.3 Research Analysis

The research computed the field data into the software; Statistical Package for Social Sciences (version 24) for analysis. Comparative descriptions were derived for respondent demographics, helmet wearing rate and associated economic considerations, among other analysis. Outputs from cross-tabulated analysis and single-subject responses are displayed through tables, percentages and basic descriptions depicting data capture from the field.

3. Results

3.1. Respondent Demographics

Basic data from this study indicate nearly 22% participation by females with the remaining of 78% to males. Of such demographics, 48% of the respondents were aged 25 to 30 years old (Table 1). A majority of them attained their tertiary education from universities (38%). In relation 21% were in public sector employment, 49% were self-employed, 12% were in private establishment, 16% were students, whereas 2% were economically unemployed.

Table 1: Age and sex demographics of respondents**.**

Age	Sex		%
	Male	Female	
19 - 24	20	8	6.5
25 - 30	148	56	47.7
31 - 35	108	24	30.9
36 - 40	56	4	14
41 and above	0	4	0.9
Total	332	96	100%

3.2. Helmet Wearing Rates and Demographics

Significantly, 156 of the respondents representing about 36% wore helmets while the remaining 64% (272) were not wearing crash helmets. From the research, approximately 82% of the respondents wore their own crash helmet, while 38% of them did not own and wear helmet. Helmet wearing rates among the sexes showed that 83% non-

wearing rate among females, while 58% for males; thereby detailing that 17% of female riders wore helmets while 42% of male riders.

In further relation, a cross tabulation was ascertained for ownership of crash helmets by males/men and females/women. Table 2 shows half of female riders owned crash helmets regardless their use when riding; whereas approximately 54% of males owned crash helmets though varying the use when riding. In effect as shown in the table, about 53% of riders own crash helmets. This shows a great difference between ownership and helmet wearing rates particularly for women/female riders because 17% of them not wearing helmet although half of them owned it.

Table 2: Crash helmet ownership by riders.

Ownership of Helmet	Sex		%
	Male	Female	
Yes	180	48	53.3
No	152	48	46.7
Total	332	96	100%

3.3. Reasons for Not Wearing Crash Helmets

This study revealed that approximately 22% of riders who don't wear crash helmet believed that the journey or distance was too short to wear helmet. As such notion of distance played a single contributory factor to not wearing crash helmets. Moreover, 18% of the respondents said the motorcycles were not theirs as such they did not have crash helmets to wear. While some 8% subscribed to the discomfort (heat) of helmets, other factors such as absence of police, lack of money to purchase helmets, forgetfulness and apathy consumed majority of the remaining reasons for the practice. Further analysis indicates that 45% of females who did not wear crash helmets concerns for their hairdo; this was the biggest reason. The crash helmets unable to accommodate the hairdos or the rider unwillingly to indulge the hair stylishness.

3.4. Helmet Non-Use: A deeper demographic analysis

Perusing the demographics of responses, it was revealed that about 71% of riders between the ages of 19 to 24 years did not wear crash helmets. This was scaled up to 73% for those between the age of 25 to 30 years. However, going older, the dynamics changed as the rate went down to approximately 53% for riders aged between 31 to 35 years and 33% among 36- to 40-year-old group. As well as only 25% of riders above the age of 40 did not wear crash helmets.

In contrast, this study showed that 63% of the respondents possessing a minimum of Diploma not wearing crash helmets. In addition, approximately 74% of the respondents possessing Junior High School certificates and 59% of those with Senior High/Vocational/Technical School (SVT) training were not wearing crash helmets. Furthermore, about 78% of riders who possessed primary school education as their highest academic attainment were not wearing crash helmet. 28% out of this portion relayed short trip as their reason for not wearing crash helmets.

Going further into an analysis of basic exposures, it was observed that higher educated women cared more about their hairdo to the benefits the crash helmets provide. Table 3 displays a cross tabulation analysis on reasons why individuals failed to wear helmet as compared to their educational levels. The outlined educational levels encountered were primary school leavers, Junior High School (JHS) leavers, Senior High School and Vocational/Technical School leavers (SVT) and Tertiary Schools such as training colleges and university. Women acclaiming hairdo as the reason, approximately 55% possessed tertiary education.

3.5. Helmet Wearing Rates and an Economic Perusal

This study revealed on economic background and helmet wearing rates that many self-employed individuals were unlikely to wear crash helmets (65%). About 21% of the respondents were not wearing helmets due to short intra-town movements. About 94% of student-riders were not wearing crash helmets. This figure was 100% among the unemployed interviewed respondents. The lowest not wearing helmets rates occurred among respondents in private corporate employment and public servants which were 46% and 48% respectively.

It was important to observe that only 10% of the respondents who asserted to heat and other related discomfort of helmets knew the exact market price of crash helmets. As well as 70% of them knew the basic types of crash helmets on the market. Similarly, 58% of those who did not own the motorcycle they rode (yet were not in helmet) were completely not aware of the prices of crash helmets. In contrast, 51% of those found in crash helmets knew the exact market rates of helmets, with another 41% aware about it and only 8% remaining not aware. There is a direct relation between high and low helmet wearing rates, and awareness and ignorance of helmet prices.

Table 3: Educational levels/Reasons for non-wear compared.

Highest attainment	Why do you not wear helmet?						Total
	Not have	Short trip	Don't own bike	No item	Hair	Ot-her	
Primary	0	8	0	4	4	12	28
JHS	8	8	16	8	4	24	68
SVT	0	16	20	8	8	16	68
Tertiary	8	28	14	13	20	20	103
Other	0	0	0	0	0	5	3
Total	16	60	50	33	36	77	272

4. Discussion

From the sampling done, many respondents were males detailing the majority of riders being males in the traffic system. This disproportionate share was similar to data from comparable studies where more than 60% of riders were identified as males (Ackaah & Afukaar, 2010; Iddrisu et al., 2017; Musah et al., 2018).

Crash helmet wearing rate continues to be a negative factor to road safety in the Bolgatanga East Municipality. This study identified the non-wearing helmet rate to be around 64% among riders, the consequences from head and neck injuries remain a significant concern to public health. The non-wearing helmet rate is much akin to the proportion (66%) experienced by Iddrisu et al. (2017) and Ackaah and Afukar (2010) in their respective works in Tamale which possesses similar traffic components. This study shows that wearing crash helmet is more fashionable among males (42%) than females (17%); with the latter citing unaccommodating hairdos as reasons why the practice persists, a report corroborating with a study done by Musah et al. (2018). Pressing on reasons for the non-wearing crash helmets, the study identifies short intra-city/urban movements as the largest contributory factor to riders not wearing their helmets; much akin to Musah et al. (2018). This is observed to be a far departure from similar studies as Iddrisu et al. (2017) and related literature such as Skalkidou et al. (2009), and Zamani-Alavije et al. (2011) which identify discomfort to the head, visual disturbance and hearing impairment for riders as the most significant reasons. Nevertheless, congruence on precipitating factors were found with Ackaah and Afukaah (2010) on the factor of where 'helmet wearing rates increase with age'. Further to this the other significant contribution had been riders' assertion that ridden motorcycles were not their personal properties; indicating they had been borrowed from friends, relatives and acquaintances for such trips. This situation buys into a prevalent practice where almost every youth going or young adult is accustomed to riding motorcycle albeit probably not being professionally trained or licensed. Coupled with the quite moderate pricing and effortlessly accessible nature of such motorcycles, the Ghanaian sharing culture easily makes friends and relations share motorcycles without much concern to issues of riding licensing, experience and similar.

Uniquely, the study further props up interesting dynamics to other precipitating factors promoting the non-compliance to the wearing of crash helmets. The research indicated that higher educational levels

brought significant improvement to helmet wearing rates; there was more than 70% of non-wearing helmet rate among riders with primary and Junior High School certificates as highest academic attainment. The study also found that the more economically stable the rider is, the more likely she/he to own and/use a crash helmet. In this sense non-wearing helmet rate among the unemployed was 94%, with 100% among students whereas public sector employees brought 48% and figures topped at 46% non-wearing helmet rate for riders with private corporate bodies. Essentially as well, majority of the respondents who were not own the motorcycles were not wearing crash helmets.

5. Conclusion and Recommendations

This research draws similar patterns with some established studies undertaken whereby locations in Ghana with riders dominating the helmet wearing rates below 40%. Risk of fatality increases due to head and neck injuries. The helmet wearing rate is critically low despite regulation stipulated by the Ghanaian laws enforcing such practice. It is revealing and worrying at the same time as many people borrow motorcycles from friends and relations without having a strong responsibility to acquire a crash helmet to wear. Mandated institutions like the National Road Safety Authority (NRSA), Driver and Vehicle Licensing Authority (DVLA) and the Police's Motor Traffic and Transport Department need strategise methods to improve the rate of helmet wearing among riders especially cancelling the overwhelming notion that helmets are only useful during long distance travels. Women or females need to be educated as the report showed high non-wearing rates among them significantly emanating from concerns over the stylishness of their hairdos. This study dynamically also presents few demographic and related elements to the precipitating factors affecting adequate helmet use rates. In addition, education needs to be enhanced to the younger generations as similar study had identified that younger riders have a low helmet wearing rates. Additionally, sensitizations need to be intensified at basic levels of education to prime the mindset of future riding public to the essence of crash helmets. Moreover, many individuals need to be educated that crash helmet is a priority in riding as rates significantly reduced with lesser economic purchasing power; thus, juxtaposing the safety gear to a quasi-luxury.

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