

Factors Influencing the Low uptake of Health Information on First aid among Public Service Motorcycles Operating in Nyagatare District, Rwanda

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Abstract: Road traffic accidents (RTAs) are a major contributor to injury and death globally, and in Rwanda, public service motorcycle riders are frequently first responders at crash scenes. Despite this, there is limited data on their first aid knowledge and the uptake of related health information. This study, conducted in Nyagatare District, Rwanda, aimed to assess the prevalence and factors influencing the low uptake of first aid health information among commercial motorcycle riders. It examined knowledge levels, hygiene practices of safety devices, and the influence of knowledge, attitudes, and practices on first aid utilization.

Using a mixed-methods approach descriptive cross-sectional, cohort, and triangulation designs data were collected through structured questionnaires, key informant interviews, and focus group discussions. The study revealed that 91% of the riders were male, with a significant portion being single. Only 24% of respondents had adequate health information on first aid, highlighting a concerning gap. Furthermore, 77% lacked proper hygiene practices, such as sanitizing helmets between customers, posing public health risks. While 47.8% of respondents recognized motorcycle riders as first responders in RTAs, only 20.9% saw healthcare professionals as the primary providers of first aid.

The study found limited practical engagement in first aid delivery, especially in handling fractures and bleeding victims, due to fear and lack of training. In conclusion, motorcycle riders in Nyagatare District have moderate awareness but poor practical application of first aid. The study recommends targeted training, better access to first aid resources, and peer-led interventions to improve emergency response and reduce RTA-related mortality.

Keywords: First Aid, Health Information, Public Service Motorcycles Nyagatare District (Rwanda).

I. INTRODUCTION

Globally, road traffic crashes (RTCs) remain a leading cause of injury and death, with over 1.35 million fatalities and between 20 to 50 million non-fatal injuries recorded annually [2]. Vulnerable road users particularly pedestrians, cyclists, and motorcyclists account for more than half of all road traffic deaths worldwide. Among these, motorcycle-related injuries represent approximately 28% of total fatalities, underscoring the gravity of the problem [1].

The burden is particularly severe in regions where emergency medical response systems are underdeveloped, and prehospital care is limited. In response, the WHO has advocated for regular road safety audits and the strengthening of prehospital care systems, including the promotion of first aid as a life-saving intervention at crash scenes [2].

Low- and middle-income countries (LMICs) bear a disproportionate share of this global burden, experiencing road traffic injury rates nearly three times higher than those in high-income countries [1]. These injuries impose significant human and economic costs, including long-term disability, reduced productivity, and increased pressure on already fragile healthcare systems. Motorcycle-related injuries are especially prevalent in LMICs due to rapid urbanization, limited road safety enforcement, and widespread use of motorcycles for commercial transport [3]. Most victims suffer injuries to the head and extremities, with many fatalities occurring before reaching a health facility, highlighting a critical gap in prehospital care [4]. Despite the proven effectiveness of first aid in reducing mortality and injury severity, the uptake of first aid-related health information among motorcycle taxi operators remains low. A 2021 study in Kigali revealed that 87.5% of commercial motorcyclists had poor knowledge of first aid, and over 50% demonstrated poor practical skills, despite having positive attitudes [5].

In Nyagatare, *taxi-motos* are the dominant form of public transportation, placing their operators in a crucial position for providing early intervention. While they are organized under cooperatives and regulated at the local level, significant challenges remain in accessing, understanding, and applying first aid and health information. These challenges have not been adequately explored.

Understanding the underlying factors contributing to low uptake of first aid knowledge is crucial to designing targeted interventions, enhancing community-level emergency response, and reducing preventable injury and death in this vulnerable population. Therefore, this study seeks to explore the factors influencing the low uptake of first-aid-related health information among public service motorcycle operators in Nyagatare District, in order to fill this evidence gap and inform context-specific public health strategies. This study aims to determine the factors influencing the low uptake of health information on first aid among public service motorcycle operators in Nyagatare District. The specific objectives were

- (i). To determine the prevalence of low uptake of first aid-related health information among public service motorcycle operators in Nyagatare District.
- (ii). To assess the level of knowledge and awareness of first aid among public service motorcycle operators.
- (iii). To evaluate the hygiene standards of safety devices (e.g., helmets, jackets) used by passengers of public service motorcycles.

II. THEORETICAL FRAME WORK

Health Belief Model (HBM) and Its Relevance to the Study. The Health Belief Model (HBM) is a psychological theory developed in the 1950s by Hochbaum, Rosenstock, and Kegels to understand why people do or do not take part in health-promoting behaviors. The model suggests that an individual's decision to take preventive health actions is influenced by their personal beliefs about a health issue and the available strategies to reduce its risk [6].

The HBM is based on six key components. First, perceived susceptibility refers to a person's belief about how likely they are to experience a health problem. In this study, it relates to whether public service motorcycle operators in Nyagatare believe they are at risk of being involved in road accidents that may require first aid. Second, perceived severity involves how serious they believe the consequences of such accidents could be, especially if immediate help is not given. Third, perceived benefits are the beliefs about the advantages of learning and using first aid skills, such as reducing injuries or saving lives [7]. Fourth, perceived barriers are the obstacles that might prevent someone from acting, like lack of access to training, time constraints, language difficulties, or financial limitations.

III. CONCEPTUAL FRAMEWORK

A conceptual framework provides a visual representation of the relationship between variables in a study. In this research, the conceptual framework highlights how various factors influence breastfeeding.

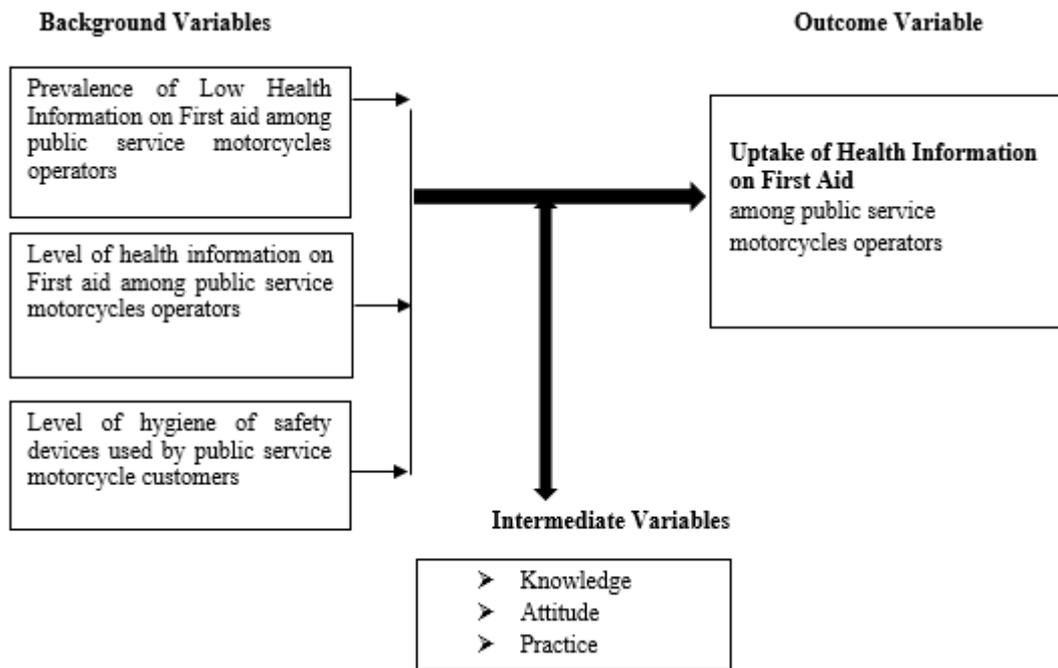


Figure 2. 1 Conceptual Framework. Source: Silali, (2025)

In this study on the factors influencing the low uptake of health information on first aid among public service motorcycle operators in Nyagatare District, the key focus is to understand what determines whether or not motorcyclists receive, understand, and apply first aid knowledge in their daily operations. The dependent variable in the study is the uptake of health information on first aid, which represents the main outcome or behavior the research seeks to explain.

The independent variables are those factors directly influencing this outcome. First, the knowledge of first aid how much a motorcycle operator understands about basic emergency procedures can greatly determine whether they engage with or use health information. A person with more accurate and practical knowledge is more likely to respond appropriately during accidents. Similarly, attitude toward first aid plays a vital role, as positive beliefs about its usefulness increase the likelihood of applying that information, while negative or indifferent attitudes can hinder engagement.

IV. RESEARCH METHODOLOGY

Research Design

Descriptive cross sectional, cohort and triangulation of themes to saturation points in qualitative research. This study adopts a mixed-methods research designs of qualitative and quantitative. This design is well-suited for investigating the factors influencing the low uptake of health information on first aid among public service motorcycle operators in Nyagatare District, Rwanda.

In the first phase, quantitative data were gathered through structured surveys administered to a representative sample of motorcycle taxi operators. These surveys will assess levels of knowledge, attitudes, access to health information, and the uptake of first aid practices. The use of surveys is justified by their ability to provide measurable, generalizable data and to reveal patterns and associations such as how education level or risk perception may correlate with first aid information uptake.

Following the quantitative phase, the second phase was involved qualitative data collection through in-depth interviews or focus group discussions with a selected group of participants. These individuals will be chosen based on their survey responses to provide deeper insight into the quantitative findings. The qualitative phase will explore the personal, cultural, and contextual factors that may explain why some operators engage with first aid information while others do not. This phase is crucial for understanding underlying beliefs, perceived barriers, and motivations that are not fully captured through surveys.

The combination of these two methods enhances the strength of the research. Quantitative data offers a broad overview of the issue, while qualitative data adds depth and context. This approach is particularly relevant to Nyagatare District, given its diverse social, economic, and geographic characteristics. It ensures both statistical rigor and cultural sensitivity in exploring behavioral health issues among motorcycle operators.

Study Population

This study was conducted at Nyagatare District is located in the eastern province of Rwanda and is the country's largest district by area, covering approximately 1,741 km², of which about 1,738 km² island. According to the 2022 census, the district has a population of 653,861, making it the second most populous district in Rwanda. The population has grown significantly from 255,104 in 2002. This population is distributed across 14 administrative sectors, 106 cells, and over 600 villages (imidugudu).

Geographically, Nyagatare lies in the northeastern extremity of Rwanda and borders Uganda to the north and Tanzania to the east. To the south, it adjoins Gatsibo District, and to the west, Gicumbi District. The terrain comprises grassy plains and gentle hills, characterized by higher-than-average temperatures and lower precipitation, making parts of the district semi-arid and prone to drought. Demographically, the district is predominantly rural, with a significant proportion engaged in cattle farming and agro-pastoral livelihoods. The urban heart of the district is Nyagatare City, the administrative center and former capital of the old Umutara province. High density of public service motorcycle operators (moto-taxis) likely due to growing population and limited vehicular transport infrastructure making it a significant context for first aid behavior research. The semi-arid and vast terrain, including high road traffic vulnerability, increases the likelihood of accidents underscoring the relevance of first aid knowledge for this group. Socioeconomic diversity, including varying education levels, resource access, and urban rural divides across sectors, supports examination of multiple influencing variables.

Sample Design

This study adopts a mixed-methods research design of survey and interviews, specifically using an explanatory sequential approach, which involves collecting and analyzing data in two successive phases quantitative followed by qualitative. This design is well-suited for investigating the factors influencing the low uptake of health information on first aid among public service motorcycle operators in Nyagatare District, Rwanda.

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Sample Size Determination

In this study, the sample size was determined based on the target population. This was established using the formula developed by Yamane (1967) to identify the number of motorcycle riders in need to provide research information [11].

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size

N = population size (assumed \approx 333 operators)

e = level of precision (typically 0.05)

$$n = \frac{333}{1 + 333(0.05)^2} = 134$$

Estimated Sample Size: Approximately 134 participants will be selected for the survey to ensure representativeness and statistical validity.

Sampling Technique

A stratified random sampling method was used. Nyagatare District will be stratified based on geographic sectors (urban and rural). Within each stratum, simple random sampling was applied to select participants.

Purposive sampling was used to select individuals for in-depth interviews or focus group discussions (FGDs). This approach ensures participants provide rich and varied insights into barriers, attitudes, and social contexts.

Sampling Frame, a list of registered moto-taxi operators obtained from local transport cooperatives and the Rwanda Utilities Regulatory Authority (RURA) was used as the sampling frame. 8 to 12 participants for in-depth interviews, 2 to 3 FGDs, each with 6–8 participants.

The actual number may vary depending on data saturation (i.e., when no new themes are emerging). Stratified random sampling ensures proportional representation from various sectors of Nyagatare District, accounting for rural-urban differences in access to health services and exposure to information.

Purposive sampling in the qualitative phase ensures that key perspectives, especially from those with low uptake or unique challenges, are thoroughly explored. This combined design balances breadth (quantitative) with depth (qualitative), in alignment with the mixed-methods research strategy.

Data Collection Methods

Data Collection Instruments

The research employed both quantitative and qualitative data collection instruments to ensure a comprehensive understanding of the factors influencing the low uptake of health information on first aid among public service motorcycle operators in Nyagatare District.

a) Questionnaire: A structured questionnaire was used as the primary tool for collecting quantitative data from motorcycle operators. The questionnaire included both closed-ended and a few open-ended questions to allow for statistical analysis while also capturing individual perceptions and experiences. It is cost-effective and efficient for collecting data from a large number of respondents. It ensures anonymity, which increases the likelihood of honest responses. Suitable for gathering standardized data to identify trends and patterns.

b) Key Informant Interview (KII) Guide: Key informant interviews were conducted with selected individuals such as health workers, local government officials, and leaders of motorcycle cooperatives. It provides in-depth insights and expert perspectives on the challenges and interventions related to health information dissemination. Enables the researcher to clarify responses and explore underlying issues that may not surface through questionnaires. Copies of both the questionnaire and interview guide are attached in the appendices.

Procedures of Data Collection

The data collection process involved several key steps:

Preparation and Training: Prior to data collection, the research team was trained on the purpose of the study, ethical considerations, and proper administration of the instruments.

Pilot Testing: A pilot study was conducted with a small group of motorcycle operators outside the main sample to test the clarity, relevance, and reliability of the questionnaire. Adjustments were made accordingly.

Administering Questionnaires: The questionnaires were distributed to selected public service motorcycle operators at various designated parking sites across Nyagatare District.

The respondents were informed about the purpose of the study and gave informed consent before participation. The questionnaires were self-administered with the assistance of the research team for those who needed clarification.

Conducting Key Informant Interviews: Appointments were scheduled with key informants, and interviews were conducted face-to-face using the interview guide. Interviews were recorded (with permission) and later transcribed for analysis.

The collected data were managed by SPSS software version 25 and analyzed using both descriptive and inferential statistics and for qualitative methods themes were discussed to saturation

Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize demographic data and responses related to awareness, accessibility, attitudes, and training.

Inferential statistics, particularly Chi-square tests and logistic regression analysis, were employed to determine the relationship between various factors (e.g., education level, access to training) and the uptake of health information on first aid. The results were presented in the form of tables, charts, and graphs to enhance clarity and understanding.

Qualitative Data Analysis: Data obtained from key informant interviews were transcribed verbatim and analyzed thematically. Thematic analysis involved coding the data, identifying patterns, and categorizing them into themes related to barriers, perceptions, institutional efforts, and recommendations for improvement. Key quotes from respondents were included to support the emerging themes and enrich interpretation.

V. RESEARCH FINDINGS AND DISCUSSION

Demographic Characteristics of Respondents

The study opined that the majority of respondents, 122 (91%), Operating motorcycle public service industry in Nyagatare District were male and only 12 (9%) were female with significant p value of 0.023, in supplement of transport service in the district and as they may influence a rider’s likelihood to deliver first aid at accident scenes.

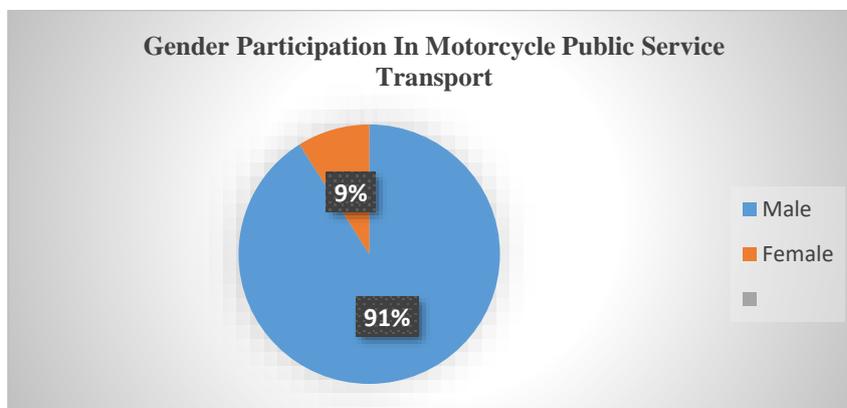


Figure 1. Gender Participation in Motorcycle Public Service Transport

The results showed that most significant marital status participation, with p values of 0.023 providing motorcycle public service transport were mostly single males and females 57% (35) respondents while married were 43% (49) married males respondents in generating daily income.

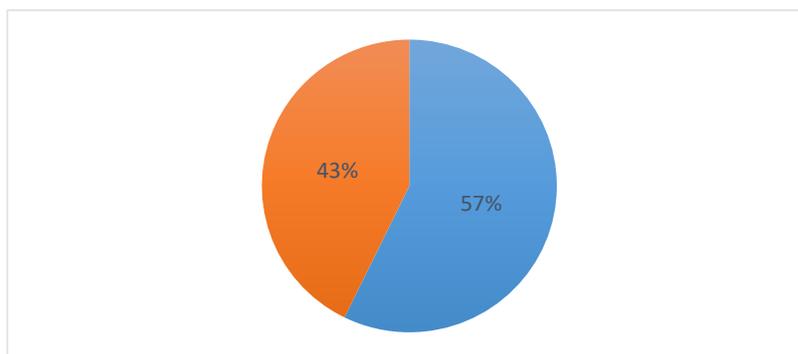


Figure 2. Demonstrates distribution of married and single population health in provision of motorcycle transport and health information on first aid in Nyagatare District

Presentation of Findings

Prevalence of Health Information on First Aid Provision by PSV cyclists

The prevalence of health information on first aid by motorcycle drivers in the study area was only 24% (32) respondents with Significant P values 0.014 95%CI of quality health information on first aid provision during RTA compared to 102 (76%) respondents who were not aware,

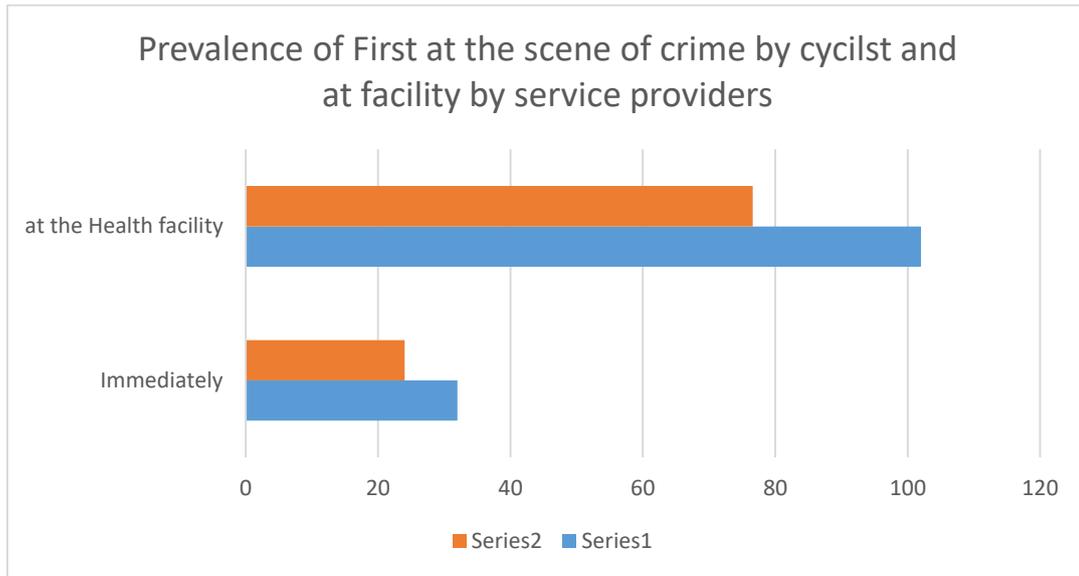


Figure 3. Prevalence of first at the scene of crime by cyclist and at facility by service providers

Level of Health Information Uptake on First Aid among Public Service Motorcycles Operation

The study opined that level of health information on first aid among public service motorcycles operation was significantly low with p value of 0.034 and 95% CI, the population health and motorcyclists in Nyagatare District with range frequency respondents of 82. Which also echoed in KII in Nyagatare,

“PSV motorcyclists usually get information of First from our Traffic police via regular meeting, media and their smart phones” KII held with leader of PSV motorcycles in august 2021.

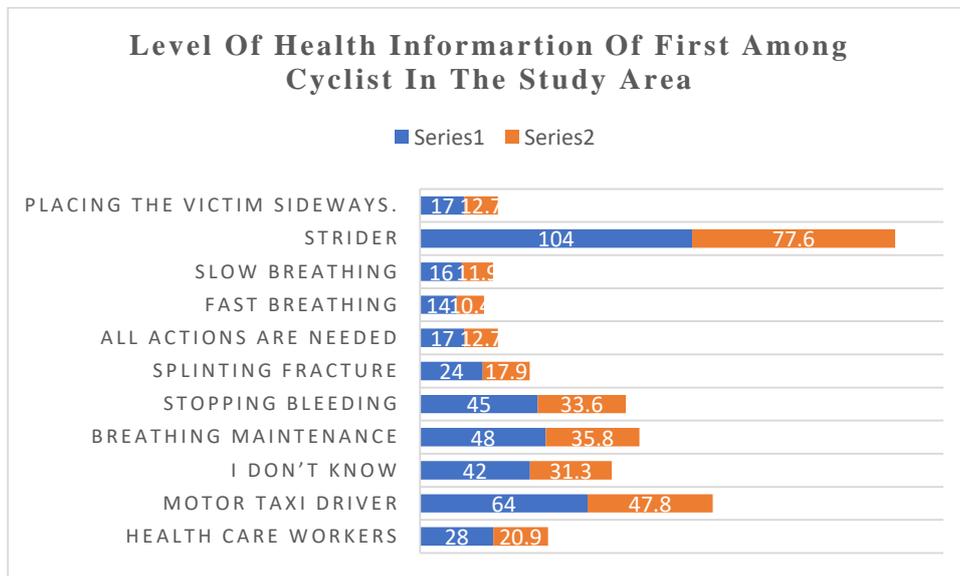


Figure 4. Level of Health Information of First among Cyclist in the Study Area

Level of Hygiene of Safety Devices Uptake by Public Service Motorcycle Customers

The level of hygiene and control of inhalation of the shared helmet of PSV motorcycles results showed that most of respondents 76% (102) with insignificant with P value of 0.345, posing danger to cross infection of infectious diseases, do not have spray sanitizer to spray on the glass helmet after dropping every customer at his or her destination and carry another one. Only 24 %, 32 respondents had either sanitizer or clean cloth to clean helmet before give another customer.

This was also realized in in FGD where most cyclists said-

“Know disinfectant / sanitizer only for COVID 19 and no other diseases”. FGD held 30/10 2021 in Nyagatare district

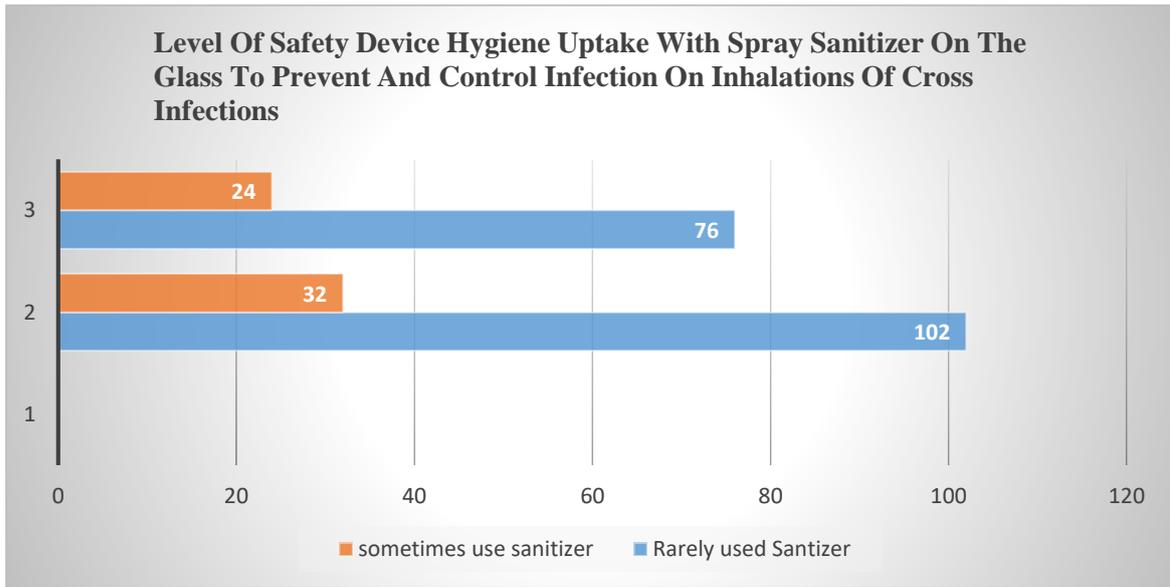


Figure 5. Level of safety device hygiene uptake with Spray Sanitizer on the glass to prevent and Control infection on inhalations of cross infections

Knowledge, Attitude and Practice of Health Information on First Aid among Public Service Motorcycle

Study opined that most respondents are aware that in case of any accident, 64 (47.8%) identified motorcycle taxi drivers as the primary reliable for providing First aid while only 28 (20.9%) believed that healthcare workers responsible, ones to provide first aid as they send their custom at their designated places in Nyagatare, this was also emphasized in FGD discussion:

“When any accidents occur it proper, we deliver the causalities to facility to be attended by health service providers compared to motor cyclist who have limited knowledge on the matter” FGD discussion held on 18/9/2021

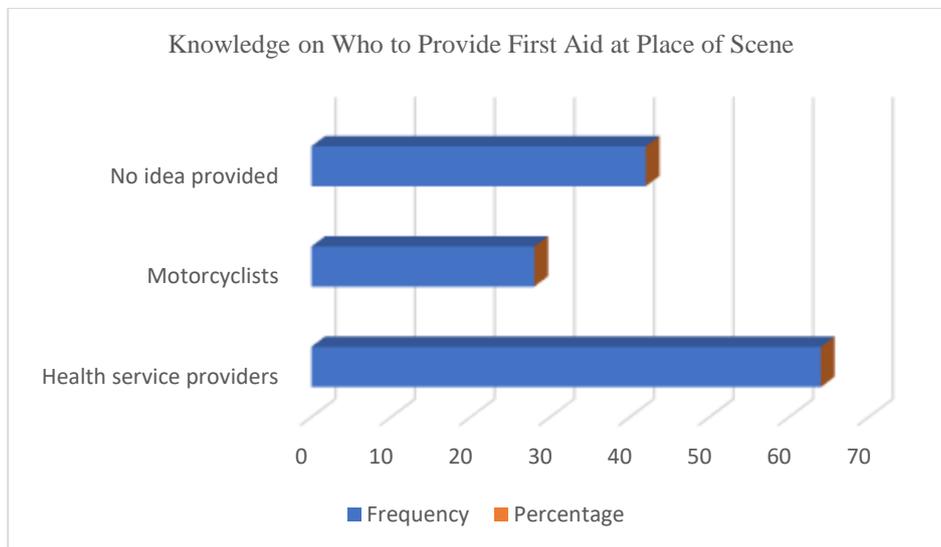


Figure 6. Knowledge on Who to Provide First at Place of Scene during a RTA

knowledge on attitude and practice immobilizing body fractures using splints at RTA scene by PSV transport Cyclists

The knowledge on attitude and practice immobilizing body fractures using splints at RTA scene by PSV transport Cyclists. Prefer, referring to the facility the respondents had limited practice and perception due the oozing blood from the victim bruises which they belief he/ she may die and needed only specialized care. From the hospital. This was also need in Key in format of Nyagatare motor cyclist leader who said.

“Me like most motorcyclist of PSV transport fear seeing some oozing blood from bruise any body part so we prefer such case being handled at facility and not at RTA scene”. KII held in October 2020 by chief in charge of the PSV cyclists.

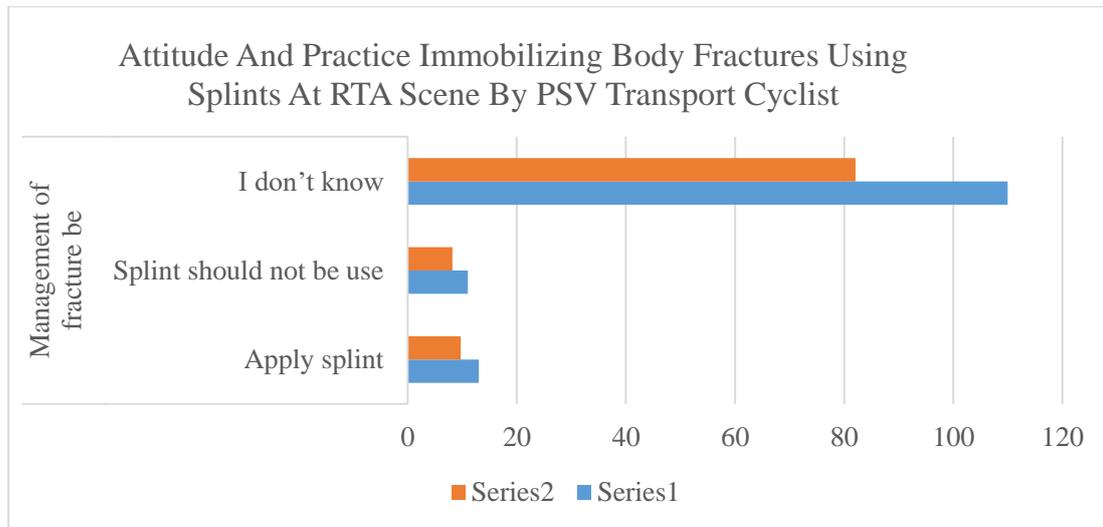


Figure 7. Level of Attitude and practice on immobilizing body fractures using splints at RTA scene by PSV transport Cyclists

VI. DISCUSSION OF FINDINGS

This study explored the knowledge and practices of first aid delivery among commercial motorcycle riders in Nyagatare District, Rwanda, with a focus on levels of knowledge, actual first aid practices during road traffic accidents (RTAs), and the factors influencing these outcomes [15]. The findings are discussed in relation to the study objectives and existing literature.

Level of knowledge of commercial motorcycle riders on first aid during road traffic accidents in Nyagatare District

The findings reveal that the mean level of higher first aid knowledge among commercial motorcycle riders was (51.07%), while (48.79%) had lower or insufficient knowledge. This moderate knowledge level is consistent with studies in similar contexts. For instance, a study in Nigeria found that only (47%) of commercial drivers had adequate first aid knowledge [14], while another in Uganda reported a higher knowledge rate of 62% [8]. In the current study, respondents showed better understanding of airway management (77.6% recognized “stridor” as a sign of obstruction), yet demonstrated confusion over bleeding management and the correct positioning of accident victims. These gaps align with findings from Ethiopia, where knowledge about bleeding control was particularly poor among transport operators [7].

The fact that (82.8%) of the riders in Nyagatare lacked formal first aid training likely explains the limited and inconsistent knowledge. This is a trend also observed in Ghana, where the absence of training was directly correlated with poor first aid knowledge among motorcycle riders [8]. These findings underscore the need for structured, context-specific first aid training programs targeting this high-risk occupational group.

The practices of first aid among commercial motorcycle riders during road traffic accidents in Nyagatare District

In terms of practice, only (41.8%) of riders indicated they would administer first aid immediately at the accident scene, with (33.6%) uncertain about when and where to act. Moreover, although nearly half (47.8%) believed that motorcycle riders themselves should provide first aid, only a small fraction had actually done so during an incident. For the fracture management, the results revealed that only 13 motorcycle riders (9.7%) could apply splint on the fractured bone at the scene.

This reflects a concerning disparity between perceived responsibility and actual practice, which is similarly observed in a study from Kenya, where less than (40%) of boda-boda riders provided first aid despite believing it was their duty [9]. Further, inconsistencies in the prioritization of first aid actions such as breathing versus bleeding indicate a lack of standardized practice guidelines, echoing results from a Tanzanian study showing similar uncertainty in emergency response among informal transport workers [10].

Interestingly, riders who recognized the importance of actions like airway management, fracture splinting, and CPR were significantly more likely to provide aid ($p < 0.05$), suggesting that targeted knowledge may drive better first aid behavior. However, access to resources remained a barrier: none of the riders who had a first aid kit actually used it during an emergency, a finding that mirrors that of Eze et al. in Nigeria, who reported that possession of kits did not necessarily equate to use without proper training and confidence.

VII. CONCLUSION

In conclusion, commercial motorcycle riders in Nyagatare District demonstrate a moderate level of first aid knowledge, yet there are evident deficiencies in both their understanding and application of life-saving practices. While many riders are familiar with some critical first aid procedures, a considerable number remain unclear about essential aspects such as the timing, appropriate setting, and correct techniques for administering aid. First aid practices among these riders are notably inconsistent and are strongly influenced by individual characteristics such as age, riding experience, place of residence, and household size. Importantly, gender and education level did not show significant associations with first aid delivery, which implies that effective training interventions can be implemented regardless of a rider's educational background.

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