

Motorcycle Helmet Use in Low-Income Urban Communities: A Knowledge, Attitude, and Practice Study in Klang, Selangor

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Abstract: This study investigates the relationship between knowledge, attitude, and practice towards motorcycle helmet usage among riders residing in a low-cost housing area in Bukit Tinggi, Klang, Selangor. The research aims to identify how varying levels of knowledge and attitudes influence riders' actual safety practices, particularly in the context of daily short-distance commuting where compliance with helmet regulations is often neglected. A quantitative approach was applied using a structured questionnaire distributed among local motorcycle users. Data collected were analyzed through descriptive statistics and reliability testing to determine patterns and correlations among the variables. The results could help to bring improvement including adopting an integrated strategy that combines education, behavioral awareness, and accessibility to quality helmets. This study contributes to the existing literature on road safety behavior and provides valuable input for policymakers, enforcement agencies, and community organizations in developing targeted interventions to enhance motorcycle safety within low-income urban communities.

Keywords: *Helmet usage, knowledge, attitude, practice, road safety behavior, low-cost housing*

1. Introduction

Motorcycle safety remains one of the most pressing road safety issues in Malaysia, where motorcycles account for more than 60 percent of registered vehicles and the majority of fatal traffic collisions (MIROS, 2024). Among various risk factors, the most preventable yet common contributor to severe injury and death is the failure to use helmets properly or consistently. Though the use of motorcycle helmets is mandated under the Road Transport Act 1987, non-compliance remains widespread, especially in residential and low-income areas where enforcement visibility and awareness levels are relatively low.

The low-cost housing area in Bukit Tinggi, Klang, represents one such setting where motorcycles are the most common mode of daily transportation due to their affordability and convenience. However, frequent observations and anecdotal reports reveal that riders often neglect wearing helmets for short-distance rides within the neighbourhood, or wear them incorrectly without fastening the straps. This practice reflects not merely an enforcement gap but also deeper behavioural and perceptual issues related to knowledge, attitude, and personal safety priorities.

Empirical evidence from several Malaysian studies indicates that helmet compliance is strongly influenced by riders' knowledge of safety regulations, attitudes towards risk, and habitual practices (Ahmad & Mohd, 2022; Lim & Tan, 2021). Riders with limited understanding of the consequences of head injuries or with the belief that "short trips are safe" tend to exhibit poor compliance. Additionally, socio-economic constraints often lead some individuals to use low-quality or non-standard helmets, compromising the protective effect intended by the law.

This phenomenon calls for a more holistic exploration that goes beyond enforcement actions alone. It requires an understanding of how knowledge, attitude, and practice collectively shape

helmet-wearing behaviour among community riders. Accordingly, this study examines the relationship between these three dimensions (Knowledge–Attitude–Practice or KAP) among motorcycle riders living in low-cost housing areas in Bukit Tinggi, Klang, Selangor Darul Ehsan. The study aims to identify the underlying behavioural factors influencing helmet use in such communities and to provide practical recommendations that may help strengthen future awareness, education and enforcement programmes targeted at high-risk groups.

2. Literature review

Motorcycle accidents pose significant risks in Malaysia, with helmets mandated by the Road Transport Act 1987 and Road Traffic Ordinance 1959 to prevent head injuries, yet compliance lags in low-cost areas due to awareness gaps. In Persiaran Kasuarina, Bukit Tinggi, Klang, riders often neglect helmets for short trips, risking fines and fatalities—97% of child riders lack proper protection, with 37% using toy helmets. This study addresses the scientific issue of low KAP levels, relevant for enhancing enforcement and education amid rising urban motorcycle dependency. Problem statement: Despite legal mandates, inadequate knowledge leads to poor attitudes and practices, necessitating assessment of KAP relationships among local riders.

Existing studies confirm higher helmet awareness in urban (90%) versus low-cost areas (50-60%), influenced by education, income, culture, and enforcement (Ahmad & Mohd, 2022; Chong et al., 2020). Low education correlates with casual attitudes, like skipping helmets for nearby travel (Noor & Salim, 2019; Lim & Tan, 2021). Economic constraints drive use of substandard helmets, while weak patrols reduce compliance (MIROS, 2022). Gaps persist in semi-urban Klang contexts, where this KAP-focused study builds on prior findings by examining interrelationships via quantitative data.

2.1 Motorcycle Helmet Usage and Road Safety in Malaysia

Motorcycle riders constitute one of the most vulnerable road user groups in Malaysia, with a high proportion of road traffic fatalities involving motorcyclists. The use of safety helmets has been proven to significantly reduce the risk of head injuries and fatalities during road accidents. According to the Malaysian Institute of Road Safety Research (MIROS, 2022), proper helmet usage can reduce the risk of head injury by up to 69 percent and the risk of death by more than 40 percent. Despite strict legislation under the Road Transport Act 1987, non-compliance with helmet usage remains a concern, particularly among riders in low-income and high-density residential areas.

Several local studies have highlighted that helmet non-compliance is influenced by behavioural and socio-economic factors. Kulanthayan et al. (2001) found that although awareness of helmet laws was relatively high among Malaysian motorcyclists, improper helmet usage and non-standard helmets were still common. This indicates that legal enforcement alone is insufficient without addressing riders' knowledge, attitude, and practice towards helmet usage.

2.2 Knowledge Towards Motorcycle Helmet Usage

Knowledge refers to an individual's understanding of helmet safety, legal requirements, and the consequences of non-compliance. A study by Ariffin and Setapani (2018) revealed that most respondents possessed basic knowledge regarding the importance of wearing helmets; however, gaps existed in understanding helmet standards and correct wearing techniques. This limited knowledge may lead to unsafe practices, such as wearing loosely fastened helmets or using non-certified helmets.

In low-cost housing areas, access to road safety education may be limited, contributing to inconsistent knowledge levels among riders. Ambak et al. (2011) reported that riders with higher educational backgrounds demonstrated better awareness of helmet safety compared to

those from lower socio-economic groups. This suggests that knowledge plays a crucial role in influencing helmet-wearing behaviour, especially among vulnerable communities.

2.3 Attitude Towards Motorcycle Helmet Usage

Attitude reflects an individual's perception, beliefs, and feelings towards helmet usage. Positive attitudes are often associated with higher compliance rates, whereas negative attitudes may lead to risky riding behaviour. Studies conducted in Malaysia indicate that some riders perceive helmets as uncomfortable, unnecessary for short distances, or inconvenient in hot weather (Kulanthayan et al., 2001).

Ariffin and Setapani (2018) further noted that riders who believed helmets were effective in preventing serious injuries were more likely to wear them consistently. Conversely, riders who viewed helmet usage as merely a legal obligation rather than a safety measure tended to show lower compliance. This highlights the importance of shaping positive attitudes through continuous education and awareness campaigns.

Oxley, Usher, and colleagues (2018) observed that although helmet usage rates in Malaysia were relatively high, many riders failed to fasten their helmet straps properly, which significantly reduced the protective effectiveness of the helmet. Their findings suggest that even when riders hold generally positive attitudes towards helmet usage, perceptions of convenience and comfort can still undermine correct practice. This reinforces the idea that shaping attitudes must go beyond promoting compliance and should emphasize the importance of proper and consistent usage to maximize safety benefits.

2.4 Practice of Motorcycle Helmet Usage

Practice refers to the actual behaviour of riders in wearing helmets correctly and consistently. Observational studies conducted in Malaysia have shown that while helmet usage rates are relatively high, correct usage remains an issue. Oxley et al. (2018) found that a significant number of riders wore helmets without properly fastening the straps, reducing the protective effectiveness of the helmet.

In low-cost housing areas, enforcement intensity and peer influence may also affect riding practices. Riders may comply with helmet usage only when enforcement is visible, indicating that habitual safe practices have not been fully internalised. This reinforces the need to examine the relationship between knowledge, attitude, and practice to understand helmet usage behaviour more comprehensively.

Additionally, factors such as comfort and lifestyle perceptions also play a role in helmet usage practices. Some riders believe that wearing a helmet during short trips or in hot weather is unnecessary, leading them to neglect proper usage. This attitude demonstrates that although safety knowledge exists, its application in daily life remains weak. Therefore, continuous education efforts and awareness campaigns that emphasize the importance of consistent and correct helmet use must be strengthened so that safe riding practices become an ingrained culture within the community.

2.5 Relationship Between Knowledge, Attitude, and Practice (KAP)

The Knowledge, Attitude, and Practice (KAP) model has been widely used in road safety research to explain behavioural compliance. Previous studies suggest that adequate knowledge influences positive attitudes, which in turn lead to safer practices (Ambak et al., 2011; Ariffin & Setapani, 2018). However, the relationship is not always linear, as external factors such as enforcement, accessibility to certified helmets, and socio-economic constraints may also influence practice.

In addition to local studies, international research has also reinforced the importance of the KAP framework in understanding helmet usage behaviour. For example, Hung, Stevenson, and

Ivers (2008) examined motorcycle helmet compliance in Vietnam and found that while legislation increased overall usage rates, gaps in knowledge and negative attitudes still led to improper practices such as wearing non-standard helmets or failing to fasten straps. Their findings echo those of Malaysian studies, suggesting that knowledge and attitude are critical determinants of practice across different cultural contexts. This comparison highlights that effective interventions must not only enforce laws but also address behavioural and social dimensions to achieve sustained improvements in helmet safety.

Therefore, examining the relationship between knowledge, attitude, and practice towards motorcycle helmet usage among riders in low-cost housing areas in Bukit Tinggi, Klang is essential. Findings from this study can contribute to more targeted interventions and policy improvements aimed at enhancing road safety compliance among high-risk groups.

3. Research method

This study adopted a quantitative research design to examine the relationship between knowledge, attitude, and practice (KAP) towards motorcycle helmet usage among motorcycle riders residing in low-cost housing areas in Bukit Tinggi, Klang, Selangor. The research framework was developed based on an extensive review of previous literature related to motorcycle safety, helmet usage behaviour, and road safety compliance, particularly within the Malaysian context. In this study, knowledge and attitude were treated as independent variables, while practice of motorcycle helmet usage was considered as the dependent variable.

Data were collected using a structured questionnaire designed to measure each construct in the proposed framework. The questionnaire items were adapted from prior validated studies on helmet usage and road safety behaviour and were modified to suit the local context of low-cost housing areas in Bukit Tinggi, Klang. A convenience sampling technique was employed, targeting motorcycle riders who reside in the selected study area. The survey was administered either through self-distributed questionnaires or an online platform such as Google Forms.

The questionnaire consisted of two main sections. Section A collected respondents' demographic information, including gender, age, education level, riding experience, and frequency of motorcycle usage. Section B comprised measurement items assessing respondents' level of knowledge, attitude, and practice regarding motorcycle helmet usage. All measurement items were rated using a Likert scale to capture respondents' level of agreement.

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS). Reliability analysis using Cronbach's alpha was conducted to assess the internal consistency of the measurement scales. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to describe respondents' demographic characteristics and overall levels of knowledge, attitude, and practice. Furthermore, correlation and regression analyses were performed to examine the relationships between knowledge, attitude, and practice towards motorcycle helmet usage and to identify the factors that significantly influence helmet-wearing practices among the respondents.

The study adopted a quantitative research design to develop and examine a conceptual framework explaining helmet usage compliance among motorcyclists in low-cost housing areas of Bukit Tinggi, Klang, Selangor. The conceptual framework was formulated based on an extensive review of prior literature on road safety awareness, rider behavior, and enforcement factors (e.g., Ahmad & Mohd, 2022; Chong et al., 2020). Key factors frequently identified in the literature namely knowledge of regulations, attitudes towards safety, and practice consistency were operationalized as independent variables, while helmet usage compliance served as the dependent variable.

Data were collected using a structured questionnaire designed to measure each construct in the framework. The instrument items were adapted from validated KAP studies (e.g., MIROS, 2022) and refined to suit the local semi-urban context. Convenience sampling was employed,

targeting 50-100 motorcyclists via door-to-door distribution and Google Forms shared in community WhatsApp groups. The questionnaire consisted of two sections: demographic information (age, gender, education, income) and measurement items for the study constructs, rated on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree). Example items included: "Wearing a helmet is mandatory under Road Transport Act 1987" (knowledge), "Helmets effectively protect against head injuries" (attitude), and "I always wear a helmet when riding" (practice). A total of 80 valid responses were obtained.

The collected data were analyzed using Microsoft Excel and SPSS. Reliability analysis (Cronbach's $\alpha > 0.7$ for all scales) was conducted to assess the internal consistency of the measurement scales. Descriptive statistics (frequencies, percentages, means, standard deviations) and mean score analysis were used to examine respondents' perceptions and evaluate the relative influence of each KAP factor. The proposed relationships in the conceptual framework were examined using multiple regression analysis to identify factors significantly predicting helmet compliance (e.g., β coefficients, p -values < 0.05). Ethical protocols ensured informed consent, anonymity, and voluntary participation.

4. Results and discussion

The study proposes a conceptual framework in which knowledge and attitude are the key determinants influencing the practice of motorcycle helmet usage among riders residing in low-cost housing areas in Bukit Tinggi, Klang, Selangor, as illustrated in Figure 1 below.

The first independent variable, knowledge, is expected to influence motorcycle helmet usage practices because adequate understanding of helmet safety, legal requirements, and the consequences of non-compliance can shape safer riding behavior. Riders who are well informed about the protective function of helmets and relevant traffic laws are more likely to wear helmets properly and consistently.

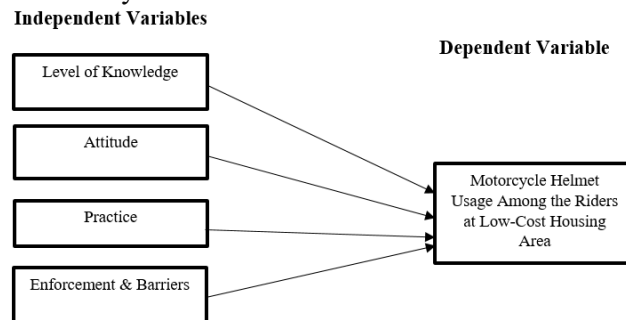


Fig. 1. Conceptual framework of the research study

The second independent variable, attitude, is included as a determinant since riders' perceptions, beliefs, and feelings towards helmet usage play an important role in influencing behavior. Positive attitudes, such as believing that helmets are effective in preventing serious injuries and viewing helmet usage as a personal safety responsibility, are expected to encourage consistent and proper helmet use. Conversely, negative attitudes, including perceptions of discomfort or inconvenience, may reduce compliance.

The dependent variable in this study is practice, which refers to the actual behavior of motorcycle riders in wearing helmets correctly and consistently while riding. Practice is influenced by both knowledge and attitude, as riders with sufficient knowledge and positive attitudes are more likely to translate these factors into safe riding practices.

In general, the conceptual framework highlights the relationship between knowledge and attitude and their influence on the practice of motorcycle helmet usage among riders in low-cost housing areas in Bukit Tinggi, Klang, Selangor. This framework provides a theoretical

basis for understanding helmet usage behavior and serves as a guide for empirical investigation and the development of targeted road safety interventions and policies.

4.1 Hypothesis

H1: Riders with higher levels of safety knowledge are more likely to practice correct and consistent motorcycle helmet usage compared to riders with lower levels of knowledge.

H2: Riders with more positive attitudes towards helmet usage are more likely to engage in proper and consistent helmet-wearing practices compared to riders with negative attitudes.

H3: Riders exhibiting good helmet-use practices are significantly more likely to demonstrate correct and consistent helmet-wearing behaviour than those who do not.

H4: Enforcement and barriers have significant impact towards helmet usage.

5. Conclusion

This study examined the relationship between knowledge, attitude and practice (KAP) towards motorcycle helmet usage among riders residing in low-cost housing areas in Bukit Tinggi, Klang, Selangor Darul Ehsan. The conceptual framework focuses on how levels of safety knowledge, personal attitudes towards risk and compliance, and actual riding practices interact to influence consistent helmet-wearing behaviour among motorcyclists in the study area.

The intention of the study is to provide not merely theoretical insight but also empirical evidence on why, despite existing laws and awareness campaigns, some riders still fail to use helmets correctly or consistently, especially for short-distance travel within residential zones. By examining the interplay between knowledge, attitude and practice, the study emphasises that enforcement and legislation alone may be insufficient if riders' understanding, perceptions and daily habits are not addressed through targeted education and community-based interventions.

The findings are expected to offer valuable guidance for policymakers, enforcement agencies and road safety practitioners in designing integrated interventions that strengthen safety knowledge, shape positive attitudes and encourage safer riding practices, thereby increasing helmet usage rates and reducing the risk of head injuries among motorcycle users in low-cost housing communities.

Beyond its immediate implications for helmet usage, this study also highlights the broader significance of cultivating a culture of road safety within vulnerable communities. Low-cost housing areas often face unique socioeconomic challenges that may influence risk-taking behaviours, including limited access to quality helmets, financial constraints, and competing daily priorities. Addressing these contextual factors is crucial to ensure that safety interventions are not only effective but also equitable. By situating helmet usage within the wider social environment, the study underscores the importance of holistic strategies that combine enforcement, education, affordability, and community engagement to achieve sustainable improvements in rider safety.

6. Implications

The findings of this study carry important theoretical, practical, and policy implications. From a theoretical perspective, the study supports the proposed conceptual framework which demonstrates that knowledge, attitude, and practice jointly influence riders' compliance with helmet usage. It highlights the interrelation between cognitive understanding, personal motivation, and behavioural practice in promoting consistent helmet-wearing behaviour. This contributes to the growing body of literature on safety behaviour, road-user psychology, and the Knowledge–Attitude–Practice (KAP) model in the local Malaysian context. The framework can also serve as a reference for future research exploring additional determinants such as peer

influence, risk perception, law awareness, or accessibility of quality helmets in shaping road safety behaviour.

From a practical standpoint, the study emphasizes the importance of strengthening awareness and education programmes among motorcyclists in low-cost housing areas. Effective interventions should focus on improving safety knowledge, fostering positive attitudes, and translating awareness into consistent practice. Community-based initiatives, collaboration between local enforcement agencies and residents' associations, as well as school- or workplace-based campaigns could play a crucial role in enhancing helmet compliance. Accessibility to affordable, quality-certified helmets is equally important to ensure that economic factors do not hinder safe riding behaviour.

In terms of policy and enforcement, the findings suggest that enforcement efforts alone are insufficient to ensure full compliance with helmet-wearing regulations. Authorities should adopt integrated strategies that combine strict law enforcement with social and educational measures addressing both behavioural and contextual factors influencing helmet use. Policymakers should also ensure continuous monitoring, periodic road safety audits within residential areas, and provide targeted assistance programmes—such as subsidized helmets or incentive-based compliance schemes—to encourage safe practices among low-income riders. Strengthening interagency collaboration between JPJ, PDRM, MIROS, and local councils will further support the development of sustainable, evidence-based policies for safer motorcycling communities in Malaysia.

7. Research limitations

This study has several limitations that should be considered when interpreting the findings related to the relationship between knowledge, attitude and practice of motorcycle helmet usage among riders in the low-cost housing area of Bukit Tinggi, Klang.

Firstly, because the data were collected at a single point in time through a cross-sectional survey design, the analysis primarily reflects correlations rather than causal relationships among the variables studied. Thus, while associations between knowledge, attitude and practice were identified, the study cannot conclusively determine cause-and-effect relationships between these factors.

Secondly, the sample was limited to riders living in one selected low-cost housing area in Bukit Tinggi, Klang. This geographic and demographic restriction may limit the generalizability of the findings to other locations or rider populations that differ in socioeconomic background, education level or exposure to road safety campaigns. Differences in enforcement intensity, road conditions and local culture may produce varied behavioural patterns in other settings.

Thirdly, the study relied solely on self-administered questionnaires to collect data, which can be influenced by recall bias and social desirability bias. Respondents may have over- or under-reported their actual helmet-wearing practices or their true attitudes and knowledge about road safety, leading to potential inaccuracies in the data.

Finally, the conceptual framework of this study focused primarily on three key dimensions—knowledge, attitude and practice—without including other potentially relevant factors that may influence helmet-wearing behaviour. Elements such as peer influence, accessibility and affordability of quality helmets, enforcement perception, and social norms were not examined in detail. These exclusions may limit the comprehensiveness of understanding the full range of determinants affecting helmet compliance among riders in low-cost housing communities.

Future research could address these limitations by adopting a longitudinal approach, expanding the study area to multiple locations, incorporating qualitative interviews, and including additional variables such as enforcement visibility, social perception, and risk awareness to strengthen the overall understanding of helmet safety behaviour.

Taken together, these limitations highlight the complexity of understanding motorcycle helmet usage behaviour and the need for more nuanced research designs. While the present study provides important insights into the interplay of knowledge, attitude, and practice among riders in low-cost housing areas, future investigations that broaden the scope, diversify methodological approaches, and incorporate additional contextual factors will be essential. Such efforts can generate a more comprehensive evidence base to inform targeted interventions, ultimately contributing to safer riding practices and reducing the burden of head injuries in vulnerable communities.

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