



Perceptions, barriers, and strategies regarding helmet use by female pillion riders in Pakistan: A qualitative study[☆]

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ABSTRACT

Introduction: Despite the existence of a national motorcycle helmet law that applies to both riders and pillion riders, the use of helmets among female pillion riders is low in Pakistan. This study aimed to explore perceptions, barriers, and strategies related to helmet use by female pillion riders.

Methods: Data was collected from nine focus group discussions held with female pillion riders and male riders working at the Aga Khan University. Focus group discussions were transcribed verbatim and checked for accuracy before being imported into NVivo2. Transcriptions were analyzed using a thematic analysis approach.

Results: Four overarching themes emerged, including: (1) motorcycle as mode of transportation, (2) law on helmet use and its enforcement, (3) barriers to helmet use among female pillion riders, and (4) strategies to improve helmet use among female pillion riders. Female participants never wore a helmet or considered wearing it even though “safety” was the most important benefit of helmet usage expressed. The motorcycle is an economical mode of transportation for families, particularly those in the middle and lower socioeconomic groups. Helmet laws are not strictly enforced for pillion riders, including females. Possible barriers to helmet use among female pillion riders included discomfort in wearing a helmet, uninvited attention from others, concerns about physical appearance, and substandard quality and design of helmets. Suggested strategies for implementing helmet use among female pillion riders encompassed awareness generation through media, complementary distribution of helmets, strict law enforcement in the form of fines, and the influence of religious leaders regarding social norms and cultural barriers.

Conclusion: Motorcycles are a risky mode of transport, and there are several social and cultural barriers regarding helmet use by female pillion riders. Enforcing helmet laws for female pillion riders, raising awareness about helmet laws, and making helmet use among pillion riders a norm are some essential steps to take to promote helmet use among female pillion riders in Pakistan.

Introduction

Globally, about 46% of all road traffic crashes involve pedestrians, cyclists and motorcyclists with the highest percentage of road traffic deaths in pedestrians (22%) and users of motorcycles (10%) [1]. The use of motorcycles is rapidly increasing along with a global increase in motorization, particularly in low-and-middle-income countries (LMICs) where two-wheelers are used as an economical mode of transportation

by low socioeconomic populations [2]. According to the Global Status Report on Road Safety 2018, the rate of road traffic deaths is high among users of motorcycles, with an estimated death rate of 24% in Iran and 74% in Thailand and Cambodia [1]. Motorcycles do not offer any protection to the rider's body, and a crash can result in partial disability, permanent impairment of vital body organs, and fatality in severe cases. In India and Pakistan, 73% of the total number of motor vehicles are motorcycles and motorized three-wheelers [1].

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The correct use of helmets by motorcyclists can reduce the risk of head injuries by about 69%, preventing death and disability as a result [3]. The prevalence of helmet use among riders of two-wheelers varies by country [4,5]. Many factors affect the use of helmets, including gender [6], the role of the rider (driver vs. pillion) [7] and helmet comfort [8]. The use of helmets among both riders and pillion riders is equally important to reduce the overall risk of fatal head injuries in motorcycle crashes. Among pillion passengers, females are more likely to wear helmets compared to males on roads with compulsory helmet use [7], but the general use of helmets among female pillion passengers is very low in LMICs [9,10].

Previous studies done in Pakistan have shown varying rates of helmet-wearing by motorcycle riders, ranging from 7–57% [11], and only 5.8% for pillion riders [12]. Different study settings and periodic enforcement of the helmet law resulted in the wide range of results for helmet use among riders. The motorcycle helmet law in Pakistan applies to both motorcycle riders and pillion passengers [13]; however, the enforcement of helmet use by traffic police is limited to riders [14]. In a cross-sectional survey of 400 women in Karachi, Pakistan, 98.8% ($n = 394$) reported never wearing a helmet as a pillion rider [15]. In Pakistan, women generally do not ride motorcycles due to social stereotypes associated with women riding motorcycles in a straddling fashion, a position that is considered to violate female modesty [16]. In addition, the use of helmets among female pillion riders is extremely low in Pakistan, though they recognize the importance of helmet use and its effectiveness against preventing death and disability [15].

This study aimed to explore perceptions related to helmet use, including associated barriers and potential solutions to increase helmet use among female pillion riders in Karachi, Pakistan.

Method

Design and setting

The focus of this qualitative study was to understand the use of helmets among female pillion riders in Karachi, Pakistan. The study was conducted at the Aga Khan University (AKU) after approval from the AKU Ethical Review Committee. It was convenient for the study team to recruit study participants commuting as pillion riders to and from AKU through empirical observation. AKU is an academic institution focused on health sciences and is the largest private healthcare provider in Pakistan with 14,300 staff and 975 faculty members.

This study was conducted between January 2011 and April 2012. However, the data continues to be significant in the contemporary context because many females still commute on motorcycles as pillion riders, without a helmet, and the cultural and legal context surrounding helmet use by females has not changed.

Participants and recruitment

Participants included female pillion riders and male motorcycle riders who used motorcycles as their main mode of commuting. A total of nine focus group discussions (FGDs) were conducted, five with females and four with males. Male perspectives on female pillion riders wearing helmets were deemed necessary, as in many households, male members are the primary decision-makers within the family. A convenience sampling approach was taken to recruit study participants. All study participants were employees (nursing, administrative and management staff) of AKU at the time of the study. Recruitment of participants for the study was done by the study team.

At the time of recruitment, all participants received an explanation of the purpose and objectives of the study and were invited to participate in the study. FGDs were conducted during work hours, and supervisor information was taken to obtain permission to allow time-off for participants. Participants were then contacted to confirm the date and time of the FGD based on their availability. All FGDs were conducted on the

premises of AKU [17]. Following the FGD, tea and biscuits were served to the participants to thank them for their time.

Data collection

FGDs were conducted by an expert facilitator who had prior training and experience in conducting qualitative research. Written informed consent was taken from each participant in Urdu before the formal FGD began. All FGDs were audio-recorded, and extensive notetaking was done by a co-facilitator. Facilitators and co-facilitators were trained by the principal investigator (URK) before data collection began. Each FGD lasted about 45–60 min and included between six and eight participants [17–20]. FGDs were conducted during work hours, so the study team was particularly mindful of participants' time. A semi-structured interview guide was developed based on previous helmet studies and was pilot tested before data collection began [21–23,8]. The interview guide was pilot tested on two AKU female staff. The objective of piloting the interview guide was to test the appropriateness and relevance of the questions and to give some early suggestions on the viability of the study to the research team. Furthermore, it facilitated the researcher in gaining experience conducting interviews and building rapport with the participants. Facilitators used probes as necessary to encourage maximum participation. Topics addressed participant awareness of motorcycle rider safety, knowledge about the helmet law, and perceptions about the pros and cons of helmet use by female pillion riders.

Analyses

This study used Lincoln and Guba's criteria to establish rigor and trustworthiness [24]. Focus groups were transcribed verbatim and checked for accuracy before being imported into NVivo2 [25]. The software was used to assist with coding, sorting, and retrieval of data. Two members of the research team (NZ & AS) led data analysis under supervision of an experienced qualitative researcher. Qualitative thematic analysis followed an iterative, inductive approach. A step-by-step analysis of the data included the following [25]:

- 1) **Coding:** The first step in the analysis process involved coding relevant text and information from the transcripts. All members of the research team initially coded some of the transcripts together. An inductive coding approach was used to identify the themes from all transcripts separately by two members of the research team.
- 2) **Category construction:** Output from the coding step contained a large number of identified quotations. The research team reviewed the quotations associated with the codes and distinguished categories through discussion and comparison.
- 3) **Completion of categorical assignments:** Significant team discussion occurred at this stage to aggregate quotes that were associated with each reviewed category.
- 4) **Thematic identification:** In the final stages of review, themes were determined and reviewed for consistency and clarity using a group process that involved reviewing the content of the interviews again and discussing each identified theme. Final consolidation of codes produced five overarching themes, described in detail below.

Results

Study participants included females who used motorcycles as pillion riders and males who used motorcycles either as riders or as pillion riders. A total of 61 participants participated in the FGDs: 32 females (52.46%) and 29 males (47.54%). A majority of our focus group participants were between 20–30 years old. Occupations varied and included titles such as administrative secretary, research staff, laboratory technicians, and field workers (Table 1).

Four main themes were identified based on the thematic analysis: 1) motorcycle as mode of transportation, 2) law on helmet use and its

Table 1
Characteristics of the FGD participants (N = 61).

Characteristics		n (%)
Sex	Male	32 (52.46)
	Female	29 (47.54)
Age Category (years)	20–30	36 (59.01)
	31–40	21(34.42)
	41–50	4 (6.55)
Occupation	Administrative secretary	15 (24.59)
	PGME residents	11 (18.03)
	Research staff	17 (27.86)
	Laboratory technician	8 (13.11)
	Field worker	10 (16.39)

*PGME: Post-graduate medical education.

Table 2
Analytical themes and categories.

Themes	Categories
Motorcycle as mode of transportation	Economically feasible Convenient way of commuting User safety concerns
Law on helmet use and its enforcement	Lack of awareness Ineffective enforcement Low compliance
Barriers to helmet use among female pillion riders	Socio-cultural norms Discomfort in wearing helmet Uninvited attention by others
Strategies to improve helmet use among female pillion riders	Concerns about physical appearance Substandard quality and design of helmets Awareness generation Stricter penalties Complementary distribution of helmets Contribution of manufacturers and employers Influence of religious leaders

enforcement, 3) barriers to helmet use, and 4) strategies to improve helmet use. These themes emerged from the categories, which were ascertained by grouping related quotes from the transcripts. **Table 2** shows the themes in the form of a coding framework.

Motorcycle as mode of transportation

Study participants stated that motorcycles are a cost-effective transportation option, especially for those in the middle and lower socioeconomic classes. Motorcycles are convenient and save time and money, particularly during heavy traffic. However, participants agreed that motorcycles are risky and dangerous, particularly for females as they are more vulnerable to road traffic injuries due to their seating posture on motorcycles without grip support. In addition, females in Pakistan usually carry their children in their laps while sitting side-saddle on motorcycles as pillion riders. The motorcycle does not provide any structural protection to riders or pillion riders, increasing the risk of injuries.

“Commuting via motorcycle is economically feasible but it comes at a cost of compromising your safety [...] because the two-wheeler’s construction is not relatively stable as compared to a four-wheeled vehicle and one may end up experiencing severe injury.”
“Girls face more injuries as we sit with having legs hanging on one side of the motor bike (saddle crossed) as compared to the boys who are able to balance themselves.”

The visibility of motorcycles during dark hours was another concern,

making them more prone to road traffic crashes. Furthermore, the roads turn slippery during rainy seasons, further increasing the risk of injuries. Some participants reported being injured as a result of riding a motorcycle on slippery roads. Moreover, females in Pakistan wear shalwar kameez (Pakistan’s national dress) and loose clothing, which is risky when riding as a pillion rider on a motorcycle. Participants reported several injury events as a result of wearing a veil whereby the long end of the veil got caught in the wheels of a moving motorcycle.

“The girls of Pakistan wear dupattas (a long veil) and shalwars (loose trousers) which often get stuck with the moving tire of the bike and it gets dangerous.”
“It’s very risky to ride motorcycle during rain [...] my whole family has had accidents including myself, my kids and my husband had a fracture due to fall from the motorcycle.”

Some participants expressed concerns regarding an increased demand for transportation, which can result in an increase in traffic volume in a metropolitan city like Karachi. Using motorcycles to commute helps to minimize the over-utilization of road spaces and reduces traffic congestion as two-wheelers use less road space. In addition, parking space pricing charges for the amount of space used, encouraging smaller vehicles. Lastly, the use of motorcycles over four-wheeled vehicles promotes social and environmental benefits, including a reduction in air pollution and the creation of an affordable transportation system.

“The parking of the motor bikes in a metropolitan city like Karachi is not a problem and movement is easy on busy roads.”

Law on helmet use and its enforcement

Respondents mentioned inadequate enforcement of the helmet law as one explanation for the overall low use of helmets among both riders and pillion riders. Motorcycle riders expressed concerns related to the lack of transparency in the licensing process for motorcycle use, preventing awareness of the helmet law. Female pillion passengers shared their concerns that motorcycle riders are unaware of helmet laws, creating a ripple effect among pillion riders. Respondents believed that female pillion riders are not required by law to wear helmets but that they should be. However, participants who had gone through the proper licensing process stated that the license authorities issued a rule book that addresses helmet law.

“When there are no strict rules and regulation for the drivers of the bike regarding helmet use, then how to expect laws for the pillion riders.”
“From the legislative point of view, I think there is no law for female pillion riders to use helmets.”

Furthermore, respondents stated that the helmet law is not enforced due to a lack of law enforcement personnel and accountability. Participants who believed there was a law requiring pillion passengers to wear helmets felt that it was not strictly enforced. Female pillion passengers shared that they were never penalized or questioned by traffic police for not wearing a helmet.

“I usually go to office with my husband on his motorcycle [...] I have never been stopped by traffic police for not wearing a helmet.”
“I feel that before the execution of the law to wear helmets, we should form a law [...] I think there is no law for helmet use among pillion riders, especially for female pillion riders in Pakistan.”

Other participants expressed concerns that it would be impractical to legislate the helmet law because it only prevents head injuries, leaving other areas of the body vulnerable to injury.

“What is the point of wearing a helmet [...] it does not protect other parts of the body”

Some respondents expressed concern about traffic police using the helmet law as a money-making opportunity.

“Who follows the law and order? The traffic police take 10–15 rupees and set the person free.”

Barriers to helmet use among female pillion riders

According to participants, there is no norm in Pakistan for pillion riders to use a helmet. Interestingly, none of the female participants in the FGDs had ever considered wearing a helmet as a pillion passenger. Female participants mentioned that helmets are not suitable for women as pillion riders. They believed that helmets are made of a rigid frame that is not intended for female use and that helmets do not go well with the way women dress in Pakistan. Women in Pakistan generally wear long shirts with loose trousers and carry a shawl to cover their heads as an expression of modesty, making it challenging for them to wear helmets.

“There is no trend in Pakistan for pillion riders to wear helmets. I feel no pillion rider even thinks of wearing it.”

“In Pakistani culture, we (females) can't drive a bike and similarly we can't wear helmet.”

“Wearing of helmet as female pillion rider will not look nice; will look odd.”

Moreover, male participants expressed that the use of helmets by female pillion riders would be inappropriate considering cultural and social norms.

“It is not in our tradition or culture for females to wear helmet, if she wears helmet then everyone would think that she is handicap.”

Female participants agreed that pillion riders are more vulnerable to injuries in the event of a road traffic crash and that helmet use may be an effective source of protection for them.

“I fell from the bike and had an injury; the first thought which came to my mind was if I were wearing a helmet, my head could have been protected.”

Both male and female participants shared various concerns about wearing a helmet, including vision impediment, discomfort, unwanted attention from others, and unattractive physical appearance. Female participants acknowledged that helmets provide protection, yet they were reluctant to wear them because helmets make them feel suffocated.

“In my experience, wearing helmet obstructs the rider's vision and diminishes the road sense which increases the likelihood of road traffic accident.”

“Even if we (female pillion riders) start wearing helmets we may become an object of uninvited attention and I don't want people to stare at me.”

“The big issue is the way we sit and dress. How we look on the bike sitting saddle crossed and wearing a helmet.”

A male participant stated that a female wearing a helmet may result in that person being mocked. Females wearing a helmet have always been unusual in Pakistan, and they attract a lot of attention, which may make them uncomfortable.

“When a female wears a helmet, drivers stare through their glasses and make fun of her, asking who she is and what she is doing...they become an object of ridicule, so they avoid wearing helmets.”

Female participants mentioned that they were unwilling to compromise their comfort by wearing helmets and shared their dissatisfaction with the use of helmets for themselves and their children. Other concerns raised by participants included the difficulty of carrying the helmet around and the poor quality of the helmets.

“Helmets are ugly. Though it may protect from sun and dust, it spoils the hairdo. Imagine getting decked up for a party and make-up and hair going haywire because of helmet.”

“The helmets designed for females should be different. Their designing should be such that females could wear it. Male helmets on females would look odd.”

Respondents believed that prolonged use of helmets would cause hair loss, skin damage, and hygiene issues due to excessive sweat, especially during the months of hot weather in Karachi. Furthermore, some male participants shared that females do not need to wear helmets because they are expected to wear a veil and headscarf.

“One is prone to skin infections and hair loss due to excessive sweating as a result of wearing helmet.”

“Do you think it is realistic for females to wear helmet? Especially keeping in view the environment of Pakistan, as there is hot weather for almost nine months...also females are covered in abaya (veil) from head to toe.”
“Females in Islamic societies wear headscarves and do not need to wear helmets.”

Female participants also mentioned that it is difficult for them to wear a helmet while carrying a child in a moving vehicle and experiencing bumps due to uneven roads.

“I cannot wear helmet while carrying my child in the lap and riding on the bumpy roads of Karachi [...] it is very irritating”

Strategies to implement helmet use among female pillion riders

Participants suggested various strategies for enforcing the helmet law in Pakistan. All participants agreed that wearing a helmet would minimize the severity of head injuries. Participants thought that using a mass media campaign to raise public awareness about the social and economic advantages of wearing a helmet would be effective.

“If society as a whole adopts the habit of wearing helmets while riding bikes, we all can easily follow it.”

“Media can be involved to deliver public service messages for the use of helmets by female pillion riders, can be given through a variety of means like radio, television, etc.”

Other recommended strategies for increasing helmet use included free helmet distribution by manufacturers and employers, as well as advocacy by well-known public figures. It was also considered important that manufacturers produce standard helmets that were proven to be effective in preventing head injuries.

“Females will wear helmet if it is distributed free by manufacturers and employers.”

“The dealers and manufacturers of motorcycles should sell two helmets along with the vehicle to promote wearing of helmets by the pillion riders.”

Local influencers like religious leaders or celebrities can also play a role in

influencing social norms and raising awareness about helmet use among female pillion passengers.

“If religious leaders give Fatwa (a ruling on a point of Islamic law given by a recognized authority) on wearing of helmets by females, then everyone will follow.”

“Celebrities (like actors, cricketers) can also influence the public by advocating the use of helmet among female pillion riders.”

A few participants proposed that stricter penalties be levied on motorcyclists as well as pillion riders who violate the helmet law.

“Fine should be imposed on the pillion riders without helmets.”

Discussion

This study sought to provide insight into the perception of motorcycle users on use of helmets among female pillion riders and potential strategies to increase the use of helmets in Karachi, Pakistan. We found that while motorcycles are viewed as a cost-effective means of transportation, they are considered dangerous for females due to their sitting posture and long clothing, making them more prone to road traffic injuries. The helmet legislation is not strictly enforced, and it was generally perceived that female pillion riders are not required by law to wear helmets. Some possible barriers to helmet use among female pillion riders included helmet quality and incompatibility with female attire in Pakistan, unwanted attention from passersby, and carrying a child while riding as a pillion passenger. The production of helmets suitable for and acceptable to females and the involvement of religious leaders in influencing societal norms were believed to be effective measures for increasing helmet use among female pillion riders.

Even though many motorcyclists and pillion riders were aware of the benefits of helmet use, beliefs, attitudes and social norms were preventing female pillion passengers from wearing them. The theory of reasoned action relates that social norms have a considerable impact on the intention to use a helmet associated with perceived behavioral control [26]. According to a survey of 400 women in Karachi, the primary reason for not wearing a helmet is appearance, followed by the lack of a legislative mandate requiring helmet use and the belief that helmets are ineffective in the event of a road crash [15]. This study also showed that female pillion riders neither thought of wearing a helmet nor were asked to or fined by traffic police officers. However, a recent study from India noted high helmet use among female pillion passengers; age, trip purpose, education status, and having been stopped by the police in the previous three months were all factors that influenced effective helmet wearing [27]. According to another study in Ghana, females were more likely to wear helmets when riding motorcycles compared to their male counterparts [9].

Interestingly, all participants considered motorcycles to be risky, but none of the females thought about using a helmet for her own safety. Low prevalence of helmet use is due to weak enforcement of the helmet law, such as infrequent checks for helmet use by traffic officers [28]. Both male and female participants admitted to being unaware of the helmet law for pillion riders, particularly for females as pillion riders. This finding is consistent with a recent survey of female pillion riders conducted in Karachi in which nearly 65% of survey respondents were unaware of laws requiring riders and pillion riders to wear helmets [15]. In Pakistan, no law enforcing agency penalizes female pillion riders for not wearing a helmet. According to the Global Status Report on Road Safety 2018, Pakistan scored three out of ten points regarding the enforcement level of the motorcycle helmet law [13]. Evidence suggests that enforcing a mandatory helmet law is one of the most cost-effective strategies for successfully reducing the number of motorcycle-related injuries and fatalities [29–31]. Previous studies have shown increased helmet-wearing rates from 20% to over 96% and a reduction of fatalities by 18% in Italy [30] and a reduction of injuries by 16% in Vietnam [32]

after the introduction or revision of a mandatory helmet law. A recent enforcement campaign on a highway in Pakistan showed a nearly 13% increase in helmet use by all pillion riders [12]. Helmet legislation needs to consider enforcement mechanisms with penalties that are significant enough to incentivize behavioral changes and proportional to the socioeconomic status of the community. Moreover, the use of helmets can considerably reduce the healthcare cost even after sustaining injuries in a road traffic crash [33].

This study showed several possible barriers in helmet usage among female pillion riders, including fear of mockery by others, a sense of awkwardness, and possible discomfort. Male participants also acknowledged these barriers faced by female pillion riders. A survey of female pillion riders in India revealed that they were also reluctant to wear helmets due to discomfort and physical appearance [10]. Another probable reason for the limited use of helmets among female pillion riders was the poor quality of the helmet. An observational study conducted in China found that two-thirds of nearly 5000 motorcyclists used substandard helmets; and a study from Iran reported that people used substandard helmets because they were cheap and light in weight [22]. Availability of high-quality, well-designed helmets, specifically intended for females, might promote helmet use in Pakistani females. However, without high-quality helmets at a reasonable price, an increase in helmet use may not actually provide optimal protection. Male participants suggested that helmets suitable for and agreeable to females should be distributed among females for free to encourage their use.

Despite the many barriers, participants in this study showed a positive attitude towards helmet use, similar to what was found in India [34], and recommended the involvement of media and celebrities in helmet promotion campaigns. Increased efforts should be made to improve awareness of helmet use among pillion riders regardless of gender. In addition, education efforts should reinforce the importance of wearing helmets among female pillion riders. Following the recent launch of the Women on Wheels campaign [35] and the inclusion of women in ride-hailing services [36], it is now more important than ever to perpetuate helmet use among female riders and pillion riders as the number of female motorcyclists in Pakistan will likely increase. Participants also proposed the imposition of a fine for non-compliance of helmet use. The strategy of involving religious leaders in helmet use among females is also remarkably interesting. Such strategies have been proposed for reproductive healthcare [37], and the engagement of religious leaders has proved instrumental in the success of family planning initiatives in Bangladesh and Afghanistan [38].

There has been a greater awareness among women to ride motorcycles in Pakistan's major cities. It is widely observed that women as riders of motorcycles use helmets, but it is less likely that women pillion riders would do the same because the helmet is thought to be necessary for riders only. A study conducted in India showed that the prevalence of the effective use of helmets was lower in female pillion riders than in male and female riders [39].

Strengths and limitations

This study has brought to light an important and amenable source of injury for many females in Pakistan. The study results provide a new dimension to the subject area and support previous studies, thus adding evidence and new ideas to the current understanding. In addition, study participants included female pillion riders themselves who highlighted the challenges of wearing a helmet and strategies for increasing helmet use among them. This can be extremely useful in terms of developing new initiatives and determining how to enforce helmet laws in the context of Pakistan.

Some limitations of the current study must be taken into consideration when interpreting the findings. As a qualitative, single private institute study, we cannot assume that the opinions and concerns expressed by participants represent those of the wider population of Pakistan with its varied age groups, socioeconomic backgrounds,

occupations and educational status. In addition, those who responded to the invitation to participate in the FGD may have had a greater interest in the topic or a vested interest in having their voices heard as compared to those who did not or could not attend. The gender perspective on helmet use for females should be carefully considered because males may be biased against female pillion riders wearing helmets, due to the potential for making females the subject of unwanted attention and incurring cost in buying new helmets.

Conclusion

Many pillion riders, particularly females, do not wear helmets. The risk of death and head injury is extremely high when riding without a helmet. This study identified barriers to and potential solutions for increasing helmet use by female pillion riders, emphasizing the need for a multi-prong approach. First and foremost, the helmet law needs to be promoted and enforced, with an emphasis on shifting social norms to make helmet use acceptable in Pakistan's context. In addition, steps must be taken to improve helmet designs and quality, reduce helmet prices, and increase awareness through mass media campaigns. These measures have become increasingly important as women riding motorcycles in Pakistan have started gaining societal acceptance. The involvement of a wide range of stakeholders, including the media, helmet manufacturers and suppliers, policymakers, and local influencers may encourage female pillion riders to buckle their helmets.

Data availability statement

Deidentified participant data is available upon reasonable request from Dr. Uzma Rahim Khan, uzma.khan@aku.edu.

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Contribution

URK conceptualized the study, designed methods, supervised data collection, led project administration, wrote and reviewed manuscript. NZ was involved in project administration, data curation, data analysis, write up of first draft and in review of all the drafts. UM helped in additional analysis and in revision of manuscript. SAS led the data curation, analysis and review of the manuscript. KM reviewed all the drafts and took part in revision of manuscript.

Ethics approval

Ethical approval for this study was obtained from the Ethics Review Committee of the Aga Khan University.

Declaration of Competing Interest

The authors declare that they have no competing interests.

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Supplementary materials

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