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Original Research Article

Perceived domains that could improve helmet wearing behaviour in two-wheeler riders: a cross sectional study among internet users residing in Tamil Nadu

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ABSTRACT

Background: Road traffic accidents are major cause of morbidity and mortality. Correct helmet use can reduce fatal injuries of head and neck and death. The purpose of the study is to assess the knowledge, attitude and practice towards helmet wearing and to assess the barriers and facilitators of helmet wearing practice among internet users.
Methods: An observational cross-sectional study was carried out among Internet users who rode motorcycle between August 1, 2020 to October 1, 2020. A pretested semi-structured online questionnaire was used to collect data for the study. The collected data was entered into Microsoft Excel Version 2019 and was analysed using SPSS version 26.
Results: 29.9% had poor knowledge regarding helmets followed by 64.5% with moderate knowledge. 5.6% had good knowledge. With regard to attitude, only 5.5% had poor attitude while 66.4% and 27.9% had moderate and good attitude, respectively. Domains perceived by the participants influencing the helmet wearing behaviour included comfort (52.2%), legislative measures (38.5%), awareness (34.4%), design and quality of helmet (27.4%), cosmetic disadvantage (17.1%) and infrastructure (16.7%).
Conclusions: Improving the knowledge and attitude among the participants would aid in promoting helmet wearing behaviour. Improving the comfortability while wearing helmet, more strict enforcement of laws for helmet wearing along with increasing the severity of them and increasing awareness through various means were the three most listed domains that could improve helmet wearing among two-wheeler riders.

Keywords: Helmet, Barriers, Facilitators, Two-wheeler, Internet users, Types of helmets

INTRODUCTION

A road traffic accident (RTA) is any injury due to crashes originating from, terminating with or involving a vehicle partially or fully on a public road.[1] Road traffic injuries (RTIs) are a major cause of both morbidity and mortality globally and eight leading cause of death of all age groups around the world. According to the Global Report on Road safety 2018, the rates of road traffic death were highest in Africa and South-East Asia. India accounted for almost 11% of the accident-related deaths in the world, in which the states Tamil Nadu and Uttar Pradesh accounted for the highest number of road accidents and death on account of road accidents respectively in 2018.[2,3] Delhi is ranked first for highest deaths due to RTI, followed by Jaipur, Chennai and Bengaluru.[4] Road traffic injuries are the leading cause of death for children and young adults aged 5-29 years, in which males are

more likely (three times) to be involved in road traffic crashes than females. The risk factors are Speeding; Driving under influence of alcohol and other psychoactive substances; non-use of motorcycle helmets, child restraints and seatbelts; Distracted driving; Unsafe Road infrastructure; Unsafe vehicles; Inadequate post-crash care; Inadequate enforcement of traffic laws.[2] The correct helmet use can lead to a 42% reduction in the risk of fatal injuries and a 69% reduction in the risk of head injuries. Motorcycle helmets were invented in 1914 by Mr. Moss. However, the importance of crash helmets for civilians' motorcyclists was brought into light by Dr. Hugh Cairns.[5] There are six main types of motorcycle helmets: full face, modular, open face, half, off-road, and dual-sport helmets.[6] An important means of increasing the helmet wearing is through legislation.

Section 129 of the motor vehicle act of 1988 clearly reads that anybody driving a motorcycle or a two-wheeler of any class in a public area is mandated to put on a protective safety helmet. According to Motorcycle Amendment Bill 2019, the fine for not wearing helmets has been increased from ₹100 to ₹1,000. On subsequent charges, disqualification for 3 months from driving.[4] Despite such strict enforcement of law and imposing heavy fine, it is observed that not many tend to follow the rules and regulations and the practice of helmet wearing is observed to be low. The need for the study is to assess the reasons for less to no helmet wearing. The objective of the study is to find out the Knowledge and Attitude towards Helmet wearing while riding two-wheelers among internet users. The second objective of the study is to identifying the domains influencing the helmet wearing behaviour and the facilitators and barriers within the domains identified.

METHODS

The study was cross-sectional study conducted among internet users aged more than 18 years. The study period was August 1,2020 to November 1, 2020. The study population was people residing in Tamilnadu, India. The study participants were the internet users who rode two-wheeler in their day-to-day life. The inclusion criteria for the study were age more than 18 years, owning a two-wheeler and riding a two-wheeler. Bicycle owners and riders were excluded from the study. Ethical approval was obtained from the institutional ethics committee. A pretested semi-structured questionnaire was administered through google forms for collecting the data. A question regarding the ownership and usage of two wheelers was asked at the start of the questionnaire to fulfil the inclusion and exclusion criteria. The questionnaire comprised Sociodemographic characteristics, details regarding two wheeler and helmet, Knowledge and attitude towards helmet wearing, perceived barriers and facilitators for practising helmet wearing. The data on socio demographic characteristics like age, sex, education, occupation was collected. In order to get details regarding the pattern of helmet worn, questions like do you wear helmet, number of helmets owned were asked. The questionnaire also consisted of 19 questions regarding knowledge and attitude of helmet wearing among motorcycle riders. All 19 were close ended questions. The questions were formulated to test the knowledge, attitude and practice. Finally, the participants were asked regarding the perceived barrier and what change they think would make everyone to wear helmet. The above was an open-ended question. Internal validity of the questionnaire was assessed by presenting the questionnaire to 5 different experts. For knowledge each correct answer was given 1 mark and wrong answer was given 0 marks. The resulting scores ranged from 1 to 15, which was then classified into Poor (1 to 5), moderate (6 to 10) and Good (11 to 15) Knowledge. For attitude, strongly disagree, disagree, neutral, agree and strongly agree were scored 1 to 5, respectively. After evaluation the scores ranged from 6 to 26 which was divided into poor (6 to 12), moderate (13 to 19) and good (20 to 26).

Statistical analysis

The data collected were entered into microsoft excel version 2.41.1, which was then compiled and analysed using SPSS version 23. Descriptive statistics like Percentile, proportions were used to describe the data. For the open-ended question regarding the barriers and facilitators all the answers collected were compiled and categorized into the various domains and sub groups.

RESULTS

Out of 358 participants, 329 (92%) were in age group 20 to 30 years. Males and females were of almost equal proportion with the male: female ratio of 1.11:1. Among education status of the participants 319 (89.11%) were professionals followed by 17 (4.75%) were undergraduates. It was observed that 301 (89.08%) participants were doing a semi-skilled job, 285 (79.6%) participants were dependent. Hinduism (90.8%) was the most practiced religion. Most (88.5%) of them were unmarried. 83.8% belonged to nuclear family and almost 83% were urban residents (Table 1).

Among the participants, 286 (79.9%) owned helmet, in which 278 (77.5%) owned one helmet and 10 (2.9%) owned more than one helmet. In regards to the type of helmet owned by participants, open face helmet (30.7%) and full-face helmet (30.7%) were the most commonly owned, followed by modular helmet (11.2%). Based on the two-wheeler ownership, 259 (72.3%) owned both scooty and motorcycle followed by 166(46.4%) owning both scooty and bicycle (Table 2). The thickness of the helmet along with foam was correctly answered as 15-20 mm by 118 (33%) participants. At least 3 parts of helmet were listed by 85 (23.74%) participants. 87 (24.3%) correctly stated that a helmet must comply to ISI/bis standards.

Table 1: sociodemographic characteristics of the study participants (n=358).

Sociodemographic variable	Answers	N	%
Age (years)	20-30	329	92
	30-40	21	5.9
	40-50	5	1.5
	50-60	1	0.3
	60-70	2	0.6
Sex	Male	188	52.5
	Female	170	47.5
Education	Technical education	3	0.84
	Undergraduate	17	4.75
	Postgraduate	12	3.35
	Professional	319	89.11
	Doctorate	7	1.95
Occupation	Skilled	50	13.97
	Semi-skilled	301	84.08
	Unskilled	7	1.95
Religion	Hinduism	318	88.5
	Islam	16	4.2
	Christianity	18	5
	Others	8	2.3
Marital status	Unmarried	325	90.8
	Married	32	8.9
	Divorced	1	0.3
Type of family	Nuclear family	300	83.8
	Joint family	58	16.2
Type of residence	Rural	61	17.04
	Urban	297	82.96

Table 2: Type of helmet and two-wheelers owned by the study particiapants (n=358).

Questions	Answer	N	%
Do you own helmet?	Yes	286	79.9
	No	72	20.1
Number of helmets you own	None	70	19.6
	1	278	77.5
	>1	10	2.9
Type of two-wheeler owned	Bicycle only	18	5.03
	Motorcycle only	117	32.68
	Scooty only	168	46.93
	Scooty/Motorcycle	14	3.91
	Scooty/Bicycle	12	3.35
	Motorcycle/Bicycle	14	3.91
	Motorcycle/Bicycle/Scooty	15	4.19
Type of helmet	Modular	40	11.2
	Open face	110	30.7
	Off road	26	7.3
	Half face	33	9.2
	Full face	110	30.7

Majority (99.44%) of participants opined that helmet conferred safety. 251 (70.1%) voiced that the riders would be fined if they didn't properly fasten their helmet. Most (90.2%) of the, agreed that there was fine if the rider didn't wear helmet. Pillion riders were required to wear helmet according to 322 (89.9%) participants. 294 (82.1%) were aware that helmets were available specifically for children.

Table 3: Knowledge regarding helmet wearing among the participants.

Questions	Correct answer	N	%
What should be the thickness of the helmet along with foam?	15-20 mm	118	33
List out the parts of helmet	At least 3 parts	85	23.74
A helmet must comply with certain standards. What are the standards?	ISI/BIS	87	24.3
Helmets confer safety	Agree	356	99.44
If you don't properly fasten your helmet you will be fined	Yes	251	70.1
There is fine if the rider doesn't wear helmet	Yes	323	90.2
Do pillion riders require to wear helmet?	Yes	322	89.9
Are you aware that helmets are available specifically for children too?	Yes	294	82.1
Amount of fine if the rider doesn't wear helmet	Rs. 501-1000	94	26.2

The amount of fine if riders didn't wear helmet ranged from Rs. 501 to rs.1000 was opined by 94 (26.2%) participants (Table 3). 40.8% agreed that they felt like wearing helmet whenever they were going to switch on the bike. 30.4% disagreed when asked whether they would never wear helmet without stringent law. 41.9% agreed that they felt like immediately repairing their helmet whenever it got damaged. 37.2% strongly disagreed when asked whether they would never advise another person to wear helmet. 47.5% agreed that they would advise their pillion rider to wear helmet. 45.3% agreed that they always wore helmet before starting their two-wheeler. 32.4% were neutral on asking whether they never fastened their helmet even though they wore one.40.2% fastened their helmet always. 44.1% agreed that they immediately repaired their helmet whenever it got damaged. 33.8% agreed that their pillion riders never wore helmet. 42.2% were neutral when asked whether their pillion riders always fastened helmet whenever wearing one (Table 4). 29.9% had poor knowledge regarding helmets followed by 64.5% with moderate

knowledge. 5.6% had good knowledge. With regard to attitude, only 5.5% had poor attitude while 66.4% and 27.9% had moderate and good attitude, respectively (Figure 1).

Table 4: Attitude and practice of helmet wearing among study participants.

Variables		Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
		N	%	N	%	N	%	N	%	N	%
a	I feel like wearing helmet whenever I am going to switch on my bike	77	21.5	92	25.7	146	40.8	30	8.4	13	3.6
a	Without stringent law I will never wear helmet	24	6.7	98	27.4	69	19.3	109	30.4	58	16.2
a	I feel like immediately repairing my helmet whenever it gets damage	55	15.4	102	28.5	150	41.8	41	11.5	10	2.8
a	I will never advise another person to wear helmet	14	3.9	46	12.8	34	9.5	131	36.6	133	37.2
a	I will advise my pillion rider to wear helmet	60	16.8	95	26.5	170	47.5	20	5.6	13	3.6
p	I always wear helmet before starting my two-wheeler	73	20.4	93	25.9	162	45.3	24	6.7	6	1.7
p	I never fasten my helmet even though I wear one	20	5.6	116	32.4	78	21.8	89	24.8	55	15.4
p	I repair my helmet immediately whenever it gets damaged	51	14.2	104	29.1	158	44.1	39	10.9	6	1.7
p	My pillion rider never wear helmet	29	8.1	105	29.3	121	33.8	67	18.7	36	10.1
p	My pillion rider always fastens helmet whenever wearing one	40	11.2	151	42.2	94	26.3	52	14.5	21	5.8

a-attitude, p-practice.

Domains perceived by the participants influencing the helmet wearing behaviour included comfort (52.2%), legislative measures (38.5%), awareness (34.4%), design and quality of helmet (27.4%), cosmetic disadvantage (17.1%), infrastructure (16.7%).

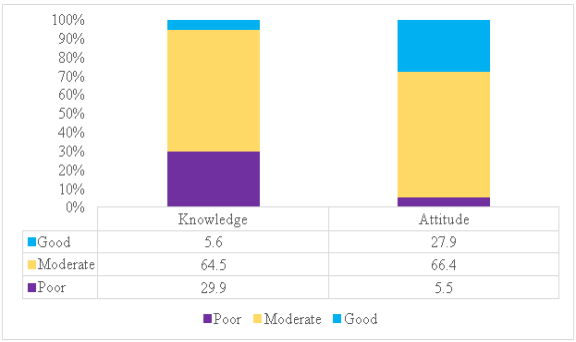

Figure 1: Distribution of knowledge, attitude and practice categories among the participants.

Within the comfort domain, 40.12% reported feeling of discomfort as a barrier to helmet wearing and 5.35% reported comfort as a facilitator of helmet wearing. Within the domain legislative measures,50% voted for strict law, 20.29% suggested levying heavy fine and 10.87% suggested increasing the already existing fine amount for promoting helmet wearing. 4.35% reported that incentives to helmet wearing could promote the behaviour. Within the domain awareness, 9.76% and 47.15% reported less awareness and proper awareness as facilitators and promoters, respectively. 10.57% suggested projecting road traffic accident pictures and 5.96% voted for road safety campaigns in order to promote helmet wearing. Among the 27.37% of the participants who thought of the domain design and quality of helmet, 48.9% reported heaviness as a factor preventing the usage of helmet and 8.5% suggested producing light weight helmets in order to promote helmet wearing. 15.3% complained of reduced peripheral vision and 1.67% suggested increasing the peripheral vision in helmets. 17.04% reported helmet wearing had a cosmetic disadvantage like hair fall and spoiling of hair styles (Table 5).

DISCUSSION

The present study was cross-sectional study carried out among internet users between August 2020 and November 2020. The objective of the study was to find out the knowledge and attitude regarding helmet wearing among the internet users and the other objective was to identify the domains perceived by the participants influencing the helmet wearing behaviour along with the barriers and facilitators in each domain. The study was conducted among those aged more than 18 years and residing in Tamilnadu. 92% of the participants were in the age group 20 to 30 years. 52.2% were males. 89.11% were professionals and 83% were urban residents. 79.1% owned two-wheeler in the present study, which was higher than the study by Friedman et al in which 69.9% own two-wheeler.[7] 79.9% owned at least one helmet, which was higher than the study conducted by Siviroj et al in which 59.8% owned helmet.[8] In the present study, 99.44% thought that helmets confer safety which was higher than the study conducted by Olakulehin et al 2015 in which 88.9% agree that helmet is truly protective.[9] 30.4% disagreed when asked whether they would wear

helmet without stringent law. This is lower than the studies by Akaateba et al 2015.[10] 47.5% agreed that they would advise their pillion rider to wear helmet in the present study.

Table 5: Distribution according to the various domains influencing helmet wearing and the barriers and facilitators within the categories.

Domains	N (%)	Barrier	Facilitator
Comfort	187 (52.2)	Discomfort-75 (40.12%) Sweat-63 (33.69%), Heat-15 (8.07%) spectacle wearers-10 (5.35%), Difficulty to drive-9 (4.8%)	Comfortable-10 (5.35%), Sweat proof helmet-5 (2.67%)
Legislative measures	138 (38.55)	-	Heavy fine-28 (20.29%), Increasing fine amount-15 (10.87%), Strict laws-68 (49.28%), More check-posts-5 (3.62%), rewards for helmet wearing-6 (4.35%), other Legislative measures-16 (11.6%)
Awareness	123 (34.36)	Less awareness, Ignorance-12 (9.76%)	Proper awareness-58 (47.15%), Road safety education-16 (13%), Showing people RTA patients-13 (10.57%), Safety campaigns-7 (5.69%), Essentiality-10 (8.13%), Motivation-3 (2.44%), Sensitivity-7 (5.69%)
Design and quality of helmet	98 (27.37)	Heaviness-48 (48.98%) Head and neck pain-15 (15.31%), Poor helmet quality-6 (6.12%), Reduced peripheral vision 15 (15.31%)	Lightweight-8 (8.5%), Increasing peripheral vision-1 (1.67%), Improving aesthetics-5 (5.5%)
Cosmetic disadvantages	61 (17.04)	Hairstyle-12 (19.67%) Hair fall-48 (78.69%), Cosmetic purposes-1 (1.64%)	-
Infrastructure	60 (16.76)	Helmet infrastructure-48 (80%)	Proper place to keep helmet-2 (3.33%), two wheeler infrastructure-1 (1.67%), Helmet sensor in vehicles -4 (6.67%), Lock facility-5 (8.33%)
Mindset	46 (12.85)	Negative mindset-19 (41.3%)	Positive mindset-17 (36.96%), Self discipline-20 (43.48%)
Laziness/carelessness/ forgetfulness	39 (10.89)	Laziness, carelessness, Forgetfulness-39 (10.89%)	-
Personalisation	26 (7.26)	Lack of personalisation-5 (19.23%)	Customised Helmets-6 (23.08%), Aerated helmets-9 (34.62%), Helmet with coolant gel-2 (7.69%), Automated helmets-3 (11.54%), Removable cloth inside helmet-1 (3.85%)
Affordability	17 (4.74)	High cost of helmets -8 (47.06%)	Reducing cost of helmet -4 (23.53%) Free helmets-5 (29.4%)
Distance	11 (3.07)	Short distance trips (11)	-
Time	8 (2.23)	No time-5 (62.5%) Lack of time-3 (37.5%)	-
Availability	7 (1.95)	Unavailability-2 (28.57%)	Availability-3 (42.86%) Accessibility-2 (28.57%)

The proportion was higher than the study by Olakulehin et al 2015 in which 12.6% reported that they would advise their passengers to wear helmet.[9]

In the present study, 29.9% had poor knowledge regarding helmets followed by 64.5% with moderate knowledge and 5.6% had good knowledge. With regard to attitude, only 5.5% had poor attitude while 66.4% and 27.9% had moderate and good attitude, respectively. Similar study by Kulothungan et al reported study participants had higher proportion of poor knowledge and attitude.[12] Namwanga et al reported an increased proportion of good knowledge and poor practice among the participants.[13]

Improving the knowledge and attitude among the study participants to good proportion would aid in improving the behaviour of helmet wearing. Riders' comfortability while wearing helmet was listed to be the most prior domain by the participants who could influence the helmet wearing behaviour.

Following comfort, the second most frequently commented domain was strict laws enforcing the usage of helmet. Participants had suggested strict enforcement of already existing laws and also making them more severe. The study found out that many participants had moderate knowledge regarding helmet and many participants too had suggested that awareness play an important role in promoting helmet wearing as behaviour. Further participants had also suggested more research into the design of the helmet producing newer designs with increased specs, comfortability and safety. The infrastructure for keeping the helmet either on the motorcycle or in a safer place should be improved in the study area.

Limitations

The results of the study were not generalisable. Even if generalised, should done with caution. The usage of google forms for collection of data, aided in getting data from internet users living in various parts of the states. There could be the presence of recall bias while the participants were reporting on age and helmet usage. There could also be the presence of social desirability bias especially while answering the questions in the attitude section. The article specifically listed the domains where actions could be taken in order to improve helmet wearing behaviour among two-wheeler riders.

CONCLUSION

Improving the knowledge and attitude among the participants would aid in promoting helmet wearing behaviour. Improving the comfortability while wearing helmet, more strict enforcement of laws for helmet wearing along with increasing the severity of them and increasing awareness through various means were the three most listed domains that could improve helmet wearing practice among two-wheeler riders.

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