

Knowledge, Attitude, and Practice of Using Helmets in Children amongst Parents to Prevent Head Injuries: A Cross-Sectional Study in Riyadh, Saudi Arabia

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Abstract

Objectives: The primary objective was to characterize the range of Knowledge, Attitude, and Practice (KAP) of Helmet use in children amongst parents to prevent head injuries and death. **Methods:** This is a cross-sectional study, done by online survey using a snowball sampling technique, the number of included responses were 386 parents (Male and female) living in Riyadh Aged 21 - 60 years old or above. **Results:** The study showed that there is a difference in Parents' belief in the importance of helmet use while riding a Bicycle vs Motorcycle/Quad bike and that was affected by parents' education level, almost all the people who answered the survey (76.7%) agree that it is important for their children to wear a helmet when riding both a Bicycle and a Motorcycle or Quadbike with a cumulative percentage of (93.8%). And almost all agreed on multiple approaches to help increase helmet use be it by forcing rental shops to give out helmets, forcing sellers to recommend the use of helmets, increasing awareness campaigns, and imposing fines for not wearing helmets. **Conclusions:** This study is the first to explore Family helmet use while riding Bicycles and Motorcycles/Quad bikes. Although Parent's belief in the importance of helmet use for their children was high, it is clear that the level of practice is low. With that the risk of head injuries might be high, our findings suggest that safety interventions for increasing pediatric helmet use are needed to increase helmet use and reduce the risk of head injury and hospitalization.

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Keywords

Head Trauma, Head Injury, Helmet, Bicycle, Motorcycle, Quad Bike, KAP Knowledge, Attitude, Practice

1. Introduction

Road traffic accidents are one if not the top cause of death and injuries worldwide, nearly 1.2 million people die and millions more are injured or disabled as a result of road crashes [1]. If that was not enough, these accidents are also causing an enormous social cost on individuals, families, and communities, affecting health services and countries' economies costing them 1% - 2% of their gross national product, for applying an active road safety infrastructure can help tremendously in decreasing the amount of road traffic-related injuries and deaths [2]. In many low-income and middle-income countries, users of two-wheelers like Motorcycles and bicycle riders are at an increased risk of being involved in a crash and that is because they often share traffic spaces with fast-moving cars, buses, trucks and are less visible in addition to their lack of physical protection makes them particularly vulnerable to being injured if they are involved in a collision. In most high-income countries, motorcycle fatalities typically comprise around 5% to 18% of overall traffic fatalities [3] [4]. For instance, in China, motorcycle ownership between 1987 and 2001 grew rapidly from 23% to 63%, with a corresponding increase in the proportion of traffic fatalities sustained by motorcyclists rising from 7.5% to 19% over the same period [5].

2. Study Design

This is a cross-sectional study, aiming to evaluate the Knowledge, attitude, and practice of helmet use among Male and Female Parents living in Riyadh aged 21 - 60 Years old and above.

The survey was developed in English first and then translated into Arabic Sample size according to the Saudi General Authority of Statistics. The Number of married Saudi adults who lived in Riyadh in 2017 was 1,925,179. Based on an acceptable margin of error equal to 5%, an expected frequency of 50%, and a design effect of 1 with 95% confidence, a sample size of at least 385 is required for our study. The sample size was calculated using Epi Info version 7.2.3.1.

Exclusion criteria:

- Living outside Riyadh.
- Age < 21.
- No Children.

This study was approved by the Institutional Review Board (IRB) of Prince Sultan Military Medical City.

3. Data Collection

Using Google Forms as our base for online surveys with the use of snowball

sampling technique, with initial written consent at the start of the online survey which was open from 12/7/2021-3/5/2022, the Number of responses collected was around 1100 with the use of our exclusion criteria we were able to reach our required sample size with 386 Male and Female Parents living in Riyadh aged 21 - 60 Years old and above.

4. Measures

The demographic variables used in the study were Age, Gender, Education level (High school or less, Diploma, Bachelor, Master, PhD or Higher), Number of children, Age of children, Living in Riyadh, or Outside Riyadh.

The participants (Parents) were asked if they owned a Motorcycle, Quad Bike, or Bicycle, and if they used of Motorcycle, Quad Bike, or Bicycle did they wear a Helmet, or No.

Then participants (Parents) were asked about their children where they rode the Bicycle or Motorcycle Quadbike and in certain areas (At home, on the road, in the desert, on the farm, in a public space for riding, or if they did not ride). Then participants (Parents) were asked if their children wore a Helmet during the Use of a Bicycle or Motorcycle Quad Bike if they did not own a helmet or if they did not know. Then participants (Parents) were asked if their children had sustained any injuries while riding these vehicles and if they were wearing a Helmet when the incident happened. Then participants (Parents) were asked about what they thought about the importance of Helmet use by their children while riding these vehicles. Then participants (Parents) were asked to give their opinion on the optimal way to increase the use of helmet wear.

5. Data Analysis

The data were collected, reviewed and then fed to Statistical Package for Social Sciences version 27 (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). All statistical methods used were two tailed with alpha level of 0.05 considering significance if P value less than or equal to 0.05. Descriptive analysis was done by prescribing frequency distribution and percentage for study variables including parents' demographic data, children age, while properties at home were graphed. Also, parents and children bicycle, motor cycle riding a using helmet practices with injury history and their knowledge and attitude about using helmets in children to prevent head injuries were tabulated. Cross tabulation to assess factors associated with parent's knowledge and attitude about using helmets in children to prevent head injuries was carried out with Pearson chi-square test for significance and exact probability test if there were small frequency distributions.

6. Results

A total of 386 eligible parents were included in the study. Parents ages ranged from 21 to more than 60 years with a mean age of 41.2 ± 11.9 years old. A total

of 202 (52.3%) respondents were mothers, 174 (45.1%) had a bachelor degree and 76 (19.7%) had a post-graduate degree. Exact of 124 (32.1%) respondents had 1 to 2 children, 144 (37.3%) had 3 to 4 children and 118 (30.6%) had 5 or more children. As for age of the child, 108 (28%) had a child aged more than 15 years, 105 (27.2%) had a child aged 6 to 10 years, and 77 (19.9%) had a child aged less than 5 years (**Table 1**).

Figure 1, prosperities parents have in their own, Riyadh city, Saudi Arabia. A total of 157 (40.7%) of the parents had bicycle, 28 (7.3%) had motorcycle, 27 (7%) had quadbike, while most of the study parents did not have any of those.

Table 2, parents and children bicycle, motor cycle riding practices and injury history. Exact of 89 (23.1%) of stud fathers ride a Bicycle or Motorcycle or Quad bike and 16 (4.1%) parents (fathers and mothers) do. Also, 56 (50.5%) of fathers

Table 1. Study parent's socio-demographic data, Riyadh, Saudi Arabia (n = 386).

Personal data	No	%
Age in years		
21 - 30	67	17.4%
31 - 40	108	28.0%
41 - 50	119	30.8%
51 - 60	75	19.4%
>60	17	4.4%
Gender		
Male	184	47.7%
Female	202	52.3%
Educational level		
High school or less	76	19.7%
Bachelor's degree	174	45.1%
Diploma	60	15.5%
Post-graduate degree	76	19.7%
Number of children		
1 - 2	124	32.1%
3 - 4	144	37.3%
5+	118	30.6%
Age of the child in years		
<2	19	4.9%
2 - 5	58	15.0%
6 - 10	105	27.2%
11 - 15	96	24.9%
>15	108	28.0%

Table 2. Parents and children bicycle, motor cycle riding an using helmet practices with injury history.

Practice and injury	No	%
Does any of the parents ride a Bicycle or Motorcycle or Quad bike?		
Father only	89	23.1%
Mother only	6	1.6%
Both of them	16	4.1%
None	275	71.2%
Does any of the parents when using a Bicycle or Motorcycle or Quad bike wear a helmet? (n = 111)		
Father only	56	50.5%
Mother only	6	5.4%
Both of them	11	9.9%
None	38	34.2%
Where does your children usually ride the Bicycle?		
They don't ride a Bicycle	69	17.9%
At home	145	37.6%
In public parks	87	22.5%
On the road	51	13.2%
In the desert	23	6.0%
In the farm	11	2.8%
Where does your children usually ride the Motorcycle or Quadbike?		
They don't ride a Motorcycle or Quadbike	201	52.1%
In the desert	78	20.2%
At home	42	10.9%
In public parks	34	8.8%
On the road	17	4.4%
In the farm	14	3.6%
When do your children wear a helmet?		
They don't own helmet	182	47.2%
They don't ride any of them	60	15.5%
While riding both (Bicycle and Motorcycle/Quadbike)	57	14.8%
While riding a Bicycle	33	8.5%
While riding a Motorcycle or Quadbike	26	6.7%
Don't know/unsure	28	7.3%
Have they had any injuries while riding a Bicycle or Motorcycle or Quad bike?		
Yes	128	39.3%
No	171	52.5%
Don't know	27	8.3%

Continued

Were they wearing a helmet while riding a Bicycle or Motorcycle or Quad bike when they sustained their injury? (n = 155)

Yes	26	16.8%
No	97	62.6%
Don't know	32	20.6%

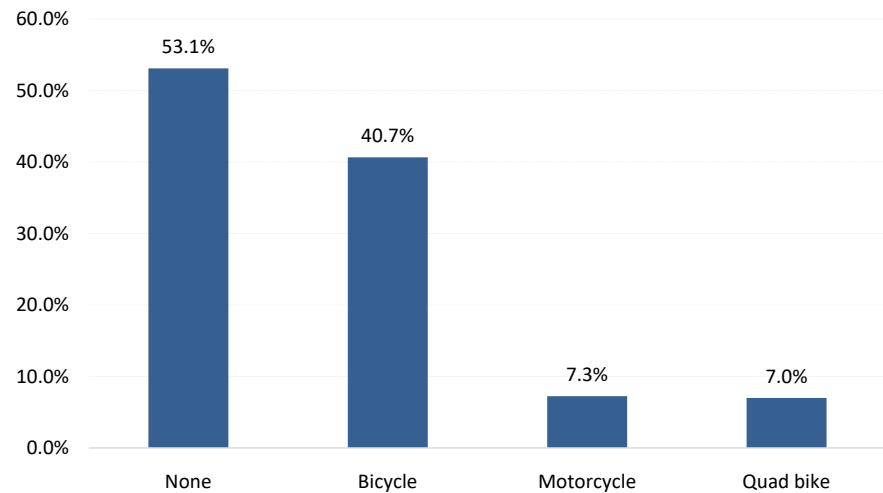


Figure 1. Prosperities parents have in their own, Riyadh city, Saudi Arabia.

who wear a helmet when using a Bicycle or Motorcycle or Quad bike and 11 (9.9%) of both parents do (9.9%). A total of 145 (37.6%) of children ride the Bicycle at home, 87 (22.5%) ride in public parks, and 51 (13.2%) on the road. Also, 78 (20.2%) of the study parents' children usually ride the Motorcycle or Quadbike in the desert, 42 (10.9%) at home, and 34 (8.8%) in public parks. As for wearing helmet, 182 (47.2%) of the parents reported that their children don't own helmet, 57 (14.8%) wear helmet while riding both (Bicycle and Motorcycle/Quadbike), 33 (8.5%) wear helmet while riding a Bicycle only and 26 (6.7%) wear helmet While riding a Motorcycle or Quadbike. A total of 128 (39.3%) of the study parents told that their children had injuries while riding a Bicycle or Motorcycle or Quad bike and only 26 (16.8%) of them were wearing a helmet while riding a Bicycle or Motorcycle or Quad bike when they sustained their injury.

Table 3, parents knowledge and attitude about using helmets in children to prevent head injuries. The vast majority of the study parents (76.7%; 296) agreed that its important for the children to wear a helmet when riding Bicycle and Motorcycle/Quadbike, 58 (15%) agreed to wear while riding a Motorcycle or Quadbike, and 8 (2.1%) agreed to wear while riding a Bicycle. The most reported optimal way to increase the use of helmet wear suggested by the study parents included improving public awareness of the importance of helmet wear (18.7%), Setting a clear law and enforcing it when not using the helmet (18.7%), Forcing rental shops to give out helmets when renting a bicycle or Motorcycle or Quadbike

Table 3. Parents knowledge and attitude about using helmets in children to prevent head injuries.

Knowledge and attitude	No	%
How important do you think is for your child/children to wear a helmet when riding?		
Agree, while riding both (Bicycle and Motorcycle/Quadbike)	296	76.7%
Agree, while riding a Motorcycle or Quadbike	58	15.0%
Agree, while riding a Bicycle	8	2.1%
Don't agree	15	3.9%
Don't know/unsure	9	2.3%
In your opinion, what do you think is the optimal way to increase the use of helmet wear?		
Public awareness of the importance of helmet wear	72	18.7%
Setting a clear law and enforcing it when not using the helmet	72	18.7%
Forcing rental shops to give out helmets when renting a bicycle or Motorcycle or Quadbike	33	8.5%
Forcing sellers to recommending the use of helmet when purchasing a bicycle, Motorcycle or Quadbike	22	5.7%
All of the above	187	48.4%

(8.5%), Forcing sellers to recommending the use of helmet when purchasing a bicycle, Motorcycle or Quadbike (5.7%) while 48.4% reported for all of these.

Table 4, factors associated with parent's knowledge and attitude about using helmets in children to prevent head injuries. All parents who wear helmet when using a Bicycle or Motorcycle or Quad bike totally agreed for its impotence to prevent injuries compared to 63.2% of those who did not ($P = 0.046$). Also, 89.5% of parents whose children wear helmet during riding both (Bicycle and Motorcycle/Quadbike) totally agreed for its importance compared to 84.8% of parents whose children wear during bicycling but 69.8% of those whose children didn't own helmet ($P = 0.029$). Likewise, 96.1% of parents whose children were injured while riding a Bicycle or Motorcycle or Quad bike agreed for wearing helmet importance versus 93% of others who had non-injured child ($P = 0.049$).

7. Discussion

The current study aimed to assess knowledge, attitude, and practice of using helmets in children amongst parents to prevent head injuries. As riding bicycles and all-terrain vehicles (ATVs) is a popular pastime among kids, despite the American Academy of Pediatrics' (American Academy of Pediatrics Committee on Injury and Poison Prevention) recommendation that minors under 16 not ride ATVs [1] [2].

The current study showed that most of the parents were highly educated with 3 or more children. Also, about half of the study families had bicycle, motorcycle,

Table 4. Factors associated with parent's knowledge and attitude about using helmets in children to prevent head injuries.

Factors	It's important for your child to wear a helmet when riding any						p-value
	Disagreement/not sure		Partial agreement		Total agreement		
	No	%	No	%	No	%	
Age in years							
21 - 30	4	6.0%	16	23.9%	47	70.1%	0.241 [^]
31 - 40	7	6.5%	20	18.5%	81	75.0%	
41 - 50	8	6.7%	14	11.8%	97	81.5%	
51 - 60	2	2.7%	14	18.7%	59	78.7%	
>60	3	17.6%	2	11.8%	12	70.6%	
Gender							
Male	12	6.5%	36	19.6%	136	73.9%	0.437
Female	12	5.9%	30	14.9%	160	79.2%	
Educational level							
High school or less	4	5.3%	13	17.1%	59	77.6%	0.456
Bachelor's degree	7	4.0%	28	16.1%	139	79.9%	
Diploma	7	11.7%	10	16.7%	43	71.7%	
Post-graduate degree	6	7.9%	15	19.7%	55	72.4%	
Number of children							
1 - 2	6	4.8%	26	21.0%	92	74.2%	0.660
3 - 4.	10	6.9%	21	14.6%	113	78.5%	
5+	8	6.8%	19	16.1%	91	77.1%	
Does any of the parents ride a Bicycle or Motorcycle or Quad bike?							
Father only	3	3.4%	15	16.9%	71	79.8%	0.279 [^]
Mother only	0	0.0%	3	50.0%	3	50.0%	
Both of them	2	12.5%	3	18.8%	11	68.8%	
None	19	6.9%	45	16.4%	211	76.7%	
Does any of the parents when using a Bicycle or Motorcycle or Quad bike wear a helmet?							
Father only	2	3.6%	7	12.5%	47	83.9%	0.046* [^]
Mother only	1	16.7%	2	33.3%	3	50.0%	
Both of them	0	0.0%	0	0.0%	11	100.0%	
None	2	5.3%	12	31.6%	24	63.2%	
When do your children wear a helmet?							
Don't know/unsure	0	0.0%	5	17.9%	23	82.1%	0.029* [^]
They don't own helmet	13	7.1%	42	23.1%	127	69.8%	
They don't ride any of them	6	10.0%	7	11.7%	47	78.3%	
While riding a Bicycle	3	9.1%	2	6.1%	28	84.8%	

Continued

While riding a Motorcycle or Quadbike	0	0.0%	6	23.1%	20	76.9%	
While riding both (Bicycle and Motorcycle/Quadbike)	2	3.5%	4	7.0%	51	89.5%	
Have they had any injuries while riding a Bicycle or Motorcycle or Quad bike?							
Yes	5	3.9%	30	23.4%	93	72.7%	0.049*
No	12	7.0%	22	12.9%	137	80.1%	
Don't know	1	3.7%	7	25.9%	19	70.4%	
Were they wearing a helmet while riding a Bicycle or Motorcycle or Quad bike when they sustained their injury?							
Yes	1	3.8%	3	11.5%	22	84.6%	0.518^
No	4	4.1%	24	24.7%	69	71.1%	
Don't know	1	3.1%	10	31.3%	21	65.6%	

P: Pearson χ^2 test, ^: Exact probability test, *P < 0.05 (significant).

or quad bike which mean high liability for injuries. Also, about one-third of the parents ride a Bicycle or Motorcycle or Quad bike but two-third of them wear a helmet when using a Bicycle or Motorcycle or Quad bike. This may be negatively reflected on their children behavior making them more liable for injuries if wear bicycles or motorcycles unprotected simulating their parents. This was proved in a study conducted in USA by Jewett A. *et al.* [3] who found that 21% of adults reported riding a bicycle in the previous 30 days, and 29% said they always used a helmet. Of the 61% of kids who rode bicycles in the previous 30 days, 42% of respondents said they always wore helmets. When adult respondents said that they always wore helmets, children were more likely to do the same (90%) than when they reported that they did not (38%). Also, Ehrlich P.F. *et al.* [4] found that More than 60% of parents don't wear helmets when riding, and their kids tend to simulate that. In the current study this was more clarified later where more than half of the parent's children use mainly bicycles, but others also use motorcycle or quadbike with a disappointing finding was that nearly half of them don't own helmet and very few percent use it while using any. This explains the high rate of reported injuries while riding a Bicycle or Motorcycle or Quad bike (more than one-third) and about two-thirds were not wearing helmet while riding a Bicycle or Motorcycle or Quad bike when they sustained their injury. Similar poor practice regarding wearing helmet was reported by Weiss B.D. [5] as Just only 1.85% of elementary schools' bicyclists had on a helmet. Also, 1.9% of the senior high riders and none of the 103 junior high bikers used helmets. Helmet use was reported by 10% of university bikers, which is substantially higher than the other age groups. Also, Linn S. *et al.* [6] found that more than 70% of cyclists who suffered injuries said they never used a helmet. When it came to bicycle accidents, the percentage of patients who were admitted without a helmet was consistently greater than the percentage of patients who did. Similarly, Shafi

S. *et al.* [7] documented that only 15% of Bicycle crash victims wore helmets at the time of the crash. Wymore C. *et al.* [8] documented that the percentage never wearing a helmet while on an ATV was 68% for subjects, 71% for spouses, and 47% for children.

Regarding parent's knowledge an attitude about using helmet in children to avoid injury, the current study showed that most of the study parents agreed about the importance of wearing a helmet when riding Bicycle and Motorcycle/Quadbike but less than one-fifth of them partially agreed (told about importance during only bicycling or during motorcycle only). In concordance to the current study findings, Wymore C *et al.* [8] reported that on a scale of 1 to 10, the importance of children wearing helmets on bicycles and ATVs was assessed as high and equally important, at 9.28 and 9.58 points, respectively. Also, Jantz P.B. and Trinh T.L., [9] in their study concluded that parents showed a high significant attitude towards the adult and child motorcycle helmet-wearing practices. Many other studies revealed that parents who participated in the studies were aware that helmets can prevent brain injury and that their behavior is ultimately influenced by their modeling and promotion of helmet wear [10] [11] [12]. On the other hand, Miller P.A. *et al.* [13] in their study found that about 33% of the parents heard about helmets from their children's pediatrician.

8. Conclusion and Recommendations

In conclusion, the current study revealed that irrespective of high parents' awareness and attitude towards the significance of using helmet during bicycling, most parents did not use it which was negatively reflected on their children behavior. Most parents know about the helmet use importance to prevent head injury and they also agreed for the significance of raising public awareness about this issue either through health education campaigns or through legislations.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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