Accident Analysis and Prevention 75 (2015) 211–216

Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

Unlicensed motorcycling of high school adolescents in Dehaghan county (Isfahan Province of Iran)

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ARTICLE INFO

Article history:
Received 23 July 2014
Received in revised form 1 December 2014
Accepted 2 December 2014
Available online 9 December 2014

Keywords:
Adolescent
Motorcycling
License
Iran

ABSTRACT

Background: Unlicensed motorcycling increases the chances of accidents in adolescents. There are many behavioral and non-behavioral factors involved in adolescents' unlicensed motorcycling which were not addressed in research yet completely.
Methods: The cross-sectional study aimed to determine prevalence and related factors of unlicensed motorcycling on 500 unlicensed male high school adolescents in Dehaghan, who entered in the study by census. Demographic and motorcycling information were collected via self-report questionnaire, and its content validity was approved by a panel of experts. The statistical analyses of the data included Pearson Correlation Coefficient, chi-square, independent samples *t*-test and ANOVA with Tukey post hoc test.
Results: The prevalence of unlicensed motorcycling among participants was 74.2% and mean age at first motorcycling experience was 11.97 ± 1.97 years ranged from 8 to 17. Of the motorcyclist participants, 59.6% owned their personal motorcycle. Most motorcycle passengers (62.8%) were adolescent's friends, and the most frequently expressed reason for use of motorcycle was fun and entertainment (54.2%). Age at first motorcycling experience was lower among rural adolescents than urban adolescents. However, unlicensed motorcycling was more prevalent among urban adolescents than rural ones. The relationship between living status, father's job, mother's job and age at first motorcycling experience was insignificant ($P > 0.05$). However, mean age at first motorcycling experience among students of humanities, technical disciplines, and general first year was lower than that among students of natural sciences and math.
Conclusion: High prevalence of unlicensed motorcycling and significant role of family and social environments on adolescents' high-risk motorcycling without license, is indicative of the need for interventions at all levels of peers, family, and schools and also establishing new driving regulations in Iran.

1. Introduction

Annually, 1.2 million people lose their lives in road accidents worldwide, and 20–50 million are disabled (Peden, 2004). Deaths due to traffic accidents are 25.8 in every 100 thousand people of Iran's population. The importance and sensitivity of the issue in Iran becomes clearer when this figure is compared to the world's (19.9%), low to middle income countries (20.7%), and Eastern Mediterranean countries (15.2%) (Montazeri, 2004). Motorcyclists have the highest proportion of accident injuries on urban and rural roads in Iran, and put themselves and others at risk with their high-risk behaviors (Nantulya and Reich, 2002). A study revealed that in a 9-months period, motorcycle accidents claimed nearly 7000 deaths and 700000 injuries in Iran (Torabi et al., 2009). In the US, motorcycle accidents are one of the causes of injuries among 15–20 year olds. In a 5 year study in the US, out of 436 accidents resulting in adolescents' deaths, 378 cases involved under-fifteen adolescents without license (Frisch et al., 2003). The US National Highway Traffic Management Center in 2004 reported that motorcycle riders are killed in road accidents 34 times more than car passengers (NHTSA, 2006). Moreover, fatal and horrific accidents have been reported much more in drivers without license (Blows et al., 2005). Factors influencing motorcycle accidents include speeding, age, special occasions, alcohol and drug use, failure to wear helmet, roadside factors, and some high risk behaviors (Colburn et al., 1993; Elvik, 1995; Clarke et al., 2006). Amid, younger drivers are more involved in high risk behaviors like speeding than experienced drivers (Chesham et al., 1993). Two

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http://dx.doi.org/10.1016/j.aap.2014.12.002
0001-4575/

different and extensive factors affect adolescents' safe driving: 1 – immaturity, 2 – inexperience (Senserrick and Whelan, 2003). In a study, it was found that nearly 38.8% of the high school freshmen and 68.9% of high school senior students have ridden motorcycles before reaching the legal age, and experienced accident and injury 3 fold compared to their car-driving peers (Preusser et al., 1998). Investigation in a number of countries reveals that increased licensing age has not reduced under-age adolescents' access, and that they are just as exposed to risk of accidents as other motorists (Yeh and Chang, 2009). For instance, in Taiwan minimum motorcycle licensing age is 18 years, while in the US, Australia, New Zealand, and most European countries, 15–16 years old adolescents are legally permitted to ride motorcycles (Schoon, 2004; Mulvihill, 2005). Minimum age for motorcycle licensing is indicative of diverse risk management policies in these countries (Yeh et al., 2008). Motorcycle licensing system in Taiwan is categorized in three distinct phases: 1 – moped up to 50 cc, 2 – light motorcycles from 50 cc to 250 cc, and 3 – heavy motorcycles (over 250 cc). Minimum age for obtaining license for type 1 and 2 is 18 years, and no previous experience or compulsory training, other than medical examination, is required for license to ride motorcycles. It seems Taiwanese adolescents either learn riding these motorcycles through self-teaching or trial and error. With respect to heavy motorcycles, they must be 20 years old and have been holding light motorcycle license for minimum of one year, participation in a 32 h training course is also required (Yeh and Chang, 2009). In Iran, requirements for motorcycle license test (for riding motorcycles up to 200 cc) include: 1 – minimum age of 18 years, 2 – providing mental and physical health certificate, issued by medical authorities, 3 – providing certificate of attendance in theory and practice courses from a driving school or certified drivers' training center, and 4 – passing theoretical and practical skills test for riding motorcycles up to 200 cc (ICARC, 2014). About the 3rd clause, it should be mentioned that, it is a short course which is held for a maximum of 20 h before the theoretical and practical skills tests. That will take maximum two days as applicants attend in theoretical classes. They also practice motorcycling within the training centre and are supervised by the trainer when motorcycling. Therefore, in Iran, actual learning process is informal and people usually learn motorcycling through self-teaching unlicensed motorcycling. Considering that no specific study has yet been conducted on Iranian adolescents' age at onset motorcycling prior to receiving a license and factors that affect this process, still, riders without license have seldom been recognized by authors, and less been subject of public health debates, unless or until they are involved in traffic accidents (Rathinam et al., 2007). Thus, this study was conducted to determine the prevalence and related factors of unlicensed motorcycling among male high school students in Dehaghan county of Isfahan Province (Iran).

2. Materials and methods

2.1. Subjects

The descriptive cross-sectional study was conducted on all male high school students (who had not got a motorcycling license) in Dehaghan County of Isfahan province in central Iran from February 2012 to March 2013. Dehaghan is a city in western Isfahan Province, Iran, and at the 2006 census, its population was 16,899, in 4664 families (Statistical Center of Iran, 2006). The study population of 550 students was selected to enter in the study with census, of whom 500 students completed the questionnaire. The remaining 50 students were excluded from study due to lack of desire to participate ($n = 30$) or absence from school at the time of data collection ($n = 11$) or having a motorcycling license ($n = 9$). One of the researchers attended schools to deliver questionnaires to students, and collected them after completion.

2.2. Measures

The instrument for the study was developed by the research team. It was a 26-item questionnaire on demographic and motorcycling information. Demographic information included student's age, academic discipline, academic level, place of residence (urban or rural), grade point average (GPA) (mean of student's score in his previous class), family size (number of peoples who lived together at study time), living status (with/without parents) father's job (blue-collar worker, white collar worker, unemployed, and self-employed (those who work in their own small and medium enterprises)) and mother's job (house-wife and blue-collar worker). Motorcycling information included: students' already motorcycling status, age at first motorcycling experience as rider, number of motorcycles at home, average hours of motorcycling per week, owning personal motorcycle, mostly number of motorcycle passengers, mostly passengers category (friend/family members/relatives and associates/ageing people), mostly motorcycling reason, highest motorcycling occasion, and being fined by the police. A panel of 6 experts was asked to evaluate the content validity of the questionnaire. Minor revisions were conducted on the questionnaire based on comments from the experts, and finally they approved the appropriateness of the questionnaire.

2.3. Data analysis

Data were analyzed with SPSS20 software (SPSS Inc., Chicago, Illinois) using descriptive (frequency distribution tables) and inferential statistics. Pearson Correlation Coefficient was used for investigating the correlation status of continuous variables, chi-square test for investigating the relationship status of categorical variables, ANOVA test for investigating age at first motorcycling experience differences by multi-level categorical variables, and independent t-test for investigating age at first motorcycling experience differences by two level categorical variables. $P < 0.05$ was taken as the significant level.

3. Results

Of the 500 participants, 58% lived in the urban and 42% in rural areas. Of them, 31.2% were 14–15 years old, 65.6% were 16–17 years old, and 3.2% were 18–20 years old. Table 1 presents some more details of demographic information of participants.

Of the total sample of 500 students, 74.2% already rode motorcycles. The majority was in 10–13 year age range that had first motorcycling experience. Mean of age at first motorcycling experience was 11.97 ± 1.97 years. (Table 2)

More than half of motorcyclist students owned personal motorcycles, and majority of them rode their motorcycle 1–5 h per week with a mean of 5.09 ± 1.97 h. Adolescents carried at least one passenger when motorcycling, who was more a friend of them. More than half of adolescents expressed the reason for motorcycling, fun and entertainment, which mostly happened during summer break. Up to the commencement of study, the majority of motorcyclists (61.8%) had not been fined by the police. Related data on motorcyclist participants are presented in Table 3.

Mean age at first motorcycling experience was lower among rural adolescents compared to urban adolescents (Table 4). Also results indicated that age at first motorcycling experience varied according to different academic disciplines. Tukey post hoc test revealed that students of natural sciences and math disciplines began motorcycling at an older age. ANOVA with Tukey post hoc

Table 1
Frequency distribution of demographic information of participants ($N = 500$).

Variable	Variable label	Frequency	Percentage	Mean (S.D)
Place of residence	Urban	290	58	–
	Rural	210	42	
GPA	Under 15	241	48.2	15.77 (1.67)
	Over 15	217	43.4	
	No response	42	8.4	
Family size	2–3	222	44.4	4.98 (1.46)
	4–5	201	40.2	
	≥6	69	13.8	
	No response	8	1.6	
Living status	With parents	470	94	–
	Without parents	30	6	
Father's job	White-collar worker	95	19	–
	Blue-collar worker	135	27	
	Self-employed	205	41	
	Unemployed	49	9.8	
	No response	16	3.2	
Mother's job	Housewife	467	93.4	–
	Blue-collar worker	21	4.2	
	No response	12	2.4	

test also revealed the mean age at first motorcycling experience in the first and the second year students was lower than in the third year students, and the third year students' age at first motorcycling experience was lower than pre-university students. The relationship of living status, and parents' job with age at first motorcycling experience was found to be statistically insignificant.

A negative significant correlation was found between age at first motorcycling experience and the number of motorcycles at home, birth order and family size. This meant that age at first motorcycling experience lowered with higher number of motorcycles at home, birth order and family size. No statistically significant correlation was found between GPA and age at first motorcycling experience (Table 5).

Chi-square test showed statistically significant relationship between unlicensed motorcycling and place of residence, academic level, academic discipline, GPA, father's and mother's job the number of motorcycles at home, and adolescent's living status ($P < 0.05$). Number of urban adolescent motorcyclists was higher than rural motorcyclists. Also, pre-university students rode more than the rest. Unlicensed motorcycling among students of technical disciplines and those living with their parents was higher than the rest. Furthermore, students with white-collar fathers motorcycled more than others. There was a statistically significant relationship between mother's job and motorcyclists' student, and higher numbers of student motorcyclists were found with housewife mothers. Students with GPA fewer than 15 rode more than others. Also, a statistically significant relationship was found between the numbers of motorcycles at home and unlicensed motorcycling and students that had 2 or more motorcycles at home used them more. However, the relationship between unlicensed motorcycling and age was statistically insignificant (Table 6).

Table 2
Frequency distribution of motorcycling information of participants ($N = 500$).

Variable	Variable labels	Frequency	Percentage	Mean (S.D)
Students already motorcycling	Yes	371	74.2	
	No	129	25.8	
Age at first motorcycling experience as rider	<10 years old	115	23	11.97 (1.97)
	10–13 years old	316	63.2	
	14–18 years old	47	9.4	
	No motorcycling experience as rider)	22	4.4	
Number of motorcycles at home	0	89	18	
	1	251	50	
	≥2	148	30	
	No response	12	2.4	

4. Discussion

The study was conducted to determine prevalence and factors affecting unlicensed motorcycling among male adolescent students in Dehaghan. Considering that female motorcyclists are not common in Iran, the study was conducted on male students only. The prevalence of unlicensed motorcycling among adolescents in Dehaghan was 74.2%, and the motorcycling hours per week was reported 5.09 h. A study by Elliott et al. (2008) revealed that almost 2/3 of adolescents, despite not having a license, rode more than 3 h per week, with no specific purpose. In a study by Rathinam et al. (2007), a significant relationship was found between increased frequency of motorcycling per week by adolescents and the rate of associated accidents, and riding motorcycles 5–7 days per week significantly increased accident rates. In the present study, adolescents mostly used motorcycles during summer holidays (60.4%), and fun and entertainment was the most frequently expressed reason (54.2%) for motorcycling. In a study by Beheshti et al. (2009) in Zanjan, motorcyclists' accident rate was higher during holidays, which was due to higher inclination to ride to suburban parks. In the present study, one of the main reasons was school holidays and more free time. More than half of students stated that there was at least one motorcycle in their house, and nearly 59.6% had personal motorcycles. In Iran, like many Asian countries, motorcycling is increasing (Zargar et al., 2006). Ease of transport, occupying small space, and low cost, are Iranian families' reasons for welcoming motorcycles (Beheshti et al., 2009). Only 38.5% of students had been fined by the police when motorcycling, and it seems, to avoid fines and the police, adolescents used their motorcycles in the back alleyways, which could increase harm to pedestrians, etc. Majority of unlicensed adolescent motorcyclists had at least one passenger (38.8%), and passengers were mostly their friends (62.8%), which is indicative of peer influence and their role in adolescents' behaviors. Educating peers in this area could prove fruitful. Results of studies show that risk of accident increases with carrying passengers compared to riding alone, especially when the passenger is also an adolescent, and when the number of passengers increases (Preusser et al., 1998; Williams and Ferguson, 2002; Williams, 2003). On the contrary, having a passenger has an inverse effect with mature riders (Preusser et al., 1998; Williams, 2003). Having a passenger creates a social situation that affects adolescent riders (Williams, 2003), through irritation and stimulation, which increases driving violations (Preusser et al., 1998). In the study, the mean age of first motorcycling experience was found 11.97 ± 1.97 years ranged 8–17. In a study by Yeh and Chang (2009) in Taiwan, the mean age of motorcyclists was 14 years. In India, boys begin motorcycling at 8, which is also quite common at younger ages, as well (Rathinam et al., 2007). In the present study, although age at first motorcycling experience was lower in rural adolescents than in urban adolescents, percentage of motorcycles use was higher in urban adolescents (79%). Many young people who live in a rural or semi-rural environment start to drive cars, tractors and other vehicle at a very early age, often to help with tasks around a property (Knight et al., 2012). Contrary to common belief that availability of public transport can reduce motorcycling, financial

Table 3
Frequency distribution of motorcycling information of motorcyclist subjects ($N = 371$).

Variable	Variable labels	Frequency	Percentage
Average hours of motorcycling per week	1–5 h	263	70.9
	6–10 h	80	21.6
	>10 h	28	7.5
Owning personal motorcycle	Yes	221	59.6
	No	150	40.4
Mostly number of motorcycle passengers	Myself only	103	27.8
	1 passenger	144	38.8
	2 passengers	91	24.5
	≥3 passengers	33	8.9
Mostly passengers category	Friends	233	62.8
	Family members	106	28.6
	Relatives and associates	30	8.1
	Ageing people	2	0.5
Mostly motorcycling reason	School transport	32	8.6
	Fun and entertainment	201	54.2
	Daily chores transport	105	28.3
	Others	33	8.9
Highest motorcycling occasion	Summer vacation	223	60.4
	During academic year	93	25.1
	Examination time	23	6.5
	Others	30	8
Fined by the police	Yes	143	38.5
	No	228	61.5

ability of urban families in providing motorcycles for their children influences statistics in this area. However, more participation of rural adolescents in daily family chores, given the prevailing culture in these areas, and having less free time have also influenced these results. In a study by Hanna et al. (2006) unlicensed riders were mostly from rural and low-income areas. Mean age of first motorcycling experience of technical and humanities disciplines student motorcyclists was less than mean age of natural sciences and math students. Also, age at first motorcycling experience reduced with reducing academic level, which can indicate the growing problem of high risk behaviors of adolescent motorcyclists without license. Higher number of motorcycles at home reduced age at first motorcycling experience due to higher and easier availability. Age at first motorcycling experience reduced with increasing family size and higher birth order, which can reflect lower parental supervision or role modeling of adolescents from other family members. In the present study, unlicensed motorcycling was more prevalent among ages close to receiving license, which is pre-university age. The present study shows that technical, humanities, and first year general students used motorcycles more than other students (Table 6), which can be attributed to having more free time because of lower load of weekly curricula. Also it can be explained by their academic achievement, because there was an inverse relationship between unlicensed motorcycling and GPA. In the present study, more than 94% of students lived with their parents, which seems imperative, given Iranian culture of living with family, and 78% of them were motorcyclists. According to the statistic, parental cooperation and supervision can be utilized to reduce adolescents' driving accidents. The number of adolescent motorcyclists with white-collar worker fathers or housewife mothers showed a significant increase, which can be attributed to lack of knowledge of mothers or reduced supervision of fathers due to work engagements in relation to high-risk behaviors of adolescents. Beck et al. (2001) revealed that poor parental supervision and control is associated with adolescents' dangerous driving. Furthermore, more strict parents delay their children's riding motorcycles without license (Hartos et al., 2001).

Table 4
Distribution of mean and standard deviation of age at first motorcycling experience according to some demographic variables.

Variable	Variable labels	Mean	S.D	*P*
Place of residence	Urban	12.20	1.84	<0.01
	Rural	11.60	2.09	
Academic discipline	Humanities	11.00	0.00	<0.01
	Natural sciences	12.61	1.85	
	Mathematics	15.00	0.00	
	General first year	11.58	1.93	
	Technical	11.85	1.99	
Academic level	1st grade	11.58	1.98	<0.01
	2nd grade	11.84	1.87	
	3rd grade	12.28	1.87	
	Pre-university	13.5	1.87	

5. Limitation

Iran is a country with diverse cultural and ethnic diversity and maybe the results could not be generalized to other regions of the country and requires more extensive studies. Yet complete studies in relation to cultural and social factors affecting driving status in Iran are necessary, as most of teen driving behaviors root to them. Moreover, the data were based on self-report of teenagers and hiding the risky behaviors among them is not uncommon. Another

Table 5
Distribution of correlation coefficient between number of motorcycles, birth order, and age at first motorcycling experience.

Variable	Correlation coefficient	*P*
Number of motorcycles	−0.256	<0.01
Birth order	−0.151	<0.01
GPA	0.046	0.34
Family size	−0.189	<0.01

Table 6
Frequency distribution of unlicensed motorcycling according to some demographic variables.

Variable	Variable labels	Number of motorcyclist	Percent	χ^2	*P*
Place of residence	Urban	229	79	12.8	<0.01
	Rural	142	68		
Academic year	1st grade	99	71	104.8	<0.01
	2nd grade	145	73		
	3rd grade	90	75		
	Pre-university	37	93		
Academic discipline	Humanities	63	75	387.74	<0.01
	Natural sciences	23	59		
	Mathematics	15	43		
	General first year	90	64		
	Technical	180	89		
Living status	With parents	368	78	1270.8	<0.01
	Without parents	3	10		
Father's job	White-collar worker	81	85	108.36	<0.01
	Blue-collar worker	100	74		
	Self-employed	142	69		
	Unemployed	34	69		
Mother's job	Housewife	346	74	1301.23	<0.01
	Blue-collar worker	13	62		
GPA	<15	207	86	236.51	<0.01
	≥5	141	65		
Number of motorcycles at home	None	25	28	140.11	<0.01
	1	200	80		
	≥2	138	93.2		

limitation is that only students were examined and teenagers out of school did not include.

6. Conclusions

Several particular environmental, social, and economic conditions are involved in adolescents' high risk behaviors of unlicensed motorcycling, and it is the responsibility of organizations such as Traffic Police Department, mass media, education office, and Ministry of Health to provide effective interventions through collaboration with one another. Iran is a country with a culture in which the majority of adolescents live with their parents. In this study, 94% of adolescents lived with their parents. As a result, many behaviors, including driving, are first taught to adolescents by their parents. Educating parents and adolescents through health personnel, police, mass media, and schools should be taken into consideration.We believe that educational programs should be implemented before children start driving. Planning and implementation of more coherent policies for students' leisure time can reduce their tendency toward unlicensed motorcycling.

Acknowledgements

We thank all students, teachers, and education authorities of the Dehaghan County, Shahid Sadoughi University of Medical Sciences (International Campus), and Isfahan Province Police Research Center that supported the project financially or otherwise.

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