

Risky Driving Behaviours among Medical Students in Erbil, Iraq

*Nazar P. Shabila, Kamaran H. Ismail, Abubakir M. Saleh, Tariq S. Al-Hadithi

سلوكيات القيادة المحفوفة بالمخاطر بين طلاب الطب في أربيل، العراق

نزار بولص شابيله، كامران أسماعيل، ابوبكر صالح، طارق الحديثي

ABSTRACT: Objectives: This study aimed to assess risky driving behaviours among medical students in Erbil, Iraq, and to explore the relationship between risky driving behaviours and perceptions of risky driving. **Methods:** This self-administered questionnaire-based survey was conducted from January to May 2014 among a random sample of 400 medical students at Hawler Medical University in Erbil. The questionnaire was designed to assess the frequency of engagement in 21 risky driving behaviours, the perceived risk of each behaviour and the preference for each behaviour as ranked on a 5-point scale. **Results:** A total of 386 students responded to the survey (response rate: 96.5%). Of these, 211 reported that they currently drove a vehicle (54.7%). Drivers most frequently engaged in the following behaviours: playing loud music (35.9%), speeding (30.4%), allowing front seat passengers to not wear seat belts (27.9%) and using mobile phones (27.7%). Least frequent driving behaviours included not stopping at a red light (3.9%), driving while sleepy (4.4%), driving after a mild to moderate intake of alcohol (4.5%) and drunk driving (6.4%). Mean risky driving behaviour scores were significantly higher among males ($P < 0.001$) and those who owned a car ($P = 0.002$). The mean risk perception score was higher among >20 -year-olds ($P = 0.028$). There was a significant positive relationship between the preference for risky behaviours and risky driving behaviours (beta = 0.44; $P < 0.001$). **Conclusion:** Medical students in Erbil reported high frequencies of several serious risky driving behaviours. The preference for risky behaviours was found to be an important predictor of risky driving behaviours among medical students in Erbil.

Keywords: Medical Students; Automobile Driving; Risk-Taking; Perception; Risk Assessment; Iraq.

الملخص: الهدف: هدفت هذه الدراسة إلى تقييم السلوكيات المحفوفة بمخاطر القيادة بين طلاب الطب في أربيل، العراق، واستكشاف العلاقة بين سلوكيات القيادة الخطرة وتصوراتها. **الطريقة:** تم إجراء هذه الدراسة بواسطة الاستبيان الذاتي من يناير إلى مايو 2014 على عينة عشوائية من 400 طالب طب في جامعة هولير الطبية في أربيل. تم تصميم استبيان لتقييم وتيرة الارتباط في 21 من سلوكيات القيادة الخطرة، والمخاطر المتوقعة من كل سلوك وتفضيل كل سلوك على الآخر حسب تصنيفها على مقياس من 5 نقاط. **النتائج:** استجاب ما مجموعه 386 طالباً للدراسة (معدل الاستجابة: 96.5%). تم رصد سلوكيات القيادة الخطرة التالية الأكثر شيوعاً على حسب ترتيب حدوثها للطلاب: تشغيل الموسيقى بصوت عالٍ (35.9%)، والإسراع (30.4%)، السماح بعدم ارتداء ركاب المقعد الأمامي لحزام الأمان (27.9%) واستخدام الهواتف النقالة (27.7%). بينما كانت السلوكيات الخطرة الآتية أقل انتشاراً مثل، عدم التوقف عند الإشارة الضوئية الحمراء (3.9%)، والقيادة أثناء النعاس (4.4%)، والقيادة تحت التأثير الخفيف والمتوسط للكحول (4.5%) والقيادة في حالة السكر البين (6.4%). كانت سلوكيات القيادة المحفوفة بالمخاطر أعلى بصورة دالة إحصائية بين الذكور ($P < 0.001$) وأولئك الذين يمتلكون سيارة ($P = 0.002$). كان متوسط درجة إدراك مخاطر أعلى بين الذين أكبر من سن 20 عاماً ($P = 0.028$). كان هناك علاقة ذات دلالة إحصائية إيجابية بين تفضيل السلوكيات الخطرة وممارستها الفعلية (بيتا = 0.44; $P < 0.001$). **الخلاصة:** ينتشر العديد من سلوكيات القيادة الخطرة بين طلاب الطب في أربيل. وجد أن تفضيل السلوكيات الخطرة هو مؤشر هام للتنبؤ بهذه السلوكيات بينهم.

مفتاح الكلمات: طلاب الطب؛ قيادة السيارات؛ المخاطرة؛ التصور؛ تقييم المخاطر؛ العراق.

ADVANCES IN KNOWLEDGE

- Risky driving behaviour was common among the studied group of medical students in Erbil, Iraq. Students reported frequently engaging in dangerous driving behaviours.
- However, risky driving behaviour was more common among the male medical students than the female medical students.
- Enjoyment of risky behaviours was found to be an important predictor of risky driving among this sample of medical students.

APPLICATION TO PATIENT CARE

- It is important that those employed in the medical profession be exemplary role models and advocates of safe driving. It is therefore concerning that many of the medical students, who will be in direct contact with the victims of road traffic accidents once they have graduated, are themselves frequently engaged in risky driving behaviour. The results of this study may inform future public health programmes targeted at this population.

ROAD TRAFFIC INJURIES ARE A MAJOR public health problem around the world. An estimated 1.24 million people die on the road every year, with another 20–50 million sustaining non-fatal injuries as a result of road traffic crashes.^{1,2} Human error is the most common factor for traffic accidents (~90%).² Risky driving behaviours are common amongst young people and are strongly linked to traffic accident risk.³ Research worldwide has suggested different factors as important aspects and predictors of risky driving behaviour in young drivers. These include knowledge, beliefs and attitudes relating to risky driving, driving experience, personality factors and a lack of education regarding risky driving.^{4–7} Risky driving behaviour is also attributed to a number of cognitive processes in young drivers, including underestimating the seriousness of the risk, overestimating driving skills and overconfidence in the ability to recognise hazards.^{8–11}

Commonly applied theoretical models generally assume that risky behaviour decision-making occurs through rational processes, such as risk perception and risk assessment of a specific behaviour. However, there is still no clear evidence that increased risk perception or risk awareness reduces risky driving behaviour and ultimately the rate of road traffic accidents.^{10,12} For many individuals, driving is characterised by positive emotions associated with the pleasures of driving.¹³ Liking or enjoyment of (or positive feelings towards) specific driving behaviours, including risky behaviours, may be especially strong for young drivers.¹⁴ Many medical students, once qualified, will have direct contact with patients who have engaged in risky driving behaviours and those suffering the consequences of road traffic accidents. Those in the medical profession should be exemplary role models and advocates for safe driving. However, medical students, like many young people, are themselves frequently engaged in these risky behaviours.¹⁵

Iraq is among the countries without available death registration data. According to the World Health Organization, the estimated road traffic death rate in Iraq per 100,000 population was 31.5 in 2013, which was the highest in the Eastern Mediterranean region after Iran.¹ Rapid economic growth in the Iraqi Kurdistan region, the open market economy and an increase in imported cars over the last decade has resulted in a substantial increase in the number of cars in the region, as well as a rapid increase in the number of teens and young people both driving and owning cars.¹⁶ Road traffic injuries are an increasing public health concern in the region; however, there is limited research on the subject, particularly among the younger generation and medical students. Therefore,

this study was carried out in order to assess risky driving behaviours among a group of medical students in Iraq and to explore the relationship between risky driving and the perception and enjoyment of risky driving.

Methods

This self-administered questionnaire-based study was conducted from January to May 2014 among students from the College of Medicine at Hawler University in Erbil, Iraq. A simple random sample of medical students was selected from the list of all undergraduate medical students in the College of Medicine. A sample size of 375 students was chosen from a total of 1,000 students, based on ± 4 precision with an estimated 50% of students driving a car and a 95% confidence interval. However, the sample size was increased to 400 students to adjust for non-response.

An English-language questionnaire was designed to assess the self-reported frequency of engaging in a range of risky driving behaviours, the perceived risk of engaging in each of these actions and the enjoyment of or preference for each behaviour. Questions were developed by reviewing the relevant literature.^{10,17–19} A total of 21 items covering different risk-taking behaviours formed the main questionnaire. For each item, participants indicated on a 5-point scale how frequently they usually engaged in the behaviour when driving (1 = never, 2 = rarely, 3 = sometimes, 4 = frequently and 5 = always), their perception of the risk associated with the behaviour (1 = not risky at all, 2 = slightly risky, 3 = fairly risky, 4 = very risky and 5 = extremely risky) and their enjoyment of the behaviour (1 = strongly dislike, 2 = dislike slightly, 3 = neutral, 4 = like slightly and 5 = strongly like). The order of the behaviours was randomised within each section. Data were also obtained on the demographic characteristics of the participants, including whether they drove or owned a car.

The survey instrument was tested to assess the comprehensiveness, adequacy, clarity and relevance of the items. This involved two cycles of modifications to the survey based on feedback from participants. The instrument's internal consistency, measured by Cronbach's alpha, was 0.78 for the frequency component, 0.83 for the risk perception component and 0.82 for the enjoyment component. The questionnaire was disseminated directly to the selected sample of medical students.

Data were analysed using the Statistical Package for the Social Sciences (SPSS), Version 18.0 (IBM Corp., Chicago, Illinois, USA). The descriptive statistical analysis combined positive and negative ratings of engagement in behaviours using a 3-point

Table 1: Frequency of risky driving behaviours among a group of medical student drivers in Erbil, Iraq (N = 211)

Behaviour	Frequency, %		
	Never/ rarely	Sometimes	Frequently/ always
Playing loud music while driving	40.2	23.9	35.9
Driving faster than the speed limit	50.7	18.9	30.4
Front seat passenger not wearing a seat belt	48.1	24	27.9
Using a mobile phone without a hands-free device while driving	50	22.3	27.7
Switching lanes frequently to get ahead of other cars	38	37.1	24.9
Fast acceleration and braking	52.0	25.2	22.8
Driving during rush hours	55.9	26.3	17.8
Overtaking from the right-hand lane	56.9	25.5	17.6
Lack of correct knowledge about speed limits in different areas	61.8	20.6	17.6
Driver not wearing a seat belt	70.3	12.5	17.2
Texting while driving	68.7	17.8	13.5
Doing things that can be distracting while driving	62.9	23.9	13.2
Racing with other cars	67.2	19.6	13.2
Passengers doing things that can be distracting to the driver while driving	63.3	24.1	12.6
Braking hard to stop in time	70.7	19.5	9.8
Reading when the vehicle is in motion	68.5	22.2	9.3
Driving fast on curving roads	70.7	20	9.3
Drunk driving	89.6	4	6.4
Driving after a mild to moderate intake of alcohol	89.1	6.4	4.5
Driving while sleepy	81.5	14.1	4.4
Driving through a red light	83.5	12.6	3.9

Table 2: Risk perception of risky driving behaviours among a group of medical student drivers in Erbil, Iraq (N = 211)

Behaviour	Perception, %		
	Not risky at all/ slightly risky	Fairly risky	Very/ extremely risky
Driving after a mild to moderate intake of alcohol	14.9	5.0	80.1
Driver not wearing a seat belt	13.2	10.8	76.0
Drunk driving	15.0	12.5	72.5
Racing with other cars	13.0	15.0	72.0
Driving while sleepy	12.9	15.9	71.2
Texting while driving	14.0	16.5	69.5
Driving through a red light	13.6	17.7	68.7
Doing things that can be distracting while driving	11.5	22.0	66.5
Driving fast on curving roads	16.0	19.5	64.5
Reading when the vehicle is in motion	13.1	23.1	63.8
Driving faster than the speed limit	17.4	21.4	61.2
Passengers doing things that can be distracting to the driver while driving	15.9	25.4	58.7
Fast acceleration and braking	12.4	29.4	58.2
Switching lanes frequently to get ahead of other cars	12.6	29.8	57.6
Braking hard to stop in time	21.8	20.8	57.4
Using a mobile phone without a hands-free device while driving	19.0	24.0	57.0
Front seat passenger not wearing a seat belt	19.0	28.0	53.0
Overtaking from the right-hand lane	13.2	34.0	52.8
Driving during rush hour	20.1	31.7	48.2
Lack of correct knowledge about speed limits in different areas	21.0	33.5	45.5
Playing loud music while driving	39.4	27.3	33.3

Table 3: Enjoyment of risky driving behaviours among a group of medical student drivers in Erbil, Iraq (N = 211)

Behaviour	Enjoyment, %		
	Strongly/ slightly dislike	Neutral	Strongly/ slightly like
Playing loud music while driving	40.4	22.2	37.4
Driving faster than the speed limit	52.8	23.6	23.6
Racing with other cars	62.3	17.1	20.6
Switching lanes frequently to get ahead of other cars	54.1	25.5	20.4
Front seat passenger not wearing a seat belt	55.6	24.7	19.7
Driving fast on curving roads	64.6	18.2	17.2
Overtaking from the right-hand lane	62.3	21.4	16.3
Fast acceleration and braking	62.6	21.7	15.7
Using a mobile phone without a hands-free device while driving	58.1	26.3	15.6
Texting while driving	65.8	19.1	15.1
Passengers doing things that can be distracting to the driver while driving	57.8	27.6	14.6
Driving while sleepy	78.4	9.0	12.6
Driving through a red light	76.4	11.0	12.6
Braking hard to stop in time	66.0	21.5	12.5
Driver not wearing a seat belt	71.3	16.6	12.1
Lack of correct knowledge about speed limits in different areas	68.3	20.1	11.6
Driving after a mild to moderate intake of alcohol	77.0	12.3	10.7
Doing things that can be distracting while driving	73.3	16.4	10.3
Driving during rush hour	64.4	25.8	9.8
Drunk driving	79.1	12.2	8.7
Reading when the vehicle is in motion	70.4	21.1	8.5

scale (frequently/always, sometimes or never/rarely). Similar scales were used in reporting data from the risk perception and enjoyment components of the survey. As the internal consistency of the

questionnaire was high, scores for all items in each component were summed to determine mean scores. A t-test was used to compare mean scores according to different demographic variables. A *P* value of ≤ 0.05 was considered statistically significant. The effect of risk perception and enjoyment of the risky behaviour with regards to driving behaviour was examined using linear regression.

All participants were informed of the purpose of the study and assured of their anonymity. Informed consent was obtained from all students before inclusion in the study. This study was approved by the Research Ethics Committee of the College of Medicine at Hawler University in Erbil, Iraq (#412).

Results

A total of 386 students completed the survey (response rate: 96.5%). The mean age of the respondents was 21.02 ± 1.87 years old (range: 17–26 years old; median and mode: 21 years old). Of the participants, 211 (54.7%) reported that they were currently driving a car. The majority of drivers reported that they drove every day (66.4%). The mean age of the drivers was 21.37 ± 1.78 years old (range: 17–26 years old). There were 48.3% male drivers and 51.7% female drivers. Of the drivers, 91.9% resided inside the city, only 89.6% had a driving licence and 66.4% owned a car.

Table 1 shows the frequency of each risky driving behaviour. The most frequent risky driving behaviours among the medical students were playing loud music (35.9%), speeding (30.4%), allowing the front seat passenger to not wear a seat belt (27.9%) and using a non-hands-free mobile phone (27.7%). The least frequent risky driving behaviours included not stopping at a red light (3.9%), driving while sleepy (4.4%) or after a mild to moderate intake of alcohol (4.5%) and drunk driving (6.4%).

Participants perceived that driving after a mild to moderate intake of alcohol (80.1%), not wearing a seat belt (76.0%), drunk driving (72.5%), racing with other cars (72.0%) and driving while sleepy (71.2%) were the most risky behaviours. In comparison, they perceived playing loud music (33.3%), a lack of correct knowledge about speed limits in different areas (45.5%) and driving during rush hour (48.3%) as the least risky behaviours [Table 2].

The most preferred driving behaviours included playing loud music (37.4%), speeding (23.6%), racing (20.6%) and switching lanes frequently to get ahead of other cars (20.4%). The least enjoyed behaviours included reading when the vehicle was in motion (8.5%), drunk driving (8.7%) and driving during rush hour (9.8%) [Table 3].

Table 4: Comparison of mean scores* for frequency, perceived risk and enjoyment of risky driving behaviours by gender, age, residence and car ownership among a group of medical student drivers in Erbil, Iraq (N = 211)

Variable	n	Frequency		Perception		Enjoyment	
		Mean score \pm SD	P value	Mean score \pm SD	P value	Mean score \pm SD	P value
Gender							
Male	102	2.34 \pm 0.54	<0.001	3.66 \pm 0.75	0.266	2.24 \pm 0.83	0.116
Female	109	2.02 \pm 0.61		3.79 \pm 0.83		2.06 \pm 0.80	
Car owner							
Yes	140	2.26 \pm 0.60	0.002	3.73 \pm 0.72	0.978	2.22 \pm 0.82	0.110
No	71	1.99 \pm 0.56		3.72 \pm 0.92		2.01 \pm 0.80	
Age group							
\leq 20 years old	65	2.12 \pm 0.53	0.367	3.54 \pm 0.87	0.028	2.14 \pm 0.71	0.973
>20 years old	146	2.14 \pm 0.71		3.80 \pm 0.74		2.15 \pm 0.87	
Residence							
City	194	2.19 \pm 0.61	0.105	3.74 \pm 0.76	0.421	2.17 \pm 0.81	0.285
Outside the city	17	1.95 \pm 0.50		2.17 \pm 0.81		1.94 \pm 0.94	

* Scores were rated on a 5-point scale for driving behaviour frequency (1 = never, 2 = rarely, 3 = sometimes, 4 = frequently and 5 = always), risk perception (1 = not risky at all, 2 = slightly risky, 3 = fairly risky, 4 = very risky and 5 = extremely risky) and enjoyment (1 = strongly dislike, 2 = dislike slightly, 3 = neutral, 4 = like slightly and 5 = strongly like).

The mean frequency score of risky driving behaviour among the students was 2.17 ± 0.60 , while the mean perception score was 3.73 ± 0.79 and the mean enjoyment score was 2.15 ± 0.82 . The mean frequency score of risky driving behaviour was significantly higher among males ($P < 0.001$) and those who owned a car ($P = 0.002$). The mean risk perception score was significantly higher for those over the age of 20 years old ($P = 0.028$). No significant associations were observed between the mean enjoyment score and gender, age, residence or car ownership [Table 4].

There was a significant positive relationship between enjoyment of risky behaviours and the frequency of risky driving (beta = 0.44; $r = 0.439$; $P < 0.001$). There was a very weak negative relationship between the perceived risk of driving behaviours and frequency of risky driving behaviours (beta = -0.12; $r = -0.156$; $P = 0.026$).

Discussion

This study aimed to assess risky driving behaviour among a group of medical students in Erbil. The medical students reported frequent engagement in a number of risky driving actions. This is unfortunate as these students may soon be treating patients who engage in risk driving behaviours, or perhaps comforting surviving family members in the event of road traffic accident-associated fatalities. It is therefore important that those in the medical profession do

not engage in risky behaviours themselves. A study from Brazil revealed that risky driving conduct was highly frequent among medical students and that this was directly related to involvement in accidents with casualties.¹⁵ Sabbour *et al.* reported a number of common risky driving styles and behaviours, similar to the findings in this study, among medical students in Egypt.²⁰ These included driving at excessive speeds, driving without a licence, not wearing a seat belt and answering mobile phones while driving.²⁰ Similarly, a study from India revealed that 20% of medical students admitted to using hands-free mobile phones while driving and 68% revealed that they had surpassed speed limits on multiple occasions.¹⁸

Some risky behaviours were more frequently undertaken by the students in the current study than others. However, the frequency of a specific action was not primarily related to its perceived risk. In addition to being involved in many less risky behaviours, students frequently engaged in a number of extremely risky behaviours, such as driving faster than the permitted speed limit and using a mobile phone. This could be attributed to specific cultural and environmental factors, as well as due to established road safety and disciplinary measures that can affect risk-taking behaviour. For example, less frequently carried out risky behaviours (e.g. not stopping at a red light or not wearing a seat belt) could be related to strict monitoring and disciplinary measures in the Kurdistan region. These measures include the

presence of traffic police and speed cameras at most traffic intersections, as well as the implementation of strict fining measures. However, although there is an established fining system for exceeding the speed limit, the system for monitoring speeding is poor, as speed cameras are placed in known locations and are active only at specific times of the day. It is therefore easy and very common for drivers to breach the speed limits without being penalised. Furthermore, there are either no established or poorly implemented disciplinary measures for a number of other risky behaviours (e.g. front passengers without seat belts, switching lanes or undertaking from the right lane). Therefore, these types of behaviours are very common, particularly among young people.

A number of other findings may be closely related to the distinctive culture and environment of Erbil, such as the proportion of participants who reported driving after a mild or moderate intake of alcohol or driving whilst drunk. Alcohol-related driving behaviour was reportedly low although there are no properly implemented measures to prevent these risky behaviours in this region. This could be attributed to the fact that drinking is restricted and socially unacceptable in this predominantly Islamic society. In countries where alcohol is not as prohibited by religious and societal pressures, driving after consuming alcohol is substantially more common among young drivers. A study from India revealed that 25% of medical students had engaged in drunk driving in the previous year.¹⁸ Similarly, Colicchio *et al.* revealed that 59% of a sample of medical students in Brazil had driven after drinking alcohol; of these, 21.5% reported driving after consuming large quantities of alcohol.¹⁵

Research has suggested that the potential risks of driving while sleepy are at least as dangerous as the risks of driving under the influence of alcohol.²¹ It is therefore comforting that a low proportion of participants in the current study reported driving while tired. Driving while drowsy is particularly common among long-distance drivers. McCartt *et al.* revealed that 47.1% of surveyed long-distance truck drivers in the USA had fallen asleep at the wheel of a truck and 25.4% had fallen asleep at the wheel in the past year.²² While drowsiness is not restricted to night-time driving, the low reported frequency of driving while sleepy among participants of the current study may be due to the fact that it is uncommon to drive long distances during the night in the Kurdistan region.

The mean frequency score of risky driving behaviour was significantly higher among male than female students and among those who owned a car compared to those who did not. In a study from the USA, male drivers similarly reported engaging in risky

driving behaviours more frequently than female drivers (scores of 2.02 versus 1.93 out of 5, respectively).¹⁰ The same study also revealed that teenage drivers engaged in risky driving activities more frequently than adult drivers (scores of 2.04 versus 1.88 out of 5, respectively).¹⁰ The current study did not detect a significant difference between the two different age groups; however, this could be related to the relatively small sample size and/or the homogeneity in age of the sample.

In the current study, over one-tenth of students who drove a car reported not having a driving licence. Driving before obtaining a driving licence is a common problem in several countries. Scott-Parker *et al.* found that 12% of young people in Australia reported pre-licence driving and were significantly more risky drivers than learner and provisional drivers.²³ Sivak *et al.* showed a general reduced trend in the percentage of young persons with a driving licence in the USA; the percentage of licensed 19-year-olds dropped from 87.3% in 1983 to 75.5% in 2008 and 69.5% in 2010.²⁴ It is not known if this trend also indicates an increased number of unlicensed young drivers. Unlicensed drivers not only place themselves and other road users at risk at the time, but also usually continue to be risky drivers in the future.²³ Therefore, pre-licence driving should be discouraged and parents should be encouraged to monitor car use and the driving behaviour of their children.²³

In this study, approximately half of the students drove a car, with the majority of these driving on a daily basis. This proportion could be reflected in the similarly high rate of car ownership. Most young drivers in an Australian study reported owning a vehicle and young drivers who had their own cars reported significantly greater mileage.²⁵ For young drivers, car ownership is usually associated with more risky driving, which could be attributed to the lengthier time on the road and increased distance driven.^{25,26} In general, drivers who have their own cars usually report significantly more risky driving.^{25,27} Therefore, researchers have recommended incorporating education on the dangers of risky driving—for parents as well as young drivers—as a requirement to holding a driving licence, particularly when the driver owns a vehicle. Parents should be encouraged to delay exclusive access to a vehicle for their children.^{25,27}

The mean risk perception score was higher among those above the age of 20 years old compared to those 20 years old or less, but there was no significant difference between males and females. This score is lower than that revealed by an American study which found higher risk perception scores for adults compared with teenagers.¹⁰ Reang *et al.* reported that

the majority of medical students in an Indian sample knew the main risky behaviours that could result in road traffic accidents.²⁸ Overall knowledge of road safety measures was similarly high among participants in the current study. However, unlike the present study, males had significantly better knowledge compared to females in Reang *et al.*'s study.²⁸ Another study from India showed that the overall awareness of medical students on road safety measures was slightly higher among females than males.¹⁸ Nonetheless, participants demonstrated significantly less awareness of other risky driving behaviours, including consumption of alcohol (4.2%), not wearing seat belts (20%) and using mobile phones without a hands-free device (6.1%).¹⁸

No significant associations were observed between the mean enjoyment score and other variables (gender, age, residence and car ownership) in the current study. Despite this, the mean score of liking risky driving behaviour was substantially higher than that revealed by a study from the USA.¹⁰ Researchers found higher scores for teenagers compared to adults, although this was not significant, and significantly higher scores for males compared to females.¹⁰

In the sample of medical students from Erbil, there was a weak negative relationship between perceived risk and risky driving and a significant positive relationship between liking risky behaviour and risky driving. A study from the USA showed that affect and risk perception were independent predictors of risky driving behaviours among young people and adults.¹⁰ A study of adolescents from New Zealand reported a significant positive correlation between risk perception and driving behaviours with regards to exceeding posted speed limits and driving fast for pleasure or thrill.²⁹ Another study from Australia revealed that poorer perception of safety was associated with an increased crash risk.¹⁷

According to the available literature, effective interventions to reduce risky driving behaviours among teenagers and young people include the implementation of educational programmes to effectively change behaviours and help risky drivers to temper positive emotions related to driving and more fully understand the associated risks.^{10,15} These interventions are in addition to more general measures targeting drivers, altering vehicle design and making the environment safer for road users.³⁰ Effective prevention strategies to reduce risky driving behaviours among teenagers and young people should also address the ways in which the socioeconomic environment of a community shapes individual behaviours. Juarez *et al.* reported that multisectoral

prevention strategies which are culturally appropriate and engage the target population are effective.³¹ In the context of the Erbil community in Iraq, prevention strategies could include the implementation of educational and awareness programmes for medical students. These programmes would aim to reduce enjoyment of risky driving behaviours, improve risk perception and remind students to act as role models for safe driving behaviour. In addition to stricter implementation of current traffic rules, these prevention strategies could represent promising methods of reducing risky driving behaviour.

This study provided an insight into the risky driving behaviours of a group of young medical students in the Iraqi Kurdistan region and shed light on how perception and liking of risky driving behaviours can affect actual driving behaviours. However, further exploration of the attributes of and contributors to risky driving behaviours among teenagers and young adults is strongly suggested. The findings of this study were limited to a sample of medical students; the behaviours of non-students or students in other colleges or institutes, which might differ substantially, were not investigated. Due to the lack of previous research on risky driving behaviours in the Kurdistan region and Iraq, particularly among young people, it was not possible to compare the findings of this study to other non-medical students in Iraq in order to determine any differences. It would be very useful if a similar survey was conducted with other young people in Iraq who are not students in order to determine ascertain more general implications of driving behaviours in this region. Further research is needed to explore the attributes and causes of risky driving behaviours among teenagers and young adults.

Conclusion

A high frequency of several serious risky driving behaviours were noted among this sample of medical students in Erbil, including speeding, allowing the front seat passenger to not wear a seat belt and using a mobile phone. Enjoyment of risky behaviours was an important predictor of risky driving behaviour. Further research is recommended to shed light on this important public health issue in Iraq, particularly regarding the driving behaviour of young people and teenagers.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

References

- World Health Organization. Global status report on road safety 2013: Supporting a decade of action. From: www.who.int/violence_injury_prevention/road_safety_status/2013/en/ Accessed: Mar 2015.
- World Health Organization. World report on road traffic injury prevention. From: www.who.int/publications/2004/9241562609.pdf Accessed: Mar 2015.
- Fergusson D, Swain-Campbell N, Horwood J. Risky driving behaviour in young people: Prevalence, personal characteristics and traffic accidents. *Aust N Z J Public Health* 2003; 27:337–42. doi: 10.1111/j.1467-842X.2003.tb00404.x.
- Chen CF. Personality, safety attitudes and risky driving behaviors: Evidence from young Taiwanese motorcyclists. *Accid Anal Prev* 2009; 41:963–8. doi: 10.1016/j.aap.2009.05.013.
- Gulliver P, Begg D. Personality factors as predictors of persistent risky driving behavior and crash involvement among young adults. *Inj Prev* 2007; 13:376–81. doi: 10.1136/ip.2007.015925.
- Yilmaz V, Çelik HE. Risky driving attitudes and self-reported traffic violations among Turkish drivers: The case of Eskişehir. *Doğuş Üniversitesi Dergisi* 2006; 7:127–38.
- Hassen A, Godesso A, Abebe L, Girma E. Risky driving behaviors for road traffic accident among drivers in Mekele city, Northern Ethiopia. *BMC Res Notes* 2011; 4:535. doi: 10.1186/1756-0500-4-535.
- Delhomme P, Verhac J, Martha C. Are drivers' comparative risk judgments about speeding realistic? *J Safety Res* 2009; 40:333–9. doi: 10.1016/j.jsr.2009.09.003.
- Harré N, Foster S, O'Neill M. Self-enhancement, crash-risk optimism and the impact of safety advertisements on young drivers. *Br J Psychol* 2005; 96:215–30. doi: 10.1348/000712605X36019.
- Rhodes N, Pivik K. Age and gender differences in risky driving: The roles of positive affect and risk perception. *Accid Anal Prev* 2011; 43:923–31. doi: 10.1016/j.aap.2010.11.015.
- Teese R, Bradley G. Predicting recklessness in emerging adults: A test of a psychosocial model. *J Soc Psychol* 2008; 148:105–26. doi: 10.3200/SOCP.148.1.105-128.
- Mayhew DR. Driver education and graduated licensing in North America: Past, present, and future. *J Safety Res* 2007; 38:229–35. doi: 10.1016/j.jsr.2007.03.001.
- Sheller M. Automotive emotions: Feeling the car. *Theory Cult Soc* 2004; 21:221–42. doi: 10.1177/0263276404046068.
- Winston FK, Senserrick TM. Competent independent driving as an archetypal task of adolescence. *Inj Prev* 2006; 1:i1–3. doi: 10.1136/ip.2006.012765.
- Colicchio D, Passos AD. Driving behavior among medical students. *Rev Assoc Med Bras* 2010; 56:535–40. doi: 10.1590/S0104-42302010000500013.
- Nakshabandi MM. Casualties and deaths from road traffic accidents in Dohuk, Iraq. *Duhok Med J* 2007; 1:15–22.
- Ivers R, Senserrick T, Boufous S, Stevenson M, Chen HY, Woodward M, et al. Novice drivers' risky driving behavior, risk perception, and crash risk: Findings from the DRIVE study. *Am J Public Health* 2009; 99:1638–44. doi: 10.2105/AJPH.2008.150367.
- Kulkarni V, Kanchan T, Palanivel C, Papanna MK, Kumar N, Unnikrishnan B. Awareness and practice of road safety measures among undergraduate medical students in a South Indian state. *J Forensic Leg Med* 2013; 20:226–9. doi: 10.1016/j.jflm.2012.09.022.
- Musselwhite C. Attitudes towards vehicle driving behaviour: Categorising and contextualising risk. *Accid Anal Prev* 2006; 38:324–34. doi: 10.1016/j.aap.2005.10.003.
- Sabbour SM, Ibrahim JM. Driving behaviour, driver style and road traffic accidents among young medical group. *Inj Prev* 2010; 16:A33. doi: 10.1136/ip.2010.029215.120.
- Powell NB, Schechtman KB, Riley RW, Li K, Troell R, Guillemainault C. The road to danger: The comparative risks of driving while sleepy. *Laryngoscope* 2001; 111:887–93. doi: 10.1097/00005537-200105000-00024.
- McCartt AT, Rohrbaugh JW, Hammer MC, Fuller SZ. Factors associated with falling asleep at the wheel among long-distance truck drivers. *Accid Anal Prev* 2000; 32:493–504. doi: 10.1016/S0001-4575(99)00067-6.
- Scott-Parker B, Watson B, King MJ, Hyde MK. Young and unlicensed: Risky driving before entering the licensing system. *Traffic Inj Prev* 2012; 13:213–18. doi: 10.1080/15389588.2011.638683.
- Sivak M, Schoettle B. Update: Percentage of young persons with a driver's license continues to drop. *Traffic Inj Prev* 2012; 13:341. doi: 10.1080/15389588.2012.696755.
- Scott-Parker B, Watson B, King MJ, Hyde MK. Mileage, car ownership, experience of punishment avoidance, and the risky driving of young drivers. *Traffic Inj Prev* 2011; 12:559–67. doi: 10.1080/15389588.2011.621000.
- Twisk D, Bos N, Shope JT, Kok G. Changing mobility patterns and road mortality among pre-license teens in a late licensing country: An epidemiological study. *BMC Public Health* 2013; 13:333. doi: 10.1186/1471-2458-13-333.
- García-España JE, Ginsburg KR, Durbin DR, Elliott MR, Winston FK. Primary access to vehicles increases risky teen driving behaviors and crashes: National perspective. *Pediatrics* 2009; 124:1069–75. doi: 10.1542/peds.2008-3443.
- Reang T, Tripura A. Road safety: Knowledge, practice and determinants among undergraduate medical students of Agartala Government Medical College and Govinda Ballabh Pant Hospital. *Int J Med Sci Public Health* 2014; 3:911–15. doi: 10.5455/ijmsph.2014.090420143.
- Brookland R, Begg D, Langley J, Ameratunga S. Risk perception and risky driving behaviours of adolescents and their parents: New Zealand drivers study. *Inj Prev* 2010; 16:A170. doi: 10.1136/ip.2010.029215.607.
- Khan AA, Fatmi Z. Strategies for prevention of road traffic injuries (RTIs) in Pakistan: Situational analysis. *J Coll Physicians Surg Pak* 2014; 24:356–60. doi: 10.4236/JCPSP.2014.24356.
- Juarez P, Schlundt DG, Goldzweig I, Stinson N Jr. A conceptual framework for reducing risky teen driving behaviors among minority youth. *Inj Prev* 2006; 12:i49–55. doi: 10.1136/ip.2006.012872.