

Evaluating The Relation Between Road Safety And Public Health

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Abstract:

Objective: To assess the effect of road safety on public health by examining its influence on opportunities for physical activity and hazard exposure among drivers and pedestrians in Tikrit city.

Methods: This study is cross-sectional conducted between November 2022 and March 2023 in Tikrit, Iraq. Data were collected through direct interviews with 330 participants, comprising 145 drivers and 185 pedestrians.

Results: The majority of drivers (71%) and pedestrians (72%) perceived local roads as unsafe for physical activity, primarily due to insufficient space (30%). Drivers with ten or more years of experience demonstrated higher compliance with safety measures, including adhering to speed limits (65%) and yielding the right-of-way to pedestrians (63%). Holding a valid driving licence (75% of drivers) was associated with improved safety behaviour. Regarding environmental health, 75% of pedestrians and 61% of drivers reported being affected by vehicle-induced air pollution, while noise pollution affected 85% of pedestrians and 67% of drivers.

Conclusion: Perceived Road unsafety constitutes a significant barrier to physical activity in Tikrit. The findings highlight driver experience and licensing status as critical determinants of safety behaviour, with implications for public health and urban planning.

Keywords Road safety; public health; physical activity; drivers; pedestrians; vehicle pollution.

Introduction

Road safety concerns how roads are designed to support the population's health and how the population's physical activities actually improve their health. As we know, there is a close relationship between public health and road safety⁽¹⁾. The integration between road safety activities and wider public health work and considering them alongside healthy transport and efforts to increase physical activity⁽²⁾. Road safety activities aimed at preventing injuries have a positive impact on other areas of health; this is referred to as a co-benefit. The impact of road safety goes well beyond preventing injuries. Instead, it can improve the community's overall health by enabling many healthy activities, thereby bringing greater benefits to people and the community as a whole⁽³⁾. Choosing an appropriate way of transportation is also affected by road safety and people's health. The more dangerous the road is considered, the less healthy modes of transportation are used. So, there must be an effective intervention, such as reducing motor vehicle traffic speeds and volumes, to reduce road danger and encourage more people to travel or transport by active travel, such as walking or cycling⁽⁴⁾. Road safety permits many types of physical training. About 3 hours of cycling per week reduces the possibility of death from all causes by over one quarter. Many types of chronic diseases can be caused by sedentary lifestyle, such as coronary artery diseases, stroke, diabetes, etc. Physical activity also has an impact on mental health and has a protective function against depression, dementia and anxiety⁽⁵⁾. Likewise physical activity also reduces the risk of injuries from falls in old age. There are benefits from increased physical activity to almost all of the population rather than just those at high risk. For most of the people active travel is the easiest way to incorporate physical activity into everyday life because it's harder for them to join a gym. Actually walking and cycling can be neglected where there is a perception that they are unsafe⁽⁶⁾. Road traffic accidents (RTAs) are one of the most common causes of death and physical disability worldwide. To overcome this preventable problem, there must be a robust road safety strategy that protects individuals as effectively as possible. The World Health Organisation's safe system approach to road safety sets out an approach to speed management. In a safe system, the speed limit should be set so that crashes at or below this speed are unlikely to cause fatal injury⁽⁷⁾. Motor traffic volume is also a cause of injury. An increase of 1,000 vehicles a day on a road is associated with a 6% increase in pedestrian injuries, a 5% increase in cyclist injuries, and a 7% increase in vehicle occupant injuries. So there must be measures to reduce the number of vehicles in the community. One of those measures is encouraging people to travel actively

and educating them about its health benefits^(8,9). Another thing to consider is that motor vehicles affect people's ability to create and maintain social contact. There is always a "hurry up!" that prevents pedestrians from coming into contact with each other. On the other hand, drivers are often isolated and spend long periods driving without spending time with others. Recently, a review found that broad social support networks reduce psychological problems and problem behaviors' and can encourage positive health behaviours, such as improved diets and increased physical activity^(10,11). Motorised transport is a major source of air pollution, including nitrogen oxides and particulate matter, which have a harmful effect on health. Noise result from road can raise the risk of heart problems and causes sleep disturbance, as well as cause cognitive impairment in children and general annoyance^(12,13)

Result

The study sample includes 145 drivers: 109 with a driving license and 36 without one.

95 (84%) drivers had a driving license, while 18 (16%) used a horn for warning, and 18 (16%) drivers without a driving license used a horn for warning.

Table (4.1): Relation between having a driving license and commitment to driving safety measures among drivers.

Safety measure	Have a driving license		NOT have a driving license		Total	
	Number	Percent (%)	Number	Percent (%)	Number	Percent (%)
Checking the car's mechanical problems regularly.	60	71	25	29	85	100
Usage of the horn for warning.	95	84	18	16	113	100
Usage of seatbelts.	38	79	10	21	48	100
Usage of special belts for kids.	22	79	6	21	28	100
Having a warning triangle, a fire extinguisher &etc.	52	73	19	27	71	100
The chi-square statistic is 5.9379. degree of freedom is 4. The p-value is 0.203832. The result is not significant at $p < 0.05$.						

Checking car mechanical problems regularly had a higher frequency of about 48 (57%), 36 (43%) among drivers who have driven for more than 10 years, and less than 10 years, respectively. But other safety measures were less frequent. More frequent legal driving patterns among drivers who had driven for more than 10 years were: 86 (65%) obeying speed limits, 79 (63%) allowing pedestrians to cross the road if possible. Among drivers with less than 10 years of driving experience, obeying speed limits and allowing pedestrians to cross the road when possible were 47 (35%) and 47 (37%), respectively. There were 185 pedestrians in the study, of whom 171 (92%) were looking left and right while crossing the roads, with a higher frequency among males (92, 54%).

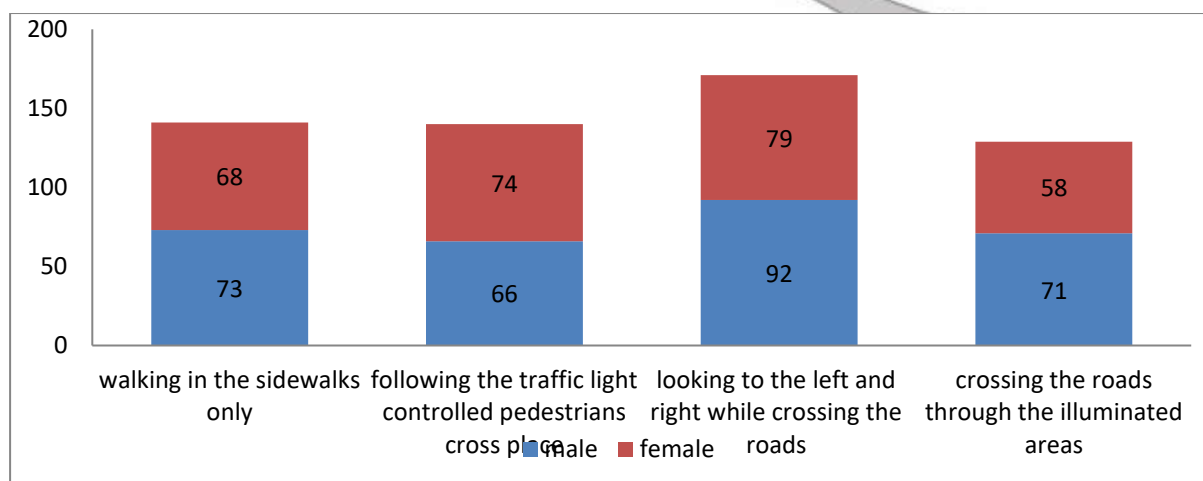


Figure (4.1): Frequency of pedestrians' safety measures commitment according to gender.

The study revealed that a high percentage of pedestrians, 138 (75%), were affected by air pollution, but a high percentage of drivers, 88 (61%), were not affected by air pollution

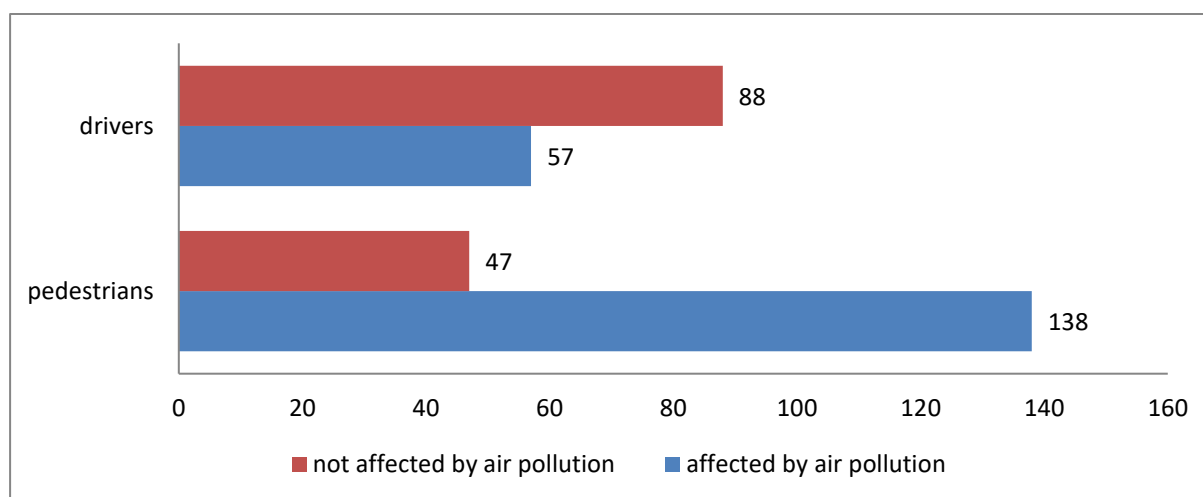


Figure (4.2) : Frequency of drivers and pedestrians affected by vehicles induced air pollution.

The study revealed that high percentage of pedestrians 158 (85%) were affected by sound pollution while 97 (67%) of drivers were affected by sound pollution.

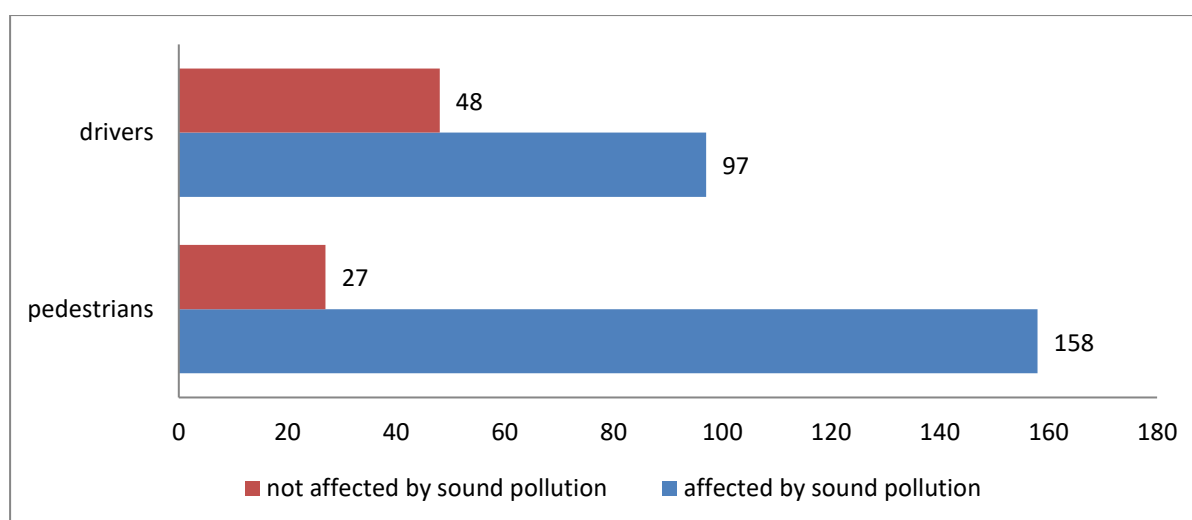


Figure (4.3): Frequency of drivers and pedestrians affected by vehicle-induced sound pollution.

The study revealed that a high percentage of pedestrians (143, 77%) and drivers (116, 80%) were affected by the presence of stray dogs on Tikrit roads.

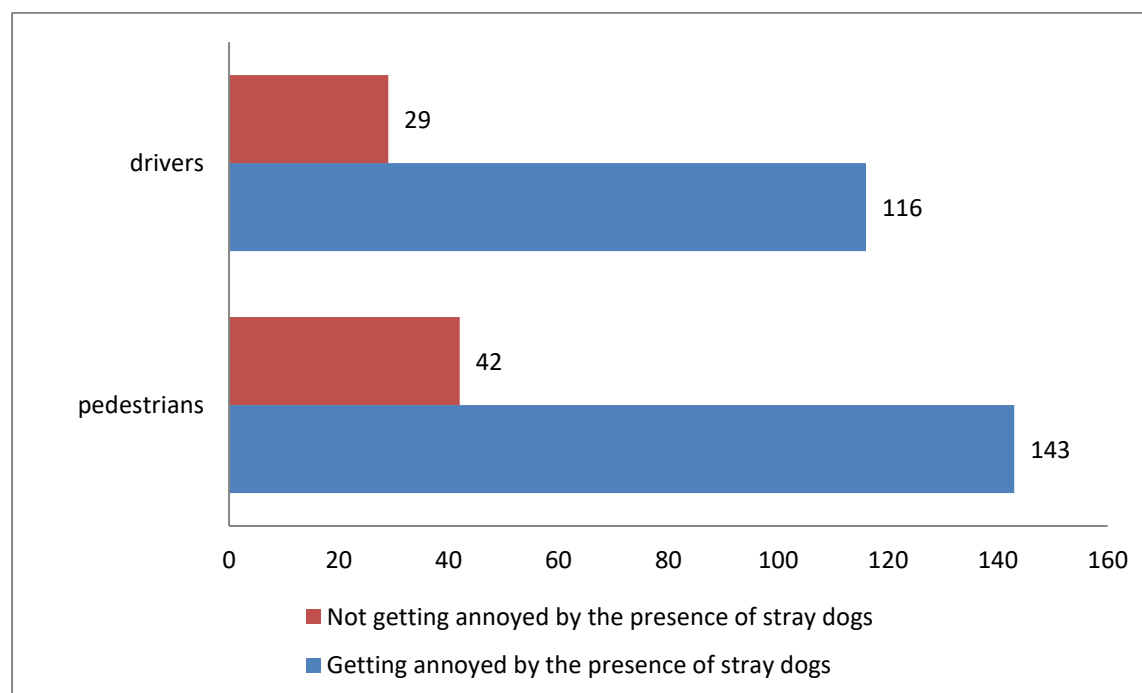


Figure (4.4): Frequency of drivers and pedestrians affected by the presence of stray dogs in Tikrit roads.

The figure showed that about 103 (71 %) of drivers and 134 (72%) of pedestrians considered Tikrit roads unsafe for physical activities.

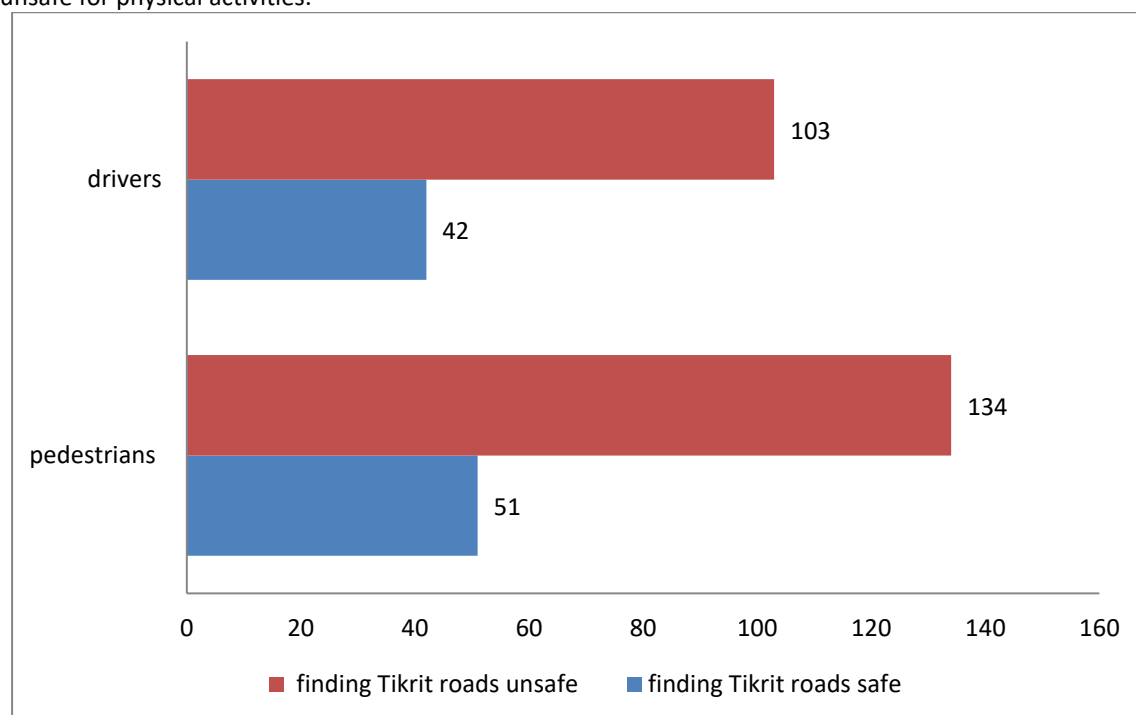


Figure (4.5): Frequency of drivers and pedestrians finding Tikrit roads safe for physical activities.

This figure shows that the most common obstacle to physical activity in Tikrit city is the lack of available places, according to the opinion of 99 (30%) of the citizens.

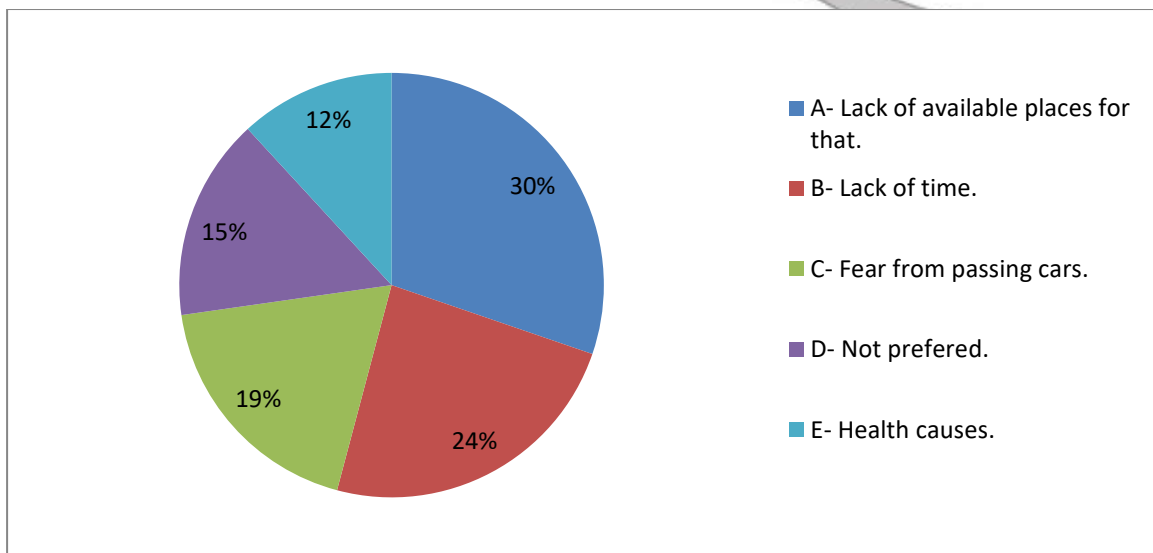
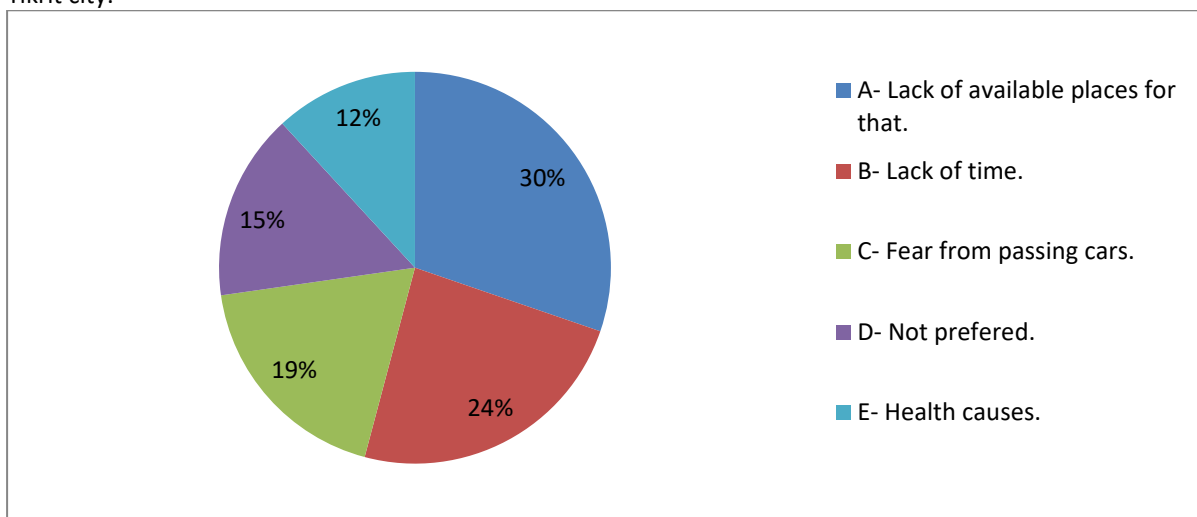


Figure (4.6): Frequency of the common obstacles that prevent citizens from doing regular physical activities in Tikrit city.



The figure (4.7) showed that a high percentage of the participants, 122 (37%), found the sidewalks good.

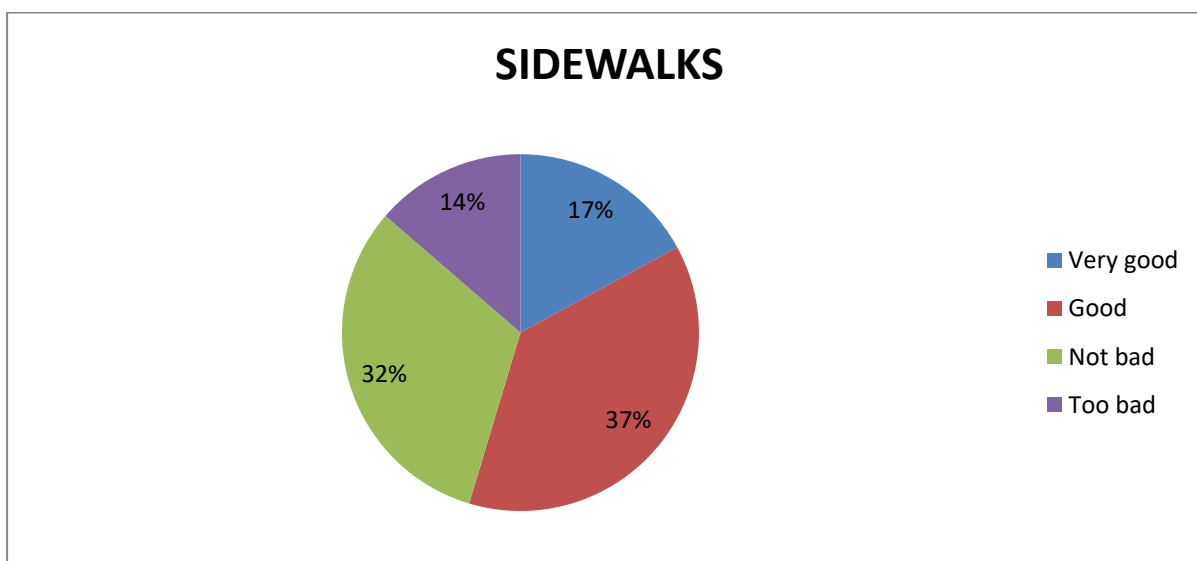


Figure (4.7) : Opinion of drivers and pedestrians about Tikrit sidewalks.

The study found that the opinion of 118 (36%) of drivers and pedestrians was not bad regarding Tikrit road tiling.

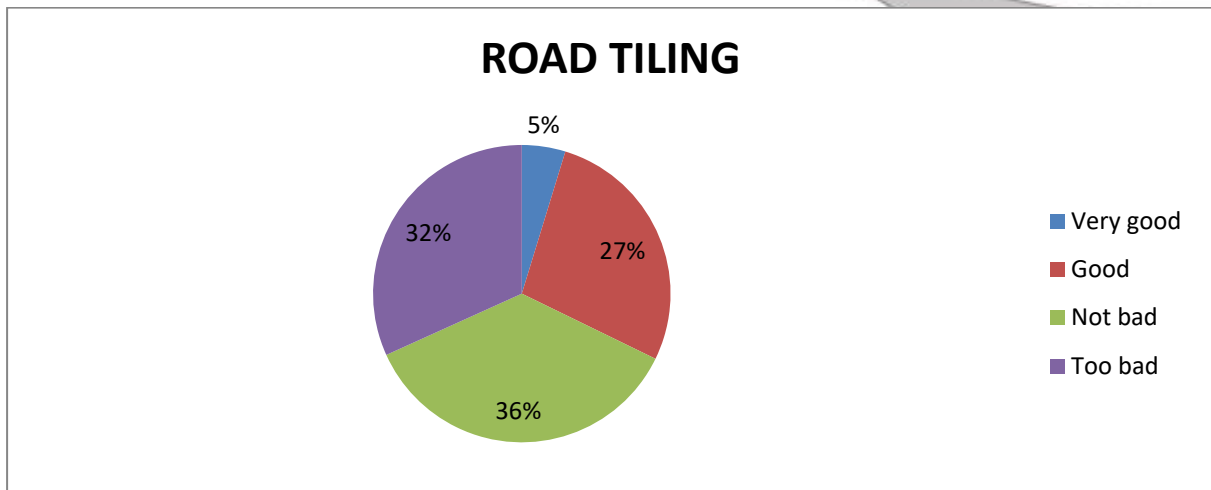


Figure (4.8): Opinion of drivers and pedestrians about Tikrit roads tiling.
The results showed that 141 (43%) of drivers and pedestrians' opinions were good regarding the Tikrit traffic light.

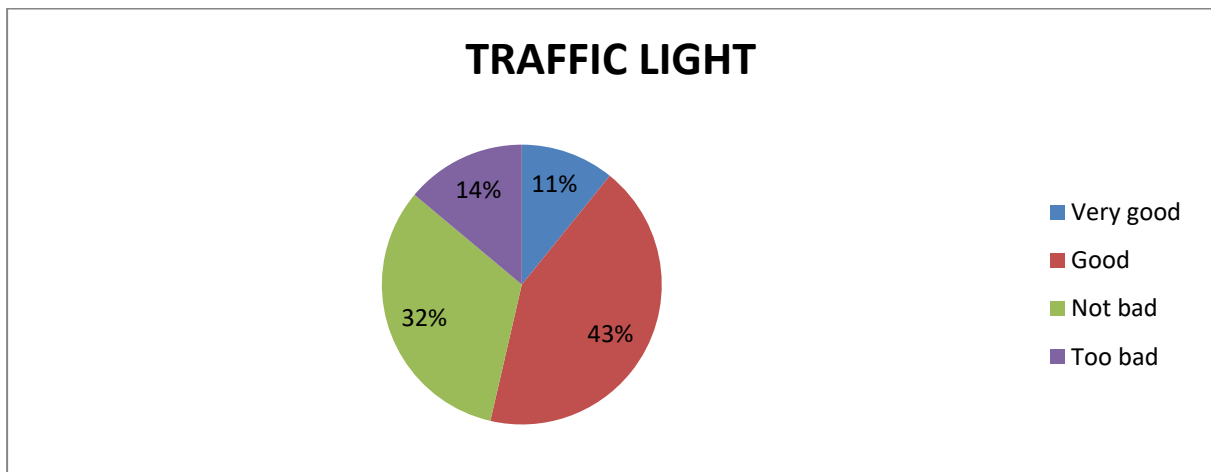


Figure (4.9): Opinion of drivers and pedestrians about the Tikrit traffic light.

Figure (4.10) shows that 118 (36%) of participants considered the trafficsignals not bad.

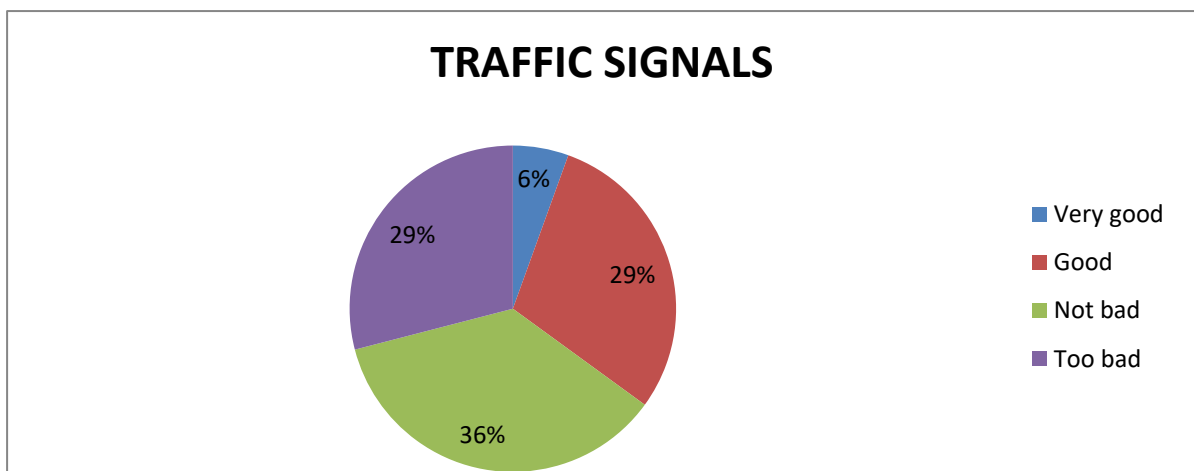


Figure (4.10): Opinion of drivers and pedestrians about Tikrit traffic signals.

Discussion

The study reveals that 75% of the drivers have a driving license and there is a positive relation between having a driving license and commitment towards driving safety measures. About 71% of the drivers who check car mechanical problems regularly, 84% of drivers who use the horn for warning, 79% of drivers who use the seatbelts, 79% who use special belts for kids and 73% who have a warning triangle, fire extinguisher and other safety package are drivers with a valid driving license. This finding agrees with other studies in Montana, including 5985 participants, which states that young unlicensed drivers are more likely than licensed drivers to adopt several health risk behaviours both in car driving/riding or otherwise⁽¹⁴⁾. Another study in the United States reveals that over 10% of the drivers involved in fatal crashes don't have a valid license⁽¹⁵⁾. Unlicensed driving is a major road safety problem in many countries, despite ongoing improvements in traffic law enforcement. It harms road safety in two aspects, which are undermining the system used to monitor and manage driver behavior and increasing illegal driving patterns such as drunk driving, speeding, and failure to wear seat belts^(16,17).

Traffic accidents are often related to a driver's behaviour, which is largely determined by their character, including age, driving experience, and driving style. The study shows that the most frequent legal driving patterns are among drivers who have driven for more than 10 years. 65% of drivers who obey speed limits, 63% who allow pedestrians to cross the road if possible, 64% who follow traffic signs, and 54% who don't use a phone while driving have ≥ 10 years of driving experience. In assessing the percentages of personal safety driving measure, the study displays that about 57% of the drivers who check car mechanical problems regularly, 64% of drivers who use the horn for warning, 65% of drivers who use the seatbelts, 61% who use special belts for kids and 46% who have warning triangle, fire extinguisher and other safety package are drivers with driving years ≥ 10 years. These findings are predictable because it is known that as the drivers garner valuable experience, restrictions are lifted in a stepwise fashion. In comparison with other studies conducted in China, which revealed that the drivers with (6–10) years of driving experience contribute the most number of accidents, followed by the drivers with 3 years of driving experience, and the drivers with 20 years or more of driving experience account for the lowest number of accidents⁽¹⁸⁾.

Gender-wise, male pedestrians showed slightly higher compliance in sidewalk use (52%), looking left/right (54%), and using well-lit areas (55%), while females followed traffic laws more (53%). This contrasts with other studies reporting that women are more safety-conscious (e.g., 66% vs 56.6% complied with road signs in Montreal) and that men are more likely to run red lights.

Women turned their heads toward traffic lights 13% more than men, and toward other pedestrians 8% more than men (6.5% and 3.5%, respectively) ^(19,20).

Regarding the effects of vehicle-induced pollution, the study reveals that 75% and 85% of pedestrians are affected by air and sound pollution, respectively, while 39% of drivers are affected by air pollution and 67% by sound pollution. These results show that pedestrians are affected by vehicle-induced pollution more than drivers are. This is consistent with other studies conducted in three European cities: Helsinki in Finland, Rotterdam in the Netherlands and Thessaloniki in Greece, which states that pedestrians inhale higher doses of air pollution than motorised transport drivers and also states that the noise level that cyclists, pedestrians or public transport users are exposed to is frequently higher than that of car users⁽²¹⁾.

Conclusion :

1. A significant number of Tikriti citizens consider Tikrit roads unsafe for doing regular physical activities like walking or cycling. The most common obstacle appears to be the lack of appropriate places for walking or cycling on Tikrit roads.
2. As the years of driving have increased, commitment towards more legal driving safety measures has become more advanced and more appreciated by drivers.
3. The male pedestrians seem to be more careful than the females regarding pedestrian safety measures obedience.
4. Having a driver's license is a good indicator of more legal driving patterns among drivers.
5. Concerning the vehicle-induced pollution, the pedestrians are affected by vehicle-induced air pollution more than the drivers, while both drivers and pedestrians are affected by vehicle-induced sound pollution equally. Also, both drivers and pedestrians are annoyed by stray dogs on Tikrit roads.

- **Consent for Publication:** Not applicable.

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