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KNOWLEDGE ABOUT ROAD TRAFFIC RISK AND SELECTED UNSAFE BEHAVIOURS AMONG PEDESTRIANS INVOLVED IN A CRASH AT A PEDESTRIAN CROSSING IN POLAND

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ABSTRACT

Introduction: Pedestrians, next to drivers of passenger vehicles, are the second largest group in traffic incidents. Crashes involving pedestrians often occur as a result of their risky behaviour.

Objective: The article recognises the relationship between selected road traffic hazards and the behaviour of pedestrians involved in traffic crashes, taking into account demographic variables.

Method: The study was conducted using a survey questionnaire among 494 people who were involved in a crash. The group included 56.88% women and 43.11% men. The respondents were divided into six age groups and by place of residence (village or city).. Frequency analysis and the$\chi 2$ test, Pearson's contingency ratio and Spearman's rank-sum test were used to analyze the problem.

Results: More than 50% of respondents answered incorrectly when asked questions about the driver's behaviour in the event of a sudden appearance of an obstacle or a living person on the road. It is more common for men (84.98%) than women (73.31%) to cross the carriageway at a forbidden place. The propensity to cross at a forbidden place decreases with age, and so, in the survey, around 80% of young people indicated that they cross at a forbidden place and 66.67% of those over 65. When crossing the

road, 16.67% of 14 - 18-year-olds use their mobile phone, while 42 - 53-year-olds use their mobile phone the least frequently (0.89% of indications). Despite the high number of crashes after dark, only 24.40% of rural residents and 16.87% of urban residents always wear reflective elements.

Conclusions: Pedestrians involved in crashes have a high propensity for unsafe behaviour and their knowledge of the risks associated with the driver's ability to halt a vehicle when a pedestrian suddenly walks on the road is too low. It would therefore be necessary to conduct in-depth studies in this area and undertake both engineering and educational measures to increase pedestrians' knowledge of road safety.

Keywords: *Pedestrian, Behaviour, Road Safety, Knowledge, Risk*

1. INTRODUCTION

In 2021, the highest rate of fatalities per 100 road accidents was recorded in Poland: 9.8 and in Bulgaria: 9.2 (**KGP, 2023**). Drivers dominate among the perpetrators of road crashes in Poland, but the second largest group of crash perpetrators are pedestrians. Crashes involving pedestrians most often occur at the pedestrian crossing. Although many police statistics point to drivers as the main perpetrators of crashes at pedestrian crossings, the study conducted by the Pedestrian Poland organization shows - based on final prosecutorial and court decisions - that the majority of pedestrian hit before 2022 was caused by their own misconduct of the Traffic Law (**Krzemień, 2022**).

With the aim of improving safety at pedestrian crossings with no traffic lights in Poland, the law was amended in 2021 which stipulates that: "a pedestrian at a pedestrian crossing has a right-of-way over a vehicle. A pedestrian entering a crosswalk shall have a right-of-way over a vehicle, excluding a streetcar" (Traffic Law, Article 13, paragraph 1a) (**Czajewski *et al.* 2013**

). In the aftermath of the amendment that extended the rights of pedestrians, there was an increase in the number of traffic accidents involving them by the end of 2022 (**Figure 1**).

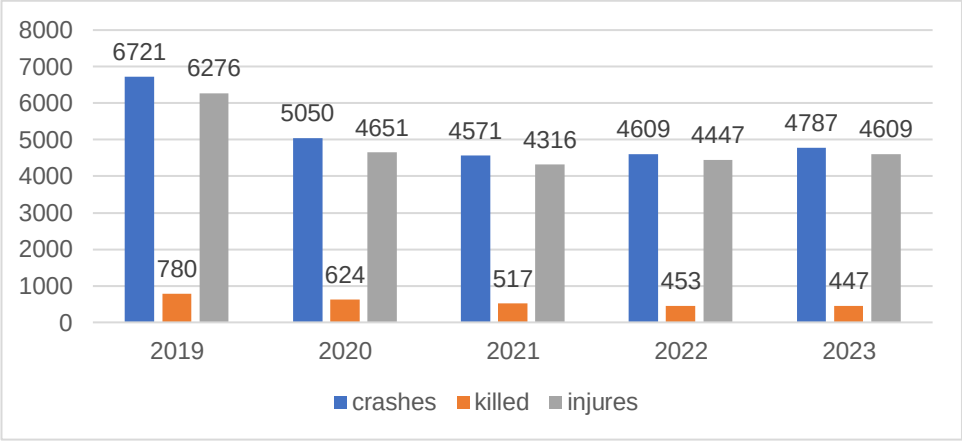

Figure 1. Structure of Crashes Involving Pedestrian Road Users

(Source: KGP, 2020, KGP, 2021, KGP, 2022, KGP 2023, KGP 2024)

As can be seen from the data in **Figure 1**, the number of accidents involving pedestrians increased in the two years following the introduction of changes to traffic law. In 2023, compared to 2020 (before the traffic law changes), there were 5.21%

fewer road accidents and only 0.91% fewer injuries. At the same time, both the number of accidents and the number of people injured in road accidents has been increasing since 2021. Only the number of people killed decreased year on year.

At the same time, some crashes were the result of pedestrians' negligence, who often thought that a right-of-way they had at pedestrian crossings relieved them from being cautious on the road. In addition, some pedestrians have become accustomed to being a privileged group of road traffic users at pedestrian crossings and, as a result, have stopped exercising caution by crossing without checking for oncoming vehicles, regardless of the prevailing weather conditions and time of day.

It is very difficult to ensure the safety of pedestrians. They are not protected by airbags, seatbelts or other safety devices, and they sometimes have to share the road with vehicles moving at dangerously high speeds (**Ke & Gkritza, 2019**). On the other hand, despite the significant risk, pedestrians are not obliged to have any, even minimal, knowledge of the traffic rules. The pedestrian, unlike vehicle drivers, does not need to hold a document proving his or her competence and mental and physical aptitude for using the road (**Bownik, 1985**). In practice, the degree of knowledge of traffic rules represented by pedestrians varies strongly from negligible to very high. This is because it strongly depends on the intellectual capacity, will, knowledge and personality traits of the pedestrians themselves (including minors, the elderly, the sick, etc.). According to a study by **Olakulehin *et al.* (2019)** conducted on the age group 18 - 63, the level of knowledge regarding traffic regulations among pedestrians living in a university community in south-western Nigeria was low. In contrast, a study by **Jothula & Sreeharshika (2021)** found that few participants knew which side of the road a pedestrian should walk on; just over half were able to correctly identify road signs. A similar trend was also observed by other researchers (**Reang & Tripura, 2014, Setorwofia *et al.* 2020**; **Tabunar, 2020**; **Nesoff *et al.* 2019**). Although the studies were conducted in different countries the results obtained regarding road safety knowledge considering gender were similar (**Kępa, 2020**). Men had a greater knowledge of road safety. At the same time, research by Ranjan 2018, shows that some road users despite having knowledge do not apply it in practice.

Pedestrian behaviour is a key factor in reducing road accidents (**Guéguen *et al*. 2015**). The results of a study conducted in Greece show that, pedestrians who were more

likely to cross at a red light are thought to be more likely to cross the road in a different undesignated place rather than at a nearby pedestrian crossing (**Nikolaou *et al.* 2023; Różowicz *et al.* 2022**). The behaviour of pedestrians at crossings is significantly determined by gender. Men are quicker to cross a pedestrian crossing than women (**Kim, *et al.* 2006**). In addition, male pedestrians are more likely to have riskier behaviour than females. (**Wang *et al.* 2020**; **Distefano *et al.* 2022**). Unsafe crossing behaviour is an important risk (**Zhou *et al.* 2009**). Distraction is a particularly dangerous behaviour, which is caused by talking on a mobile phone, browsing text messages, using headphones, listening to music, eating and not paying attention to moving vehicles (**BakhtariAghdam *et al.* 2023**, **Bayomi *et al.* 2022**). The use of mobile phone at pedestrian crossings is a growing concern as it contributes to pedestrian-related crashes. An observational study in Melbourne found that 20% of pedestrians were using mobile phones while crossing the road (**Osborne *et al.* 2020**). Field observations suggest that distraction while using a mobile phone is a significant predictor of accident risk among Indian pedestrians (**Vasudevan *et al.* 2020**). The use of mobile phone causes at least one of three types of distraction: visual distraction (e.g., texting, browsing the internet, playing games and reading articles), auditory distraction (e.g., listening to music and talking) and cognitive distraction, which can be caused by a combination of visual and auditory distraction (**Alejalil & Davoodi, 2017**, **Simmons *et al.* 2020)**. Wearing headphones constitutes another risk. According to a study by **Lee *et al.* (2020)** pedestrians are actually unable to detect the warning sound of a vehicle behind them, even from a short distance of 1 m, if they are listening to music wearing headphones at that time.

An important issue from the point of view of conducting pedestrian safety research is their visibility after dark. Studies conducted in Poland indicate that crashes involving pedestrians often occur after dark. This is often the result of not using reflective elements. A study by **Kępa *et al.* (2017)** and **Wawrzosek *et al.* (2017)** shows that visibility is reduced in the dark, affecting drivers' reaction times. A pedestrian without reflective elements is only visible to the driver from a distance of 22.4 m, while a pedestrian wearing a reflective element is already visible from a distance of 22.5 m. Increasing the distance from which the pedestrian can be perceived extends the driver’s reaction time and increases the chance of avoiding a crash or reducing its negative effects. The aforementioned study has shown that the maximum speed to

stop in front of a pedestrian without a reflective element on a paved road is only 41.05 km/h, whereas a vehicle can be halted in front of a pedestrian equipped with a reflective element even at speeds as high as 81.2 km/h (**Kępa, Żagan & Tereszkiewicz, 2017**; **Zieliński *et al.* 2019**).

The research conducted focused on pedestrian behaviour in various situations on the road. No research on the behaviour and knowledge of pedestrians who were beaten participants in a traffic incident. In this regard, it should be pointed out that there is a research gap.

The goal of this article was to investigate the knowledge of selected road traffic risks and the propensity for unsafe behaviour among pedestrians involved in crashes in Poland.

2. MATERIAL AND METHOD

The empirical analysis was conducted on the basis of a survey questionnaire. The questionnaire consisted of 3 parts: (1) demographics, (2) knowledge of selected road traffic risks, (3) unsafe pedestrian behaviour.

A pilot test was conducted with 16 people, 7 of whom were professionals dealing with road traffic safety. The pilot test aimed at testing the validity and clarity of the questions. The survey was conducted between 20.12.2022 and 01.06.2023. Two methods were used in the data collection process: Paper and Pencil Interviewing (PAPI) and Computer Assisted Web Interviewing (CAWI). The survey was transmitted electronically through various means and channels to reach as many respondents as possible (CAWI). Additionally, in order to level the chances of people who do not have access to the electronic form of our survey due to: lack of Internet, digital exclusion, inability to use a computer - especially in the case of older people who do not use technical devices on a daily basis), the collection of questionnaires was also supplemented with a paper form (PAPI) with the layout and content exactly the same as in the case of the electronic form of the survey.

The sample was selected from the general population of Polish residents in a purposive manner. We received a total of more than 3000 responses (3061 responses), of which 494 were selected for the above survey on the basis of answers to the following question: Have you been involved in a crash at a pedestrian crossing?

A crash was defined in accordance with Polish law as a situation in which a road traffic

crash occurred in the form of an unintentional violation of the applicable safety rules resulting in damage to property and death of one of the participants or bodily injury causing an impairment of bodily organ functions or health disorder lasting longer than 7 days (Act, 1997).

In determining the sample size, a confidence level of α=95%, p=0.5 and a maximum error of 2% were assumed. The minimum sample size for this survey was N=331. In total, responses were received from 507 respondents. 13 incorrectly completed questionnaires were discarded. 494 questionnaires were used for further analysis, which constitutes 97.4% of correctly completed questionnaires. In order to answer the research questions, statistical analyses were carried out using an Excel spreadsheet and the Statistica 13.3 programme, which was used to calculate basic descriptive statistics, the χ2 test and Pearson's c- contingency coefficient. The significance level in the article was α=0.05.

3. INSTRUMENT AND MEASUREMENT

In this study, variables were selected that, according to the study, indicated that they had value and were relevant to understanding the behaviour of pedestrians who were involved in a traffic incident. Part of the overall survey on knowledge and unsafe behaviour of pedestrians was used for the analysis (Table 1). The remaining questions in the questionnaire were about law changes and pedestrians' behaviour.

Table 1. Dimensions and Variables Used in the Analysis

Dimensions	Variables	Response
Sex	Sex	Female
		Male
Age	Age	15- 18*
		18-29
		30-41
		42-53
		54-65
		over 65
Residence	Residence	Village**

		City***
Knowledge of selected road traffic risks	In your opinion, what is the reaction time of a driver to a sudden appearance of an obstacle or living being on the road?	0.7–1s**** 1–15s 16–20s I have no opinion
	What distance do you think a passenger vehicle covers in one second moving at 50 km/h?	5m 14m**** 20m I have no opinion
	From what distance do you think a pedestrian is visible at an underlit pedestrian crossing after dark?	approx. 5–19 m approx. 20–39 m**** approx. 40–59 above 60 m I have no opinion
Unsafe pedestrian behaviour	Demographic variables and crossing the road in an undesignated place	Yes No
	While crossing a pedestrian crossing with no traffic lights, do you use a mobile phone?	Never Rarely Often
	While crossing a pedestrian crossing with no traffic lights, do you use headphones?	Never Rarely Often
	Do you use reflective elements after dark?	Never Sometimes Always

*The survey included people who had completed primary education.

**A settlement unit with compact or dispersed development and existing agricultural or related service or tourism functions without municipal rights or city status (Act on official names of localities and physiographic objects, 2003, Article 2).

***A settlement unit with a predominance of compact development and non-agricultural functions, which has urban rights or the status of a city granted in accordance with the procedure specified in separate regulations (Act on official names of localities and physiographic objects, 2003, Article 2).

**** Correct answer. The answers given in the survey were preceded by a survey in which respondents gave their own answers. The survey questionnaire introduced the most frequent and correct answers in line with the calculations and results of the survey (correct answer: **KornAcKi *et. al.* 2017**).

4. RESULTS

4.1 Characteristics of Respondents

The characteristics of the respondents to the survey are summarized in **Table 2**. 56.89% of women and 43.11% of men participated in the survey. In terms of age, the predominant age groups were those aged 18 - 29 years 32.6% and those aged 42 - 53 years 22.7%, the least numerous groups constituted those over 65 years of age 7.3%. Almost half of the respondents had higher education 49.3%, followed by secondary education 31%, and elementary education 13%, the fewest respondents had vocational education 6.7%. 55.3% of respondents were economically active, 33.8% attended school or university. More than half of the respondents resided in the city 66% and 34% in the countryside.

Table 2. Characteristics of Respondents

Variable	Specification	Frequency	%
Sex	woman	281	56.88
	man	213	43.11
Age	15–18	66	13.36
	18–29	161	32.59
	30–41	77	15.59
	42–53	112	22.67
	54–65	42	8.50
	over 65	36	7.29
Residence	Village	168	34.01
	City	326	65.99

4.2 Pedestrians' Knowledge about Selected Hazards Posed by Drivers of Passenger Vehicles

The safety of pedestrian road users is influenced by their awareness of the risks they

face from other road users. In the case of pedestrian crossings with no traffic lights, it is undoubtedly important to know the driver's reaction time to a sudden appearance of an obstacle or living being on the road, the braking distance of a passenger vehicle at 50 km/h, and the distance from which a pedestrian is visible at an underlit pedestrian crossing after dark. It is known that reaction depends on individual, types of roads, speed, visibility etc. but we tested if pedestrians know the rules. The responses of the respondents on the above issues are summarized in **Table 3.**

Table 3. Knowledge about Selected Behaviours of Passenger Vehicles Drivers

Variable	Specification	Correct answer	Incorrect answer	I have no opinion	Test result
		Percentage			
In your opinion, what is the reaction time of a driver to a sudden appearance of an obstacle or living being on the road? (answers: 0.7-1* s/1-15s/16-20s/I have no opinion)					
sex	woman	30.05	65.12	12.10	χ^2=39.61
	man				P<.001
		48.36	47.89	3.76	C=.27
age	15–18	30.30	53.03	16.67	χ^2=18.57
	18–29	34.16	60.87	4.97	P<.046
	30–41	41.56	51.95	6.49	C=.19
	42–53	33.93	60.71	5.36	
	54–65	30.95	57.14	11.90	
	over 65	25.00	55.56	19.44	
residence	village	29.76	64.29	5.95	χ^2=5.10
	city	35.87	54.29	9.82	P<.078
What distance do you think a passenger vehicle covers in one second moving at 50 km/h? (answers: 5m/14m*/20m/I have no opinion)					
sex	woman	18.86	65.84	15.30	χ^2=26.93
	man				P<.001
		36.62	58.22	5.16	C=.23
age	15–18	7.58	60.61	31.82	χ^2=54.51
	18–29	26.71	68.94	4.35	P<.001

	30–41	32.47	61.04	6.49	C=.32
	42–53	29.19	63.39	7.14	
	54–65	26.19	59.52	14.29	
	over 65	38.89	41.67	19.44	
residence	village	26.19	65.48	8.33	χ^2=1.93
	city	26.69	61.04	12.27	P<.381
From what distance do you think a pedestrian is visible at an underlit pedestrian crossing after dark? (answers: approx. 5- 19 m/ approx. 20 -39 m*/ approx. 40 - 59/above 60 m/I have no opinion)					
sex	woman	15.30	74.02	10.68	χ^2=6.56
	man				P<.038
		22.07	72.30	5.36	C=.11
age	14–18	16.67	59.03	24.24	χ^2=35.07
	18–29	21.12	73.91	4.97	P<.001
	30–41	11.69	81.82	6.49	C=.26
	42–53	15.18	79.46	5.36	
	54–65	21.43	64.29	14.49	
	over 65	30.56	55.56	13.89	
residence	village	13.10	79.17	7.74	χ^2=6.27
	city				P<.04
		21.17	68.71	10.12	C=.11

*Correct answer

As can be seen from the analysis of the data included in Table 2, there is a weak correlation between gender and the knowledge of a driver's reaction time to a sudden appearance of an obstacle or living being on the road. The correct answer to the question posed was given more often by men than by women. Taking into account the age of the respondents and the answer to the aforementioned question a weak correlation can be indicated. In each age-surveyed group, more than 50% of respondents did not know the correct answer. The most frequent correct answer was given by those aged 30-41 and the least frequent by those over 65. However, in the case of the respondents' place of residence and knowledge of the driver's reaction time to a sudden appearance of an obstacle or living being, there was no statistically significant relationship. By analysing the gender of respondents and knowledge of the

distance travelled in one second of a passenger vehicle a weak correlation can be found. More men than women knew the correct answer to the question posed. On the other hand, considering respondents' answers regarding the braking distance of a vehicle moving at 50 km/ha and their age, a moderate correlation can be found . Those under the age of 18 were least likely to indicate a correct response while those over the age of 65 were most likely to indicate a correct response. The latter also had the fewest incorrect answers. A significant problem for pedestrians is their knowledge and awareness of the distance from which they are visible to drivers at an underlit pedestrian crossing. The results indicate that there is a faint correlation between gender and knowledge of the distance from which pedestrians are visible to drivers at an underlit pedestrian crossing. As with previous questions, men were more likely to give the correct answer than women. However, the problem is the very high rate of incorrect answers in both groups, above. A weak correlation can also be found between age and the answer to the above question. The most frequent incorrect answer was given by those aged 30-41, and the least frequent by those over 65. There was a faint correlation between place of residence and knowledge of the distance from which pedestrians are visible to drivers at an underlit pedestrian crossing. More often the incorrect answer was given by rural residents than urban residents.

4.3 Unsafe Behaviour of Pedestrian Road Users

Lack of knowledge and awareness of traffic hazards is associated with irrational behaviour by pedestrians. The propensity for selected unsafe behaviours in the group of pedestrians who were involved in crashes is included in **Table 4**.

Table 4. Demographic Variables and Crossing the Road in an Undesignated Place

Variable	Specification	Yes	No	Test result
		Percentage		
sex	woman	73.31	26.69	χ^2=9.72
	man	84.98	15.02	P<.002 C=.14

age	under 18	80.30	19.70	χ^2=3.77
	18–29	80.75	19.25	P<.583
	30–41	79.22	20.78	
	42–53	77.68	22.32	
	54–65	76.19	23.81	
	over 65	66.67	33.33	
residence	village	85.12	14.88	χ^2=6.85
	city			P<.009
		74.85	25.15	C=.12

As can be seen from the data in **Table 4**, despite the fact that the survey included people who were involved in crashes, the majority of them still cross the road in undesignated places. There is a weak correlation between gender and crossing in an undesignated place. Both men and women indicated that they cross the roadway in an undesignated place. There is also a weak correlation between place of residence and crossing the road in an undesignated place. However, rural residents are more likely to behave incorrectly than urban residents.

Another aspect that increasingly influences unsafe pedestrian behaviour is the use of mobile phones and headphones when crossing a crosswalk with no traffic lights (**Table 5**).

Table 5. Use of Mobile Phones and Headphones When Crossing a Crosswalk with No Traffic Lights, and Frequency of Use of Reflective Items After Dark

Variable	Specification	Never	Rarely	Often
			Percentage	
While crossing a pedestrian crossing with no traffic lights, do you use a mobile phone?				
sex	woman	52.67	41.64	5.69
	man	44.60	49.30	6.10
age	15–18	25.76	57.58	16.67

	18–29	42.24	49.69	8.07
	30–41	46.75	51.95	1.30
	42–53	58.93	40.18	0.89
	54–65	73.81	23.81	2.39
	over 65	69.44	25.00	5.56
residence	village	50.60	45.24	4.17
	city	48.47	44.79	6.75
While crossing a pedestrian crossing with no traffic lights, do you use headphones?				
sex	woman	57.65	31.32	11.03
	man	43.19	38.97	17.84
age	15-18	27.27	42.42	30.30
	18–29	39.81	45.96	24.22
	30–41	48.05	45.45	6.49
	42–53	71.43	26.79	1.79
	54–65	90.48	7.14	2.38
	over 65	91.67	2.78	5.56
residence	village	57.14	34.52	8.33
	city	48.47	34.66	16.87
Do you use reflective elements after dark?				
		Never	**Sometimes**	**Always**
sex	woman	42.70	34.88	22.42
	man	41.31	43.19	15.49
age	15–18	43.94	45.45	10.61
	18–29	45.34	37.27	17.39
	30–41	35.06	38.96	25.97
	42–53	39.29	40.18	20.54
	54–65	47.62	26.19	26.19
	over 65	41.67	38.89	19.44
residence	village	34.52	41.07	24.40
	city	46.01	37.12	16.87

Mobile phones are never used at a pedestrian crossing with no traffic lights by of those aged 54-65, while mobile phones are often used by those under 18. Analysing the responses in individual age groups, it can be observed that as people get older, they rarely or never use mobile phones when crossing a pedestrian crossing with no traffic lights. Similar results were obtained for the use of headphones when crossing a crosswalk with no traffic lights. There is a statistically moderate relationship between the age of respondents and the use of headphones when crossing a crosswalk with no traffic lights. At the same time, headphones are often used when crossing a crosswalk with no traffic lights by young people under 18 years of age and 18 - 29 years of age. On the other hand, people aged 54 - 65, and over 65 mostly never use headphones when crossing a crosswalk with no traffic lights. An important problem concerning the unsafe behaviour of pedestrians is the use of reflective elements after dark. , the survey results show that almost half of the respondents do not use reflective elements after dark or use them very rarely.

5. DISCUSSION

This study is the first regarding the knowledge and behaviour of pedestrian road users after the extension of pedestrian rights at pedestrian crossings with no traffic lights and a group of people who were involved in a traffic crash in Poland. It has been documented that knowledge of selected traffic hazards among pedestrians who have been involved in a crash at a pedestrian crossing is low.

More than 50% of respondents answered incorrectly when asked questions about the driver's behaviour in the event of a sudden appearance of an obstacle or a living person. Correct answers to the questionnaire were more often given by men and people over 65. In addition, the results indicate that perhaps many crashes involving pedestrians and passenger vehicle drivers would not have occurred if pedestrians had been more knowledgeable about their visibility after dark or the driver's reaction time to a sudden appearance of an obstacle or living person, or braking distance. Knowledge of a driver's reaction time to a sudden appearance of an obstacle as well the braking distance and ability to halt a vehicle could lead to a greater caution among pedestrians and reduce crashes. This issue has been addressed by **Zahorski (2013)**, who believes that the physical possibility of avoiding a crash is determined by the speeds developed by cars, which are increasingly difficult to detect in modern vehicles,

and the resulting deceleration and stopping distances. This means that in a state of danger only a pedestrian can prevent a crash, because his natural reaction after noticing the state of danger is to stop immediately. The vehicle, on the other hand, must travel for a certain distance from the moment the driver decides to stop. Both road users, the driver and the pedestrian - even though they are still at a distance that is a multiple of the vehicle's length - are doomed to direct contact. The second paradox is that only one party is aware of the tragedy of the situation, the driver, who has less to say to prevent a crash. The other party to the incident, the pedestrian, who has every physical ability to eliminate the state of danger, is most often unaware of the growing danger, until the moment of collision or consciously enforces his right-of-way because he is at the crossing and does not participate in the driver's thought process to whom he unknowingly leaves the problem and hassle to get out of the situation. Crashes after dark on the underlit roads have the highest rate of fatalities. A significant increase in the number of crashes involving pedestrians is evident between September and December. This is due to, among other things: faster dusk and deteriorating weather conditions, which reduce the visibility of both the road and pedestrians (**Różowicz *et al.* 2022**). The issues of non-use of reflectors and lack of knowledge about the use of reflective elements after nightfall correspond with a study by **Alim *et al.* (2006)**, who found that pedestrians are seen walking on the road at night without using torch. In the survey conducted by the researchers, more than half of the respondents had no idea of the need to wear lamps when walking at night. Pedestrians walking carelessly on the road were blamed for some of the crashes.

Another worrying problem is the negligent behaviour of pedestrians as traffic road users. A very high percentage of women and men cross the roadway in an undesignated place. This type of behaviour was not affected by the age of the respondents or the place of residence. An increasingly serious misconduct is the use of mobile phones while crossing a pedestrian crossing with no traffic lights. In this context, the use of mobile phones by young people is a disturbing trend. A similar situation occurs with the use of headphones. There is a correlative relationship between the age and headphone use. Considering the above, it can be concluded that the number of crashes involving pedestrians using phones or headphones at pedestrian crossings with no traffic lights may have an upward trend. The results of the study correspond with a study by **Sheykhfard *et al.* (2021)** which shows that people

can increase the likelihood of crashes through mistakes, errors, unintentional and intentional offenses on the roadway. Also, according to research **by Osorio-García *et al.* (2023) and Tabunar (2020),** pedestrians' socioeconomic conditions, traffic safety education and gender are associated with risky behaviour when crossing streets in designated areas. Accident risks include crossing the road at red lights, crossing areas not intended for pedestrians, or stopping on the roadway while crossing.

6. LIMITATIONS OF THE RESEARCH

A limitation of the study concerned the identification of the persons involved in a traffic incident and the frequency of such situations. In addition, some respondents may have misinterpreted the very concept of a traffic incident.

7. CONCLUSIONS

In summary, it can be concluded that knowledge of the time it takes for a driver to stop in front of an obstacle or living person is low, with women having lower knowledge than men. This may be due to the fact that men are more interested in motoring than women. In addition, when asked questions about knowledge, positive answers were given from two age groups, i.e. 31 - 40 years and over 65 years. In the case of the over 65s, this may be due to their experience not only as pedestrians. In the case of the 31 - 40 age group, there is a need propensity for risky behaviour also characterises men more than women and mainly young people. The tendency of young people to engage in risky behaviour is due to their lack of experience and imagination, as well as their access to technology (phone, headphones), which makes them more inattentive. Older people, due to their greater experience and often motor limitations, are less likely to engage in risky behaviour on the road. In addition, they are much less likely to use mobile phones or headphones while travelling. Understanding this relationship, the activities of decision-makers and urban planners should focus on interventions related to improving the visibility of pedestrians at zebra crossings without traffic lights and implementing solutions to prevent pedestrians from suddenly stepping in front of a moving vehicle. In addition, it is worth introducing campaigns and educational programmes to make pedestrians aware of the dangers of other road users in specific age groups.

8. RECOMMENDATION

It seems advisable to extend the research on the knowledge of basic road traffic regulations among pedestrians and to conduct similar research among other road users, including, inter alia, drivers of passenger vehicles, cyclists or motorcyclists. An important issue for future studies would be to make comparative analyses between road traffic who participants and non-participants in road accidents.

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