

# PHONE USE BY PEDESTRIANS – PILOT STUDIES

DAMIAN PAWEŁ FREJ<sup>1</sup>

## Abstract

People use mobile phones for almost all activities throughout the day. Phones are used while performing activities such as running, cycling and walking on the pavement. Most often we listen to music, browse the Internet or just talk. Unfortunately, it should be noted that the use of a mobile phone is not always safe, as it can distract the attention of a pedestrian or driver, which can lead to a road accident. The topic of using mobile phones at pedestrian crossings is much less frequently discussed compared to using a mobile phone while driving a passenger vehicle. The phenomenon of distracting pedestrians with a mobile phone is becoming an increasingly recognisable phenomenon. In many countries, such behaviour is severely punished. The use of mobile phones by pedestrians and drivers reduces attention. Despite the risk of road accidents, many pedestrians and cyclists are accustomed to using their mobile phones while traveling in traffic. The aim of the article is to draw attention to the problem of using a telephone by pedestrians crossing an intersection with traffic lights. The collected results confirm that pedestrians often use mobile phones while crossing pedestrian crossings. Collected data from observational studies reveal several other important findings. Pedestrians using a mobile phone on a pedestrian crossing walk slower. Pedestrians are oblivious to passing vehicles and often cross the pedestrian crossing without thinking or checking in advance. Pedestrians using a mobile phone at a pedestrian crossing do not pay attention to traffic lights but follow the crowd of other pedestrians.

**Keywords:** safety; mobile phones; road accidents; pedestrians; road traffic accident

## 1. Introduction

Pedestrians, like cyclists and motorcycles, are vulnerable road users. Such road users are not protected from collisions with the vehicle, which often results in serious injuries or death in road accidents. Pedestrian crossings are widely seen as safe places for pedestrians. Unfortunately, statistics show that most accidents involving pedestrians take place at pedestrian crossings. For this reason, the topic of pedestrian behaviour is becoming increasingly popular

<sup>1</sup> Department of Automotive Engineering and Transport, Kielce University of Technology, Al. Tysiąclecia Państwa Polskiego 7, 25-314 Kielce, Poland; e-mail: [dfrej@tu.kielce.pl](mailto:dfrej@tu.kielce.pl), ORCID: 0000-0003-1899-4712

not only at the level of traffic research, but also at the level of sociological and psychological research.

Although the statistics of road accidents in Poland are improving, they are still far from ideal. In 2022, 460 pedestrians were killed and 4,367 injured, according to the police. While the mobile phone provides benefits, convenience and entertainment to users, the accident prevention community has expressed concern that it distracts pedestrians (e.g. by listening to music and talking on the phone) from safely navigating potentially hazardous traffic conditions.

Mobile phones are part of people's everyday lives. The use of mobile phones is becoming more popular every year around the world. Mobile applications make everyday tasks easier and faster [15, 23, 26]. It should be noted that using a mobile phone and a mobile application, you can, for example, order food, pay bills or listen to your favourite music with a few clicks. With all the possibilities of mobile phones, people are increasingly reaching for the digital world, not realising what the consequences of using mobile phones in public places may be [3, 5, 29]. From the point of view of road traffic safety, mobile phones can influence and disrupt correct visual perception, and thus make it difficult to assess safe road crossings.

Over the last decade, there have been many scientific publications confirming the danger in road traffic resulting from the use of mobile phones by drivers and pedestrians [2, 16, 19]. Calling, sending text messages or messages on social networks distracts the driver's attention while driving, and at the same time, significantly increases the risk of a road accident [1, 4, 8].

Using a mobile phone while driving is illegal in most countries of the European Union. Given that when writing an SMS, the driver must look away from the road towards the mobile phone screen and at the same time take his hands off the steering wheel to write or read a message, it is especially dangerous to send messages [10, 11, 18]. For the safety of travellers and other road users, car manufacturers equip vehicles with hands-free kits that enable mobile phones to be connected to vehicle systems [7, 9, 20]. In recent years, researchers have been increasingly interested in the analysis of pedestrian behaviour when crossing pedestrian crossings. Pedestrians who use mobile phones, listen to music or talk on the phone are at higher risk when crossing the road.

In previous research [22, 25], it was shown that distraction increases the crossing time for pedestrians and increases the risk of crossing the crossing. Using data from field observations, logistic regression models were built to analyse the impact of phone use on pedestrian behaviour at crosswalks at uncontrolled intersections. In other papers [21, 27], the authors observed that pedestrians walk more slowly and pay less attention to the surrounding traffic when crossing the road using phones. In different work [12, 28], the authors suggest that pedestrians using a mobile phone while crossing the road may cross the street without checking for traffic nearby [28].

The number of accidents caused by the use of mobile phones is increasing every year. Using a mobile phone is dangerous for both pedestrians and drivers. Pedestrians are so fascinated by what they see on their mobile phone screens that they do not pay attention to what is happening on the street. It is common to observe pedestrians walking in an unknown direction with their heads in mobile phone screens [13, 17]. This is especially dangerous when crossing the road after a pedestrian crossing. Pedestrians looking at mobile phone screens perceive the movement of the vehicle only out of the corner of their eyes. Police accident statistics show that this type of practice leads to an increase in pedestrian mortality at intersections [14, 24]. Pedestrians account for the majority of road fatalities. In 2019, about 7,000 pedestrians were hit and 780 people died. The purpose of reducing such accidents is special pedestrian traffic light markings. You can find solutions that illuminate the pavement in accordance with the traffic lights or sound signals informing pedestrians to put away their mobile phone. [6, 14].

## 2. Use of mobile phones by pedestrians

The survey was conducted at the Kielce University of Technology at the Faculty of Motor Vehicles and Transport on October 15, 2021 – September 1, 2022. The completed research confirmed that pedestrians walking on the street and using pedestrian crossings often use mobile phones. The study involved 451 women and 369 men. The largest group, 342 people, were people aged 18–25. Additionally, 231 people aged 26–35, 158 people aged 36–45, 57 people aged 46–60 and 32 people over 60 took part in the study. It should be noted that 100% of the respondents had a mobile phone with Internet access [6].

In one of the questions, the respondents were obliged to indicate the activities they most often perform using a mobile phone. The survey data shows that most often the respondents use their mobile phone to browse social media (97.68%) and talk on the phone (97.44%). It should be noted that 55.49% of respondents use a mobile phone to browse e-mail and 57.93% of respondents watch movies or TV series. The characteristics of the respondents in terms of activities related to the use of a mobile phone are presented in Figure 1. The analysis of the respondents' answers by gender is presented in Figure 2. It should be noted that women (99.33%) more often than men (95.66%) use the phone and browse social media. On the other hand, using a mobile phone, 64.50% of men and 48.12% of women check e-mail. Women are more likely than men to use a mobile phone to take photos and videos, use mobile applications, and browse websites and read news.

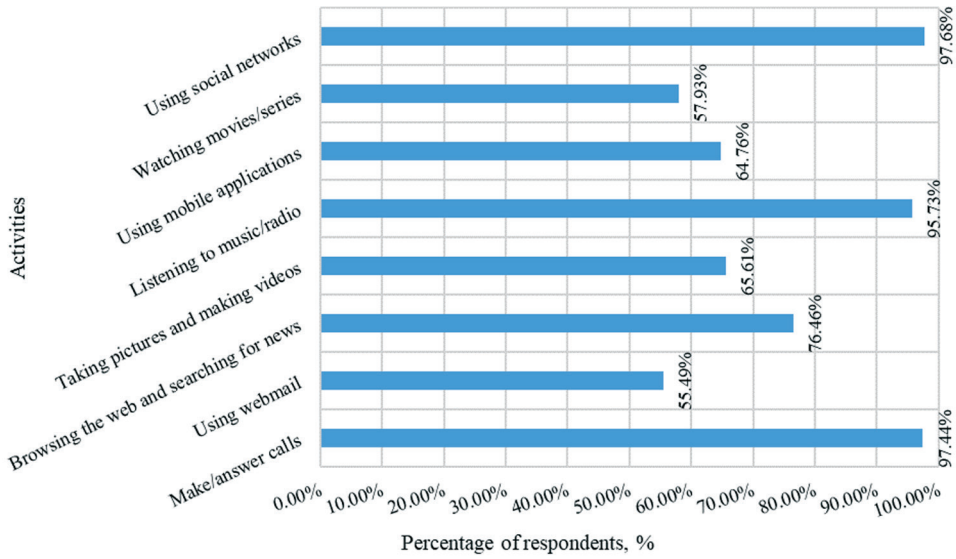


Fig. 1. Phone usage by respondents

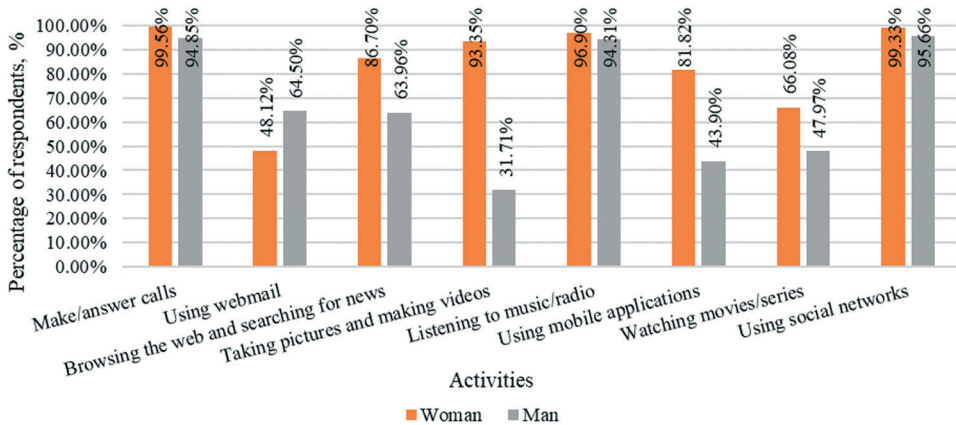


Fig. 2. Phone usage by respondents including gender

In the next question, respondents were asked to indicate the main purpose of using a mobile phone. The characteristics of the main purpose of using the mobile phone by the respondents are presented in Figure 3. Women [19.73%] more often than men [16.26%] use the phone to contact friends. Women contact their family more often than men and commonly use it for entertainment purposes. As many as 28.18% of men indicate business goals and 8.94% educational goals as the main purpose of using a mobile phone. Men [16.80%] use their mobile phones to play games more regularly than women [9.53%].

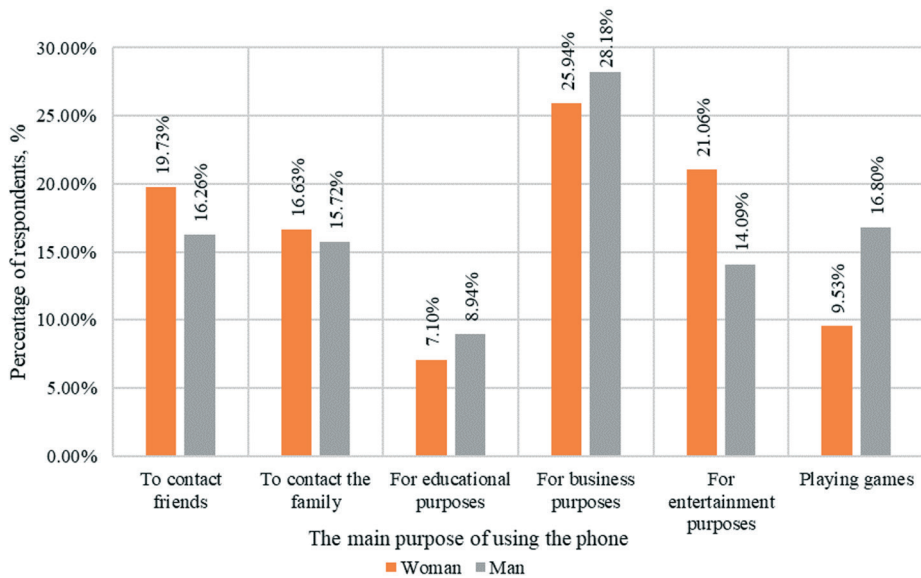


Fig. 3. Characteristics of the main purpose of mobile phone use by respondents

The collected data shows that the duration of mobile phone use is related to the gender of the respondents. Men use the phone longer than women. The largest group are people using the phone from three to four hours a day. This group includes 37.25% women and 32.25% men. Figure 4 shows the characteristics of respondents in terms of time of mobile phone use.

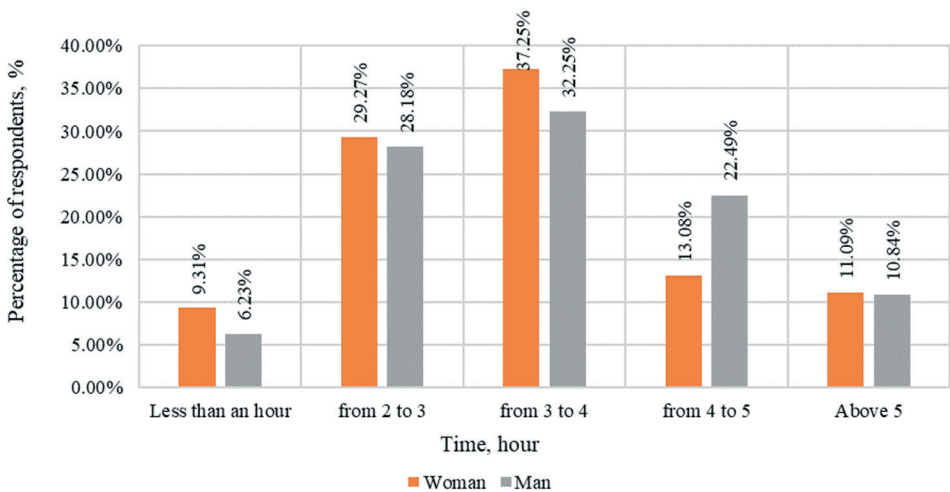
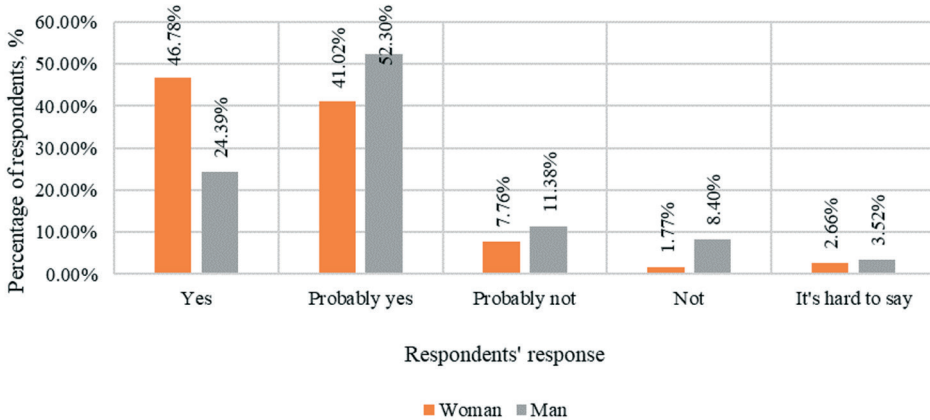


Fig. 4. The duration of respondents' mobile phone use

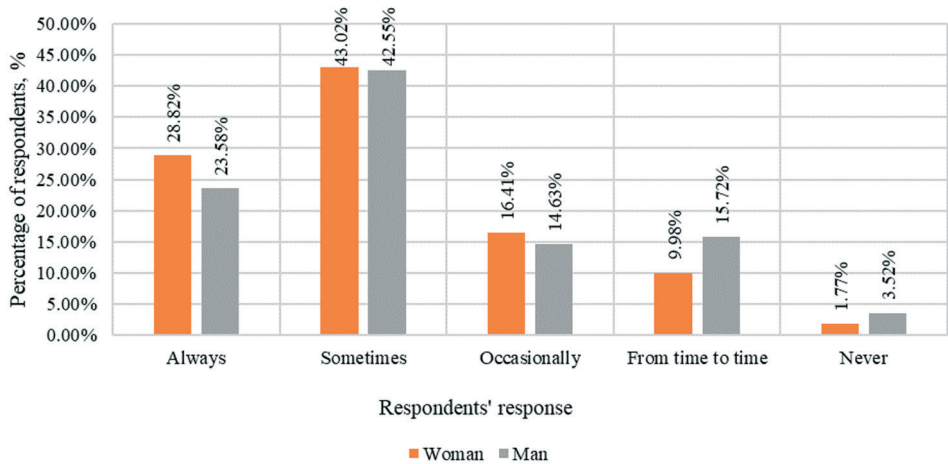
### 3. The behaviour of pedestrians moving on the street or pavement

It should be noted that as many as 46.78% of women and 24.39% of men use a mobile phone when moving on the street or pavement. It is likely that 41.02% of women and 52.30% of men use a mobile phone when walking on the street or pavement. Moreover, it should be noted that 41.02% of women and 52.30% of men answered that they probably use a mobile phone while moving on the street or pavement. Gender-specific characteristics of respondents in terms of mobile phone use when moving on the street or pavement are presented in Figure 5.



**Fig. 5. Gender-specific characteristics of respondents in terms of mobile phone use when moving on the street or pavement**

Frequency of use of a mobile phone when moving on the street or pavement by respondents by gender, are presented in Figure 6. When moving on the street or pavement, as many as 28.82% of women and 23.58% of men always use a mobile phone. Sometimes, 43.02% of women and 42.55% of men use a mobile phone while moving on the street or pavement, while 16.41% of women and 14.63% of men occasionally use the phone. From time to time, 9.98% of women and 15.72% of male respondents use the phone when moving on the street or pavement. Only 1.77% of women and 3.52% of men do not use a mobile phone when moving on the street or pavement.



**Fig. 6. Frequency of use of a mobile phone when moving on the street or pavement by respondents' gender**

It should be noted that when moving on the street or pavement, as many as 89.80% of women and 77.78% of men talk on the phone, 93.35% of women and 62.06% of men write text messages or messages on social networks, 83.15% of women and 47.97% of men browse social networks, 55.88% of women and 29.54% of men listen to music and 26.39% of women and 40.65% of men watch videos from the Internet. Current mobile smartphones have many possibilities. Respondents most often use a mobile phone to make calls and write SMS and messages on social networks. In addition, it should be noted that women are more likely than men to use a mobile phone for conversations, listening to music writing text messages and browsing social networks. Actions performed by respondents on a mobile phone while moving on the street or pavement are presented in Figure 7.

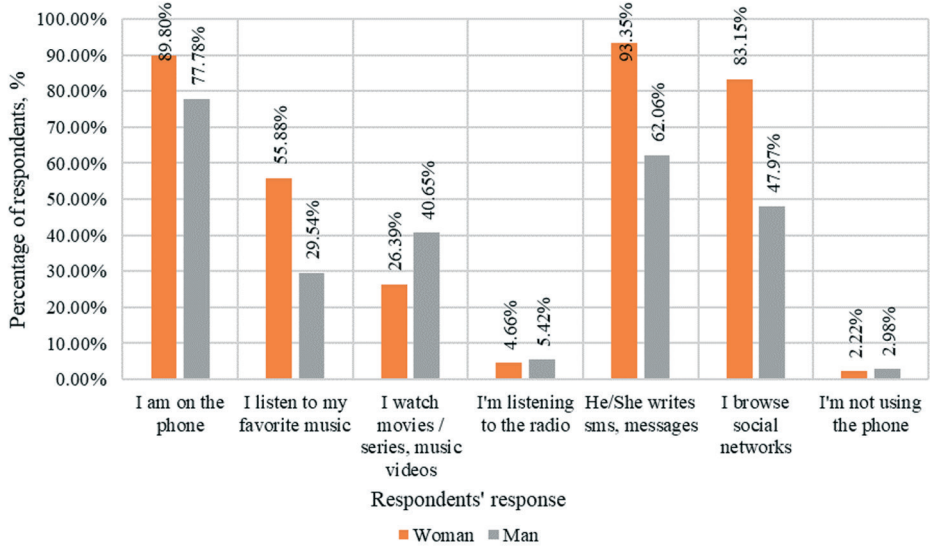
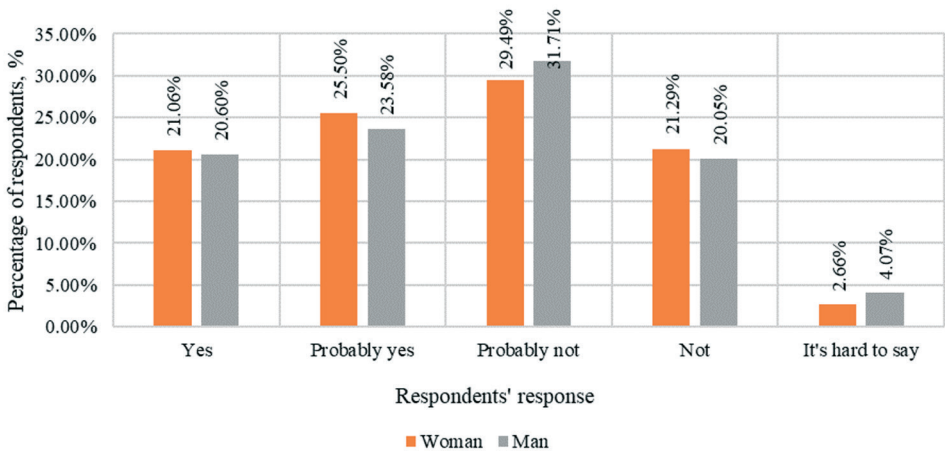


Fig. 7. Actions performed by respondents on a mobile phone while moving on the street or pavement

#### 4. Behaviour of pedestrians crossing a pedestrian crossing

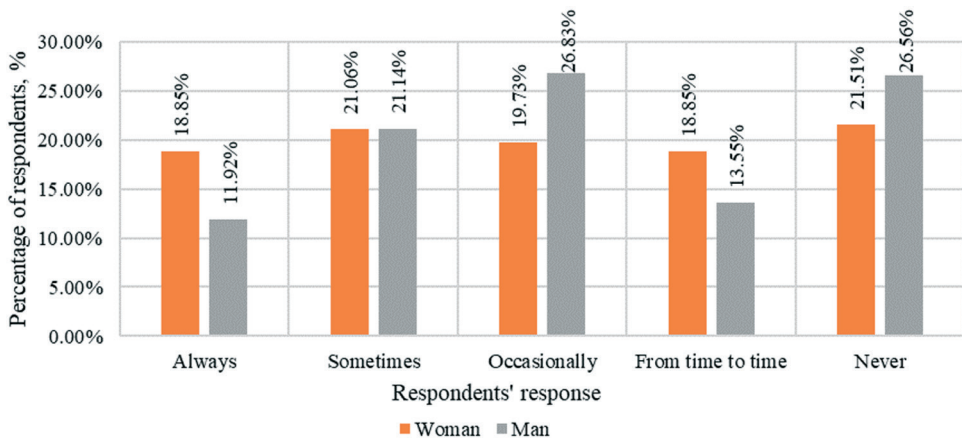
According to Polish road traffic law, the use of a mobile phone while crossing pedestrian crossings is subject to a monetary penalty. It should be noted that 21.29% of women and 20.05% of men definitely do not use a mobile phone when crossing a pedestrian crossing, probably do not use the phone as many as 29.49% of women and 31.71% of men. It should be emphasised that despite the possibility of receiving a penalty ticket, as many as 25.50% of women and 23.58% of men probably use the phone when crossing a pedestrian crossing. It should be noted that 21.06% of women and 20.60% of men respondents declare that they use the phone when crossing a pedestrian crossing. The gender-specific characteristics of respondents in terms of mobile phone use when crossing a pedestrian crossing are shown in Figure 8.





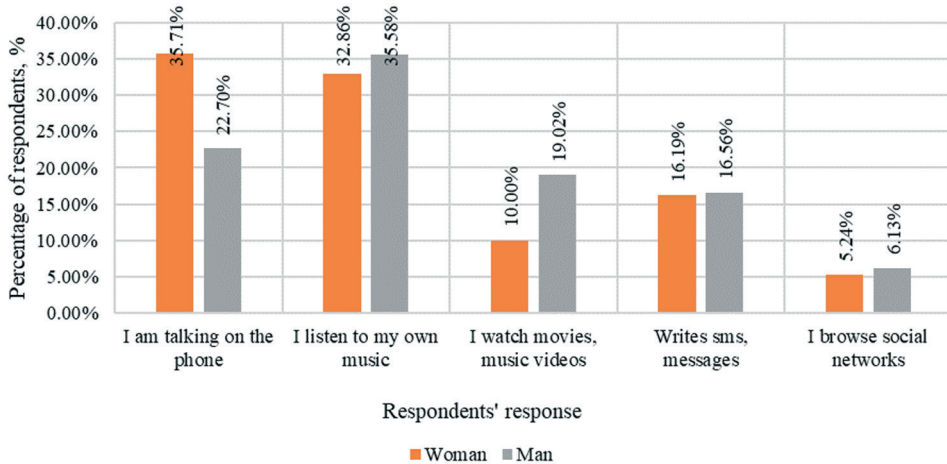
**Fig. 8. Gender-specific characteristics of respondents in terms of mobile phone use when crossing a pedestrian crossing**

When crossing a pedestrian crossing, 18.85% of women and 11.92% of men always use a mobile phone. A total of 21.06% of women and 21.14% of men sometimes use a mobile phone when crossing a pedestrian crossing. From time to time, 18.85% of women and 13.55% of men use a mobile phone when crossing a pedestrian crossing. Occasionally, 19.73% of women and 26.83% of men use a mobile phone when crossing a pedestrian crossing. Only 21.51% of women and 26.56% of men never use a mobile phone when crossing a pedestrian crossing. The frequency of mobile phone use by respondents when crossing a pedestrian crossing is shown in Figure 9.



**Fig. 9. Frequency of mobile phone use by respondents when crossing a pedestrian crossing**

Among respondents who use mobile phones while crossing a pedestrian crossing, 32.86% of women and 35.58% of men listen to music most often, 35.71% of women and 22.70% of men talk on the phone, 16.19% of women and 16.56% of men text or message on social networks, 10% of women and 19.02% of men watch videos and 5.24% of women and 6.13% of men most often browse social networks. Actions most frequently performed on a mobile phone by respondents when crossing a pedestrian crossing, are presented in Figure 10.



**Fig. 10. Actions most frequently performed on a mobile phone by respondents when crossing a pedestrian crossing**

## 5. Observation of pedestrians crossing a pedestrian crossing in terms of mobile phone use

In order to check the credibility of the surveys, observational studies were performed at the Department of Motor Vehicles and Transport at the Kielce University of Technology at the intersection connecting Warszawska Street with Pocieszka Street in Kielce. Observations were performed from 8:00 am to 12:00 pm and from 2:00 am to 4:00 pm. The observational studies aimed to identify people using a mobile phone while crossing a pedestrian crossing. The research was conducted on working days (Monday and Wednesday) at the same time of day.

The results of pedestrian behaviour observations are presented in Table 1. During the observational research over two days, there were a total of over 5,680 people at all pedestrian crossings. The first day, there were 2,854 people, and on the second day, there were 2,826 people. Observational studies have confirmed that a large part of Kielce's inhabitants often passes through selected intersections every day. Among these people, as many as 1,241 used

a mobile phone. Three times of day were selected for observation. The first time of the day from 8 am to 10 am, when most people start work. The second time of the day from 10 am to 12 pm, when there is usually a breakfast break at work and the third time from 2 pm to 4 pm when people come home from work.

It should be noted that as many as 10% of people crossing the pedestrian crossing used a mobile phone. On the first day of the first measurement period, 632 people passed through pedestrian crossings, among them as many as 156 (24%) with a mobile phone. It should be noted that the most people with a mobile phone were observed at pedestrian crossing number 2 (51 people), and the least at pedestrian crossing number 4 (23 people). On the second day in the first measurement hour, 652 people passed through pedestrian crossings, among them as many as 163 (25%) with a mobile phone. It should be noted that the most people with a mobile phone were observed at pedestrian crossing number 2 (48 people), and the least at pedestrian crossing number 1 (23 people).

The research carried out on the first day in the second measurement period showed that a total of 657 people passed through the observed pedestrian crossings, among them as many as 175 (26%) with a mobile phone were distinguished. It should be noted that the most people with a mobile phone were observed at pedestrian crossing number 2 (55 people), and the least at pedestrian crossing number 1 (33 people). On the second day of measurement, 756 people passed through pedestrian crossings, among them as many as 219 (25%) with a mobile phone. It should be noted that the most people with a mobile phone were observed at pedestrian crossing number 2 (68 people), and the least at pedestrian crossing number 1 (28 people).

On the first day of the third measurement season, 934 people passed through pedestrian crossings, among them as many as 301 (32%) with a mobile phone. It should be noted that the most people with a mobile phone were observed at pedestrian crossing number 2 (96 people), and the least at pedestrian crossing number 4 (43 people). On the second day in the third measurement season, 808 people passed through pedestrian crossings, among them as many as 228 (28%) with a mobile phone. It should be noted that the most people with a mobile phone were observed at pedestrian crossing number 2 (82 people), and the least at pedestrian crossing number 4 (39 people).

**Table 1. Observation results**

First measurement day						
Observation time	Number of pedestrians	Pedestrian crossing number				SUM
		1	2	3	4	
8:00 am – 10:00 am	without phone	158	211	163	100	632
	with phone	39	51	44	23	156
10:00 am – 12:00 pm	without phone	131	226	188	112	657
	with phone	33	55	51	37	175
2:00 pm – 4:00 pm	without phone	262	334	215	123	934
	with phone	82	96	80	43	301
Second measurement day						
Observation time	Number of pedestrians	Pedestrian crossing number				SUM
		1	2	3	4	
8:00 am – 10:00 am	without phone	122	220	182	128	652
	with phone	31	48	45	39	163
10:00 am – 12:00 pm	without phone	152	255	202	147	756
	with phone	28	68	65	58	219
2:00 pm – 4:00 pm	without phone	199	289	232	88	808
	with phone	42	82	65	39	228

## 6. Conclusions

It should undoubtedly be noted that a pedestrian remains without any protection during a road accident with a vehicle. According to the Polish road traffic law, pedestrians have the right to cross the road in front of oncoming vehicles. However, you should always remember the principle of limited trust. Pedestrians crossing the road in the designated place must be extremely careful. When crossing the road, pedestrians are obliged to use marked crossings. It should be emphasised that pedestrians crossing the street are obliged to observe the surroundings and react to possible threats and the situation with vehicles. In a situation where a person crossing the road is talking on the phone or concentrating on the phone screen, they are not able to react in time to a potential threat.

Despite changes in Polish traffic law regarding the use of cordless telephones by pedestrians crossing the road, it is still common to meet pedestrians with phones in their hands. Studies have shown that the mobile phone accompanies us in all areas of life, including when crossing the street. Men use mobile phones longer than women during the day, but they also use them less often when walking on the street or pavement and when crossing overpasses. However, observation of four crossings showed that about 22–37% of pedestrians use mobile phones when using crossings. Perhaps this is due to the fact that at such an intersection, traffic lights coordinate the movement of pedestrians and vehicles, which reduces pedestrian caution.

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