

Research Article

# Exploring the Pedestrian's Behaviors in Crossing the Street Based on Gender

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## Abstract

**Background:** Pedestrians are at high risk of traffic accidents in urban areas. Difference in gender can influence pedestrians' behavior in crossing the street. This research aims to explore the behavior of pedestrians crossing the street based on their gender, Kerman, Iran.

**Materials and Methods:** A total of 403 pedestrians were observed when crossing the street. The data were collected through a check list by a trained observer. Factors such as adherence to traffic lights, waiting before crossing, running across the road, and looking before crossing were examined. Statistical analyses of pedestrians' behavior were carried out using the Chi-Square test. The analytical results were considered to have a significant level of 0.05.

**Results:** About half of the observed subjects 54.3% (n=219) crossed the street within the marked lines. These behavior were 52.1% (n=135) among male and 58.3% (n=84) among female. Approximately half of the observed pedestrians, 49.1% (n=198), were distracted in some way. Among them men were found to be more distracted than women (64.3%, vs. 35.7%, p=0.21 respectively). Men were observed to be more likely to run when crossing the street than women (27.1%, vs., 13.3%, p=0.001).

**Conclusions:** Female pedestrians behave more carefully than males. Therefore educating population sounds very necessary, with higher stress and enforced in men. Also, if it is the case, the results might be useful to policy makers to review the adequacy and efficiency of rules and regulation regarding pedestrian behaviors over crossing the road.

**Keywords:** Gender Role; Behavior; Accidents

## Introduction

Car accidents are a leading cause of death across the nations. Iran is a Middle Eastern country and very prone to disasters and accidents. Iranians have a very high rate of traffic accidents: based on estimates, about 30,000 Iranians die because of traffic accidents annually [1]. In 2010-2011, pedestrians had the highest rate of death in traffic accidents (28%) in Iran [2].

In developed countries, drivers are most at risk of traffic injuries. However in developing countries, a high percentage of traffic accidents involving pedestrians occur, with a death rate of 55-57% in urban pedestrians [3]. Most crashes occur when pedestrians are crossing the street [4]. Either their risky behaviors or their inattention to traffic rules are the main causes of the accidents [4]. Previous studies have addressed a number of behavioral factors in relation to the occurrence of accidents. These factors include ignorance of traffic lights, crossing the street on an unmarked roadway, uncertainty or delay in crossing the road, running while crossing the road and pedestrians' inattentiveness [4-6]. Accidents due to inattentive behaviors of pedestrians are usually caused by multi-tasking while crossing the street, such as speaking on a cell phone, carrying loads, eating, speaking with others, and using headphones [5,7,8].

Gender is also a determining factor in car accidents. Based on the literature, accidents involving men occur at a higher rate than

women. This leads to higher figures of death and injuries among men. However it is worth mentioning that a small number of studies report higher risky behaviors among women in crossing the road [9].

Gender difference could explain different behaviours among male and females; females are more risk averse while males tend to take greater risks [10]. Men are also shown to violate traffic rules more often than women. For example, they are more likely not to pay attention to traffic lights or to avoid crossing the road at the designated places. In addition to this, a lower frequency of accidents among women might be due to the issue that traffic rules are more internalized in females than in males [11]. Social determinants and norms make a considerable contribution in shaping this difference among males and females [12].

It has been shown that women's behavior in crossing roads can be influenced by the presence and behavior of other pedestrians. In male pedestrians, the volume of traffic and physical conditions are determining factors for crossing behavior [12]. Although gender difference is an important factor in explaining the pattern of accidents [13], exploring the pedestrians' behavior based on gender difference has been given inadequate attention in developing countries.

For this reason, this study explores pedestrians' behavior while crossing the street in Kerman, Iran.

## Materials and Methods

This is a cross-sectional study which has been carried out in the city of Kerman, Iran, in 2013-2014. Kerman is located in the south-east of Iran, the largest province of Iran. We used a behavioral observational approach to explore the pedestrians' behavior when crossing the street.

A total of 403 pedestrians were observed when crossing the street in marked crosswalks at signalized intersections. In this investigation, four main intersections were chosen.

In this study an observational checklist was used as a data-gathering instrument. The checklist included factors which could affect a pedestrian's safety such as adherence to traffic lights, rushing into the street with no hesitation, running across the road, and looking to the right and left before and during crossing. Moreover, distraction factors such as using a mobile phone, talking with other pedestrians, smoking, eating, drinking, carrying objects, and uncertainty were explored.

The data were collected by a trained observer. Prior to data collection, to examine the reliability of the method, a pilot study was carried out. At the pilot, two separate observers observed the behavior and filled out the checklist. A high level of consistency between these observers was found. Data were collected in the morning and afternoon in summer, and took 6 weeks.

Statistical analysis was done using SPSS version 16. Analyses of pedestrians' behavior based on gender were carried out using the  $\chi^2$  test. The analytical results were considered significant with a level of 0.05. The results are presented in two main groups: positive behaviors and negative behaviors.

## Results

A total of 403 pedestrians were observed. Over half of the subjects were men (64.3%, n=259). Findings when comparing the results between men and women are presented in Table 1.

### Positive behaviors

About half of the observed subjects 54.3% (n=219) crossed the street within the marked lines. These behavior were 52.1% (n=135) among male and 58.3% (n=84) among female, but this difference was not statically significant.

**Table 1:** Pedestrians' behaviors when crossing at intersections, based on gender difference.

	Percent (Frequency)		p-value
	Male	Female	
Regarding traffic light	32(83)	43.8(63)	<b>0.02</b>
Crossing within marked lines	52.1(135)	58.3(84)	<b>ns*</b>
Waiting before crossing	32.4(84)	47.2(68)	<b>0.003</b>
Looking before crossing	81.9(212)	87.5(126)	<b>ns</b>
Looking while crossing	91.1(235)	91.7(132)	<b>ns</b>
Running while crossing	27.1(70)	13.3(19)	<b>0.001</b>
Stepping backwards	8.1(21)	9.7(14)	<b>ns</b>
Changing direction while crossing	62(160)	52.8(76)	<b>0.07</b>
Uncertainty in crossing	32.9(85)	40.3(58)	<b>ns</b>

(\*ns; non-significant)

Looking left and right before crossing the street was observed in 84% (n=338) of pedestrians; with a non-statistical significantly higher rate in females (87.5%, n=126) vs. (81.9%, n=212) in males.

The average figure for left-right head movement for all pedestrians during the crossing to check for oncoming vehicles was  $3 \pm 1.32$  (min=1, max=9).

Pedestrians respected the traffic lights only 36.3% of the time, where women respected the traffic lights at a higher percentage than men (male 32% vs. female 43.8%, p=0.02).

### Negative behaviors

Approximately half of the observed pedestrians, 49.1% (n=198), were distracted in some way (Table 2). Among them men were found to be more distracted than women (64.3%, vs. 35.7%, p=0.21 respectively).

Carrying luggage, talking with other people and using mobile phones were the main causes of distraction (36.8%, 34.2% and 20.1% respectively), and there was no statistical significance between men and women (p=0.1).

A small percentage of observed pedestrians stepped back suddenly while they were crossing the road 8.7% (35), and the figures were similar for men and women (8.1% vs., 9.7%) respectively.

Additionally, men were observed to be more likely to run when crossing the street than women (27.1%, vs., 13.3%, p=0.001).

## Discussion

This study highlighted the fact that pedestrians pay inadequate attention to rules and safety considerations when crossing the street. In developing countries, poor enforcement of traffic law is a serious problem with regards controlling the rate of accidents. This is discussed in the literature as owing to a scarcity of resources, corruption and incompetence within administrative systems.

Furthermore, we found that men have higher risk behaviors. For example, men are less likely to respect traffic lights, which is corroborated in other studies [11,12,14,15]. Additionally, men were observed rushing into the street carelessly more frequently than women. The results also include running at the marked crosswalk as a risky behavior [5], observed again at higher rate in males. This finding is in agreement with Tom's findings (2011), which show that running during crossing on signalized places is more common among men [13].

**Table 2:** Distracted behavior observed in males and females when crossing the street.

Distracted	Male Frequency (n=120)	Valid percent	Female Frequency (n=78)	Valid percent
Eating	6	5	2	2.5
Drinking	3	2.5	4	5.1
Talking	34	28.3	33	43
Using Headphones	1	0.8	0	--
Smoking	2	1.7	0	--
Using Mobile Phones	29	24.2	11	13.9
Carrying objects	45	37.5	28	35.5

Human behaviors are affected greatly by social roles, pressures, values and norms. Differences in risky behavior among men and women could be partly explained by the differing effects of these social factors on men and women [13]. Men are more prone to risk taking while women are more risk averse. Indeed, men are encouraged to take risks and women are encouraged to avoid risk [10]. Hence, a possible explanation for risky behaviors such as running while crossing the street might be because males generally demonstrate a higher level of risk-taking behavior compared with females [11,12].

Higher compliance of female pedestrians to traffic rules can be explained by the idea that social behavior and relationships are considered crucial among females. As a result they have a higher level of concern and motivation for the practice and upkeep of social behavioral values [11]. Also, this social pressure can lead to greater internalization of traffic rules in females than in males [12].

As human beings are social creatures, many of our behaviors could be shaped by other people's presence. When pedestrians walk in groups, their behavior differs from when they are alone. Members of groups interact with each other and are influenced by each other [16]. Therefore, pedestrians' behavior can be influenced by others who might have a different degree of risk aversion when crossing the road. This could be important, particularly among women, because women are more easily influenced by the presence and behavior of other pedestrians [13]. It is shown that females' behavior is more often affected by the presence of other people at the intersection while they are waiting to cross the street [12]. However, we should be bear in mind that men will also behave differently when they are in a group; in a study by Granié (2011), men are more prone to waiting before crossing than women only when they are alone [11].

Another social factor which could influence people's behavior is their social role. In many societies, particularly traditional ones, men tend to be the breadwinners. In the archetypal Iranian family, working out of the home is mainly a social role for men. Male pedestrians, because of this role, are out in the streets at a greater rate and more often in a hurry than female pedestrians, especially in the morning on their way to work. Forsythe and Berger (1973) showed that being in a hurry could be the main reason for non-compliance to traffic lights in men [17]. In addition to this, the speeding up of social life in most societies has long been known as an important factor for hastiness [18].

In our study the level of distraction among pedestrians when crossing the street was not different based on gender. This finding is in agreement with similar study which showed there are no significant differences in distracted behavior based on gender [4].

We acknowledge that there are limitations with our study. First, if we had more information such as other demographic variables, and the reasons for pedestrians' behaviors, we could give a more comprehensive picture of the problem. In addition, because of the complexities of investigating behavioral factors, qualitative research as well as the quantitative approach is required for a deeper understanding.

Despite all the limitations that accompany this study, this study is among a very small set of studies conducted on pedestrian behaviors in developing countries. This group is at a high risk of road accidents

and the results could trigger more multidisciplinary studies to get to the root of the problem, and hopefully to implement effective interventions.

## Conclusion

Gender stereotypes are determined based on different social and cultural factors. Men are found to perform more risky behaviors when crossing a road. These results might be useful to policy makers to review the adequacy and efficiency of rules and regulation regarding pedestrian behaviors over crossing the road. Moreover, these differences could be taken into account when adopting appropriate policy in future. Also, because of the complexities of investigating behavioral factors, qualitative research to accompany the quantitative approach is recommended in order for us to gather a deeper understanding of the issue.

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