



ELSEVIER

Contents lists available at ScienceDirect

## Journal of Transport &amp; Health

journal homepage: [www.elsevier.com/locate/jth](http://www.elsevier.com/locate/jth)

## Pedestrian environment and behavior in Lahore, Pakistan

Khurram Shahid Minhas<sup>a,\*</sup>, Zahara Batool<sup>b</sup>, Bilal Zia Malik<sup>b</sup>, Irum Sanaullah<sup>c</sup>, Tahir Ali Akbar<sup>d</sup><sup>a</sup> Department of Civil Engineering, Imperial College of Business Studies, Shahkam Chowk, Canal Bank Road Lahore, 54000, Pakistan<sup>b</sup> Department of Transportation Engineering, University of Engineering and Technology, G.T. Road Lahore, 54000, Pakistan<sup>c</sup> Department of Transportation Engineering and Management, University of Engineering and Technology, Lahore, Pakistan<sup>d</sup> Urban Unit, Government of Punjab, India

## ARTICLE INFO

## Keywords:

Pedestrian behavior  
 Pedestrian safety  
 Pedestrian crossing  
 Pedestrian mobility

## ABSTRACT

In 2015 out of total road traffic crashes in the metropolitan city of Lahore, 25% fatalities involved pedestrians. In 2016 almost forty-five thousand crashes took place in the city. Seventy percent of victims from these crashes were rendered unstable, 55% involved motorcyclists, bicyclists and pedestrians, 25% were related to over-speeding and 10% each for underage and distracted drivers. City Traffic Police attributes this high rate of pedestrian deaths to their unsafe walking behavior, especially at busy intersections. This study was carried out in an attempt to understand and investigate existing side-walking and road-crossing behavior of pedestrians at intersections in the second most populous city of Pakistan. This study also investigated the behavior of drivers with respect to pedestrians at intersections. For this purpose, 1040 pedestrians and 974 drivers were observed through video recordings at eight different intersections and differences in side-walking and road-crossing behavior was investigated based on their gender, age group, land-use characteristics of the neighborhood and according to the presence of traffic signal at the intersection. Driver behavior with respect to pedestrians was also investigated for the same factors excluding land-use characteristics of the neighborhood. Children and older pedestrians showed significantly different behavior in contrast to adolescent and middle-aged pedestrians. Results showed that pedestrians' behavior was safer at sites located in more highly developed commercial areas and higher-income residential neighborhoods. Driver behavior was safer at intersections where the traffic signal was present. Driver behavior differed by gender and age group.

## 1. Introduction

Road safety literature agrees that pedestrians' safe mobility is associated with human behaviors, general or situational factors, and factors connected with infrastructure (Sucha, 2014). The literature informs that choice of crossing place, non-compliance at designated crossings, crossing speeds, pedestrian alcohol consumption, and failure to attend to traffic are the factors that can increase the risk of road traffic collisions (Martin, 2006). With reference to choice of crossing place, signalized crossings are considered the safest as drivers are more likely to give way to pedestrians at formal crossings.

Pedestrian collisions not only occur due to negligent behavior by pedestrians but the poor interaction between pedestrians and drivers. For instance, pedestrians are likely to cross the road when it suits them, in terms of convenience and saving time rather than thinking of potential safety implications (Martin, 2006). The literature about communication between pedestrians and drivers and its

\* Corresponding author.

E-mail addresses: [enr.khurramshahid@gmail.com](mailto:enr.khurramshahid@gmail.com) (K.S. Minhas), [zaharabatool14@gmail.com](mailto:zaharabatool14@gmail.com) (Z. Batool), [bilalziamalik@gmail.com](mailto:bilalziamalik@gmail.com) (B.Z. Malik), [irumsanaullah08@gmail.com](mailto:irumsanaullah08@gmail.com) (I. Sanaullah), [tahiraliakbar@yahoo.com](mailto:tahiraliakbar@yahoo.com) (T.A. Akbar).

<http://dx.doi.org/10.1016/j.jth.2017.08.013>

Received 22 March 2017; Received in revised form 25 August 2017; Accepted 31 August 2017

2214-1405/© 2017 Elsevier Ltd. All rights reserved.

influence on pedestrians' safety informs that the likelihood of a driver giving precedence increases if information about the pedestrian's intention is increased by way of the combination of various forms of signs. A study concluded that while almost none of the drivers gave precedence at a zebra crossing when the pedestrian just stopped at the curb and looked at the approaching drivers, 31% stopped or slowed down when the pedestrian looked at the driver, put his foot on the carriageway, and made a hand sign that he was about to cross (Šucha, 2014).

Road safety literature has also documented the influence of demographic characteristics on pedestrians' behavior. It is widely demonstrated that pedestrian collisions involve more males than females and proportionally younger people than older people. A possible explanation is that women are less likely to run and cross the street than men and they seem to perceive more risk so as the case with older pedestrians (Holland and Hill, 2007). For instance, studies have shown that young people (aged between 17 and 25 years) and especially young males are more likely to cross the road at unmarked crossings. Likewise, children, particularly teenagers, perform a number of potentially unsafe behaviors (Elliott et al., 2003). However, for complex traffic situation, studies have demonstrated that older pedestrians' road-crossing behavior can be less safe than their younger counterparts (Oxley and Day, 1995).

The type of land-use e.g. shopping or residential is also found to influence pedestrian behavior. The likelihood of a crash rises in proportion to the socio-economic activity in the area (Šucha, 2014). For instance, higher pedestrian collision risk is associated with shopping land-use (Summersgill and Layfield, 1996).

In Pakistan, a high proportion of pedestrians' deaths in road crashes are attributed to bad road etiquette including drivers not giving right of way to pedestrians, inadequate pedestrian walkways, lack of traffic control on many intra-city intersections, encroachment of sidewalks due to commercial activities and placement of garbage and garbage collection containers. It is argued that not only pedestrians' mobility recognition is overlooked in the country, but when provided, pedestrians do not make appropriate use of pedestrian facilities (Batool et al., 2012; Randhawa, 2016; Zia et al., 1999). There has been a decline of 11% in walking trips in Lahore which was 51% in 1999 and dropped to 40% in 2010 (JICA, 2012). The city was reported to have 81% zero car owning households in 2010 and these were projected to be 56% in 2030 (JICA, 2012). For a city with such large percentage of zero car owning households, this decline in walking trips should be taken as a serious concern. Road safety situation in the city is also getting worse with 6.7% rise in traffic crash deaths from 2015 to 2016 (Shahzad, 2016). From 1st January to 24th December 2016 traffic authorities reported more than forty-five thousand crashes in the city. Seventy percent of victims from these crashes were rendered unstable, 55% involved motorcyclists, bicyclists and pedestrians, 25% were related to over-speeding and 10% each for underage and distracted drivers (Shahzad, 2016).

### 1.1. Objectives

The objectives of this study were to investigate:

- i. comparison of side-walking and road-crossing behaviors with respect to gender, age group, land-use of neighborhoods, and the presence of traffic signal at an intersection.
- ii. comparison of behavior of drivers with respect to gender, age group and the presence of traffic signal at an intersection.

## 2. Materials and methods

### 2.1. Study locations

Eight different intersections were selected based on different land-uses of their neighborhoods. Characteristics of these locations are presented in Table 1.

**Table 1**  
Characteristics of locations.

Sr.	Site location	Land-use type	Traffic light signal	Pedestrian signal	Zebra crossing	Side-walk and percentage encroachment
1	Mall Road	Commercial with high development	Yes	NA	Yes	Yes (20% encroached)
2	Urdu Bazar	Commercial with low development	NA	NA	NA	Yes (100% encroached)
3	New Anarkali	Commercial with medium development	Yes	NA	Yes	Yes (40% encroached)
4	Punjab University	Educational	Yes	NA	Yes	Yes (10% encroached)
5	Shaukat Khanum	Hospital	Yes	NA	Yes	Yes (no encroachment)
6	Defence Housing Authority	Residential with high income	Yes	NA	Yes	Yes (no encroachment)
7	Iqbal Town	Residential with middle income	NA	NA	Yes	Yes (30% encroached)
8	Gulshan Ravi	Residential with low income	NA	NA	NA	NA

NA: Not Available.

Download English Version:

<https://daneshyari.com/en/article/7487080>

Download Persian Version:

<https://daneshyari.com/article/7487080>

[Daneshyari.com](https://daneshyari.com)