

Evaluation of Medico-Legal Implications and Other Important Issues in Pedestrians Who Got Admitted to a Tertiary Care Hospital in Colombo District Following Road Traffic Injuries in 2018-2020

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Abstract

Introduction: The most vulnerable road users are pedestrians. This article discusses important aspects of a few selected medico-legal issues that have received relatively little attention in Sri Lanka thus far.

Methodology: A cross-sectional study was conducted in which 500 patients who were admitted to the Accident Service Unit (ASU) following pedestrian-vehicle collisions between January 2018 and January 2020.

Results: There were 78% (n=391) males among the victims, and the average age of the victims was 47 years. Forty-five percent (n=224) of the incidents occurred between 6 p.m. and 6 a.m., accounting for 71% of the total. Five percent (n=25) of them had encountered an incident while crossing pedestrian lines. Fourteen percent of pedestrians admitted that the accident was their fault. Eight percent (n=39) had insurance coverage, and 54% (n=272) indicated a desire to pursue compensation through litigation. Forty percent (n= 202) correctly identified the court to which they needed to go to obtain compensation. The JMO's (Judicial Medical Officer) role was not well understood, and only 04% (n=19) were aware of it precisely. Fifty six percent sustained grievous injuries and 61% of participants had been referred to other specialities for expert opinions while being treated in the Accident Service Unit (ASU). Eighty-five percent (n=427) of patients underwent surgery, and the majority stated that they were not adequately informed about the surgical procedures before surgery. Six percent (n=29) stated that they were not in pain. There was a statistically significant correlation between age and sex and the severity of the injuries sustained. The time of the accident and the fact that it occurred while crossing the road demonstrated a significant association, whereas alcohol consumption and the fact that it occurred on a pedestrian crossing did not. There was no statistically significant difference in the amount of pain experienced by males and females. When patients reached an advanced age, they became less likely to pursue compensation claims.

Conclusion: The health sector was burdened with a huge number of pedestrian victims upon traffic-related injuries and the majority of victims suffered injuries either grievous or above in categorization of hurt. The knowledge of the service provided by a JMO and the court system was insufficient. Identification of peculiarities among victims helps to minimize casualties by addressing specific aspects.

Keywords: Pedestrian-vehicular collision, traffic injuries in pedestrians, pedestrian crossing, medico-legal practice

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Introduction

Casualties upon collisions between pedestrians and vehicles at ASUs (Accident Service Units) are a

common occurrence. The time spent on pedestrians' medico-legal examinations is substantial. Road traffic injuries are a significant public health problem

that has reached epidemic proportions. In 2019, 24611 people were injured in traffic accidents in Sri Lanka.[1] There have been a few studies performed regarding the injuries sustained by pedestrians in Sri Lanka. And according to the author's understanding, the number is around 8 by which comprehensive details about pedestrians are studied in depth.[2-4] Not only that, the author's experience indicates that when a Judicial Medical Officer (JMO) examines a patient, they discover that the service or role of a JMO is poorly understood by patients and that their knowledge of the court system and compensation mechanisms is also inadequate. Once a patient is admitted to an ASU, he or she may be referred to additional specialities such as orthopaedic, Ear, Nose and Throat (ENT), Eye, OMF (Oral and maxillofacial surgery), and plastic surgery, further overburdening those units. In turn, not only the ASU, but other specialities are also over-burdened, by the patients admitted due to pedestrian-vehicular collisions. If such time could be utilized to treat natural illnesses, it would be much beneficial to the health sector. Given the burden placed on state hospitals by patients injured in motor vehicle accidents, this study sought to describe a few demographic characteristics, as well as the nature of pedestrian injuries and their location of occurrence.

If patients are properly educated about the importance of the examination by a JMO, it will benefit them greatly and will aid in the completion of the medico-legal examination. Knowledge of judicial activities and also of ward activities is critical, particularly when it comes to informed written consent. Pedestrian-related traffic accidents should not be overlooked, as such morbidity and mortality can be reduced with sufficient emphasis. When gaps are identified, they can be used to help prevent traffic accidents.

Methodology

A descriptive cross-sectional study was conducted in which 500 patients admitted to the ASU following pedestrian-vehicle collisions between January 2018 and January 2020 were interviewed by the principal investigator and by the data collectors based on the pre-tested questionnaire. The collected data were analyzed by using IBM SPSS statistics version 23. The definitions and specifications that were considered during the data collection and also during the process of data analysis were described in the relevant sections of the results. Statistical analysis of the frequency distribution, the Chi-square, and two-sample t-test was used with a 95% significance level.

Results

Socio-demographic characteristics of victims

The sample size was N= 500, and 78% (n=391) males and 109 (n= 22) females were included.

The median age of the victims was 48.6 years (SD±17.02). The sample was divided into two age categories considering the age 40 as the demarcation. Patients under the age of 40 were classified as young, accounting for 33% (n=167) of patients, while those over 40 were classified as old, accounting for 67% (n= 333) patients.

Time of the day that the incident occurred

The highest number of incidents, i.e, 45% (n=224) occurred at night, from 6 pm to 6 am, followed by 6 am to 12 noon, 28% (n=140) and 12 noon to 6 pm and it was 27% (n=136).

Alcohol consumption at the time of the incident

Only 20% (n= 101 patients) had consumed alcohol six hours prior to the accident, while the majority (n=399, 80%) had not consumed alcohol (Based on the history and the Bead Head Ticket (BHT) findings).

Place of the accident

The majority (n=383, 77%) had been injured while walking on main roads, followed by byroads (n=62, 12%) and intersections (n=55, 11%) (A road was considered as a 'main road' if it was close to a main city or a town with a higher number of moving vehicles. If a road was situated within a less populated area with a relatively lesser amount of moving vehicles it was considered as a byroad).

Who was responsible for the accident?

Fourteen percent (n=70) of patients accepted that the cause of the accident was their fault, while 55% of patients (n=277) believed that it was the driver's fault and 31% (n=153) were unable to determine who was at fault.

Whether the patient was crossing the road or not at the time of the accident and experiencing of the incident while crossing over a pedestrian crossing Seventy one percent (n=353) of incidents had occurred while crossing the road and 29% (n=147) had occurred while the road was not being crossed. Five percent of the incidents (n= 25) occurred while crossing on a 'pedestrian crossing'.

Possession of an insurance coverage

Only 39 individuals had insurance coverage, while the majority (n=461, n=92%) did not.

Understanding of the judicial system and a desire to pursue legal action

In this section, the knowledge of the patients in relation to the Judicial Medical Officer’s role was assessed, and 51% (n=255) of respondents stated that they were unaware of the role of the JMO or the judicial process. A vague idea was indicated by 30% (n= 147), a neutral response by 10% and 6% (n=30 and 10), and a good knowledge by 4% (n= 19). If they wish to obtain compensation, the type of court to be visited was enquired. Only 40% (n=202) gave the correct response (District court), while 24% (n=120) believed they should go to a magistrate court, which was the incorrect response. Thirty six percent (n=178) of the sample stated that they were unaware of the various types of courts (In this question, only the power vested upon the civil courts to provide compensation for the damages was considered).

The severity of the injuries received

Fifteen percent of individuals (n=73) sustained non-grievous injuries (NG), 57% (n=282) of individuals sustained grievous injuries (G), and 13% (n=65) sustained injuries endangering life (EL). Fatal in the ordinary course of nature (FIOCEN) was identified in 16% (n=80) of patients.

Table 01: Association between the severity of injuries, sex and the age of the individual

	Severity of Injuries				
	NG	G	EL	FIOCEN	Total
	N=73 n (%)	N=282 n (%)	N=65 n (%)	N=80 n (%)	N=500 n (%)
Sex					
Male	65 (89)	249 (88)	50 (77)	27 (34)	391 (78)
Female	08 (11)	33 (12)	15 (23)	53 (66)	109 (22)
Age					
<40	69 (95)	68 (24)	30 (46)	00 (00)	167 (33)
>40	04 (06)	214 (76)	35 (54)	80 (100)	333 (67)

NG= non-grievous, G=Grievous, EL= Endangering life, FIOCEN= Fatal in the Ordinary Course of Nature

There was a statistically significant relationship between the sex and the severity of the injuries sustained, $X^2(3) = 114.68, p=0.000$. The age was also showed a significant association with the severity of injuries, $X^2(3) = 178.402, p=0.000 < 0.05$.

Table 02: Association of the time of the day that the incident took place and whether the victims were on pedestrian crossings

Time of the day	On pedestrian crossings		
	N=500 No n (%)	N=500 Yes n (%)	Total N=500 n (%)
	6 am to 12 noon	126 (26)	14 (56)
12 noon to 6 pm	134 (28)	02 (08)	136 (27)
6 pm to 6 am	215 (45)	09 (36)	224 (45)

While considering the association between the independent variable of time of the day and whether the victim was crossing the road on a pedestrian crossing, there had been a significant association. During the morning hours, more incidents had occurred on pedestrian crossings when compared to other times of the day ($X^2(2) = 11.390, p=0.003 < 0.05$).

Table 03: Association between the status alcohol consumption and the place of incident, i.e. whether the incident occurred while the victim was crossing along a pedestrian crossing or not

Alcohol	On pedestrian crossings		Total N=500 n (%)
	No n (%)	Yes n (%)	
	No	380 (80)	
Yes	95 (20)	06 (24)	101 (20)

The association of alcohol consumption was correlated with the dependent variable of whether the accident occurred while the victim was crossing on a pedestrian crossing or not. There was no significant correlation between alcohol consumption and the occurrence of an incident while crossing the road via pedestrian crossings ($X^2(1) = 0.236, p=0.627 > 0.05$) (Table 03). However, in this study, factors such as age, body weight, association with other diseases, type of food consumed and type of alcohol were not considered.

04. The association between the actions carried out at the time of the incident by the pedestrian and the consumption of alcohol.

Alcohol	while crossing		Total N= 500 n (%)
	while crossing N=353 n (%)	Not crossing N=147 n (%)	
	Not consumed	262 (74)	
Consumed	91 (26)	10 (07)	101 (20)

Though the status of alcohol consumption was not associated with whether the person was crossing the road on a ‘pedestrian crossing’ or not (as illustrated in Table 03), the status of alcohol consumption showed a significant association with whether the person was ‘crossing the road’ or not, $X^2(1)=23.184, p=0.000 < 0.05$.

The degree of pain endured

Patients were given a ten-point scale, with zero representing no pain and increasing pain as the number increased. Six percent (n=29) of patients stated that they were not experiencing pain at the time of the interview (the maximum delay was 48

hours after the accident), while 94% (n=471) of patients stated that they were experiencing some level of pain.

Ward procedures performed during admission and obtaining consent procedure

Before any type of surgery, informed consent is critical, and the information provided before surgery was surveyed. In this context, the patients were first explained about the ideal procedure of providing informed consent for surgical procedures and anaesthesia. Then provided the five options to be chosen as to how they felt about the procedure followed by the staff members. The options that were provided were as follows: strongly disagree, disagree, neutral, in a satisfactory level and strongly agreed.

Eighty-five percent (n=427) of patients had undergone some type of surgery (either with local or general anaesthesia), while 15% (n=73) had not undergone any type of surgery. Eighty-six percent (n=430) of patients stated that they had received some type of information, but it was not satisfactory. Fourteen percent (n=70) of patients reported that they received a neutral and satisfactory amount of information before surgical procedures. The majority had expressed their dissatisfaction with the amount of details provided before the surgery, i.e. 81% (405) and 5% (25) had mentioned that they were not provided with any information before the surgical procedure.

Referring to other specialities

Referrals to other specialties were enquired about, and the majority of patients (61%, n=307) received some form of referral. Thirty-nine percent (n=193) of individuals were not referred to any of the specialities.

Association between experiencing pain and the sex of the patient and desire to pursue legal action

The levels of pain experienced by both males and females were not significant, $t = -24, df = 498, p > 0.05$ (Table 04).

The desire to pursue legal action was dependent on the age of the victim and when patients reached an advanced age, they became less likely to pursue compensation claims, $t = 10.714, df = 498, P < 0.05$.

Table 05: The difference in the means while experiencing pain among both sex and the age of

the victims while considering the desire to pursue a legal action

Characteristic	N=500 n (%)	mean	SD
Pain scale			
Male	391 (78)	7.30	2.58
Female	109 (22)	7.42	1.87
Desire to pursue a legal action			
Desire	272 (54)	55.36	15.16
No Desire	228 (46)	40.54	15.59

Discussion

Pedestrian safety is a required component of health care. Since the first pedestrian fatality was reported in 1899, the epidemiology, patterns, and associated factors have been studied. To avoid pedestrian traffic fatalities, its pattern, as well as other related factors, must be studied. In comparison, a review of the literature revealed that actual emphasis on pedestrian accidents is still lacking.[6] Certain aspects have been highlighted in the Sri Lankan context through research, but pedestrian traffic accidents continue to occur. That is why Sri Lankan JMOs are devoting a large number of duty hours to conducting medico-legal examinations and also testifying in court as medical experts.

Comparing Sri Lankan data to data from other countries requires caution due to existing differences in infrastructure, vehicle numbers, and public attitudes. Regardless, it was mentioned that pedestrian behaviour is relatively consistent throughout the world.[7] Male predominance was observed among the 500 participants in the study. Sex had previously been identified as a unique factor associated with differences in injury risk in traffic collisions. Previous studies had discussed sex-specific differences. [8] (Table 01)

Not only has sex been identified as a factor, but age has also been identified as a significant factor in determining the severity of injuries. Thus, it is emphasized that not only sex but also age, is a factor in determining the severity of pedestrian injuries in this study. This finding adds an important conclusion about the importance of examining injury patterns in males and females when developing future safety plans. The elderly population is rapidly growing, and the WHO reports that the elderly population in middle-and lower-income countries is growing at a faster rate than in developed countries. By 2025, it is predicted that over 80% of the elderly population will reside in low-and middle-income countries. As a result, age-related issues should be addressed appropriately, (Table 01) and a thorough understanding of the severity of the issue should also be emphasized.[9] Additionally, the percentage of

incidents is higher in the older age group 67% (n=333 of those over forty years of age), necessitating identification of this fact. The time of day when the collision occurs is another critical factor to consider. Numerous studies have established a distinction between daytime and nighttime incidents (Table 02). Darkness is a factor to consider, as it significantly reduces visibility for both the driver and the pedestrian. Earlier research has established that the risk of collision increases at night.[10,11]

Though pedestrian crossings are intended to make pedestrians safer, incidents do occur. According to the literature, there were more accidents after dark, even at pedestrian crossings.[11] According to Chen et al., night-time accidents were primarily caused by inadequate lighting rather than driver fatigue or the effects of alcohol.[12] The lighting condition has been identified as a critical factor because it prevents pedestrians from being seen at a safer distance. Additionally, the current study discovered that nighttime accidents were more prevalent, and the authors speculate that the same factor may have contributed to this increase. However, additional research is necessary to confirm that fact on Sri Lankan roads. The time of the accident and whether it occurred on a pedestrian crossing or not were found to have a statistically significant correlation in this study (Table 02).

The status of consumption of alcohol which is an independent variable was correlated with two other dependent variables: while crossing on a pedestrian crossing and crossing the road without using a pedestrian crossing. However, there was no statistical correlation between alcohol consumption and the occurrence of the incident 'on the pedestrian crossing' (Table 03). Whereas, alcohol consumption was found to be significantly associated with accidents/incidents that occurred while crossing the road (Table 04). While the pedestrian crossing is a right of way, numerous articles have emphasized the importance of both drivers and pedestrians taking responsibility for preventing such collisions. According to reports, the majority of victims at pedestrian crossings were crossing alone and engaged in distracting behaviour such as texting on their phones.[13]

In any case, alcohol is a recognized risk factor for pedestrian-vehicle collisions. The alcohol status was determined in this study using Bed Head Ticket (BHT) findings and patient accounts. A retrospective study was conducted in an emergency department to examine alcohol consumption and the determination of blood alcohol levels. That study discovered that

male sex and the hours between 5 p.m. and 12 a.m. were the peak conditions for incidents. Additionally, research has indicated that there may be discrepancies between the history of alcohol consumption and actual blood alcohol concentration, and it has been suggested that a reliable method of documentation for medico-legal purposes.[14] According to a study conducted in India, alcohol was suspected or reported in 17.9% of patients diagnosed with road traffic injuries. It was more or less similar to the findings of this study as well, totaling only 20% (n=101). [15]

With an emphasis on the location of the accident, Kavousi et al. discovered that 54.5% of incidents occurred on direct routes and 45.5% occurred at intersections.[16] In another study, it was determined that intersections were the most dangerous location for incidents, though, in this study, it was determined that the main road was the most dangerous location.[17] Previous studies have noted an increase in pedestrian accidents as a result of urbanization and the increased vehicle population. Urban areas, fatalities at non-intersection, and darkness had all been identified as contributing to accidents. [18] This study was performed in an urban area and the author stipulates that the heavy traffic may have contributed to pedestrians getting injured. Anyhow, this study also confirmed that the percentage of incidents was quite significant during the dark (i.e. 45% (n=224) from 6 pm to 6 am).

Making decisions is critical when crossing roads and pedestrians bear a significant amount of responsibility as well. According to a study conducted in Spain, 16.65 % of pedestrians were at fault for the accident. [19] Additionally, pedestrians accepted their fault in 14 % (n=70) of cases in this study.

The purpose of health insurance is to obtain financial assistance in the event of illness or injury. Sri Lanka is a country where everyone is entitled to free medical care, which may explain the low rate of life and health insurance coverage revealed in this study. Regardless, a study found that being uninsured increased the risk of death following a pedestrian collision, but that concept does not apply to Sri Lanka.[20]

A JMO and medico-legal responsibilities are inextricably linked to court functions and the judiciary. This study also examined existing knowledge regarding medico-legal work and court proceedings. What constitutes a JMO's role and responsibilities, as well as basic knowledge about the Sri Lankan court system, has not been researched

previously in Sri Lanka, and the author's understanding is that the public is typically unaware of such matters. This research substantiated that stipulation. When compared to older patients (46%, n= 228), younger patients (54 %, n= 272), preferred taking legal action and it was a statistically significant finding too (Table 05).

In comparison to other road users, the inherent nature of a pedestrian's direct exposure to a collision created an additional risk factor for suffering more severe injuries.[21] Only 15% (n=73) of patients sustained non-grievous injuries, while the remainder sustained injuries classified as grievous or above under the Sri Lankan Penal Code.

Almost always, pain is a necessary component of trauma. There is no significant difference in the magnitude of pain-bearing between males and females (Table 05). Pain has a monetary and social cost, and the pain that must be endured as a result of road traffic trauma must be addressed.

According to a study conducted at Canakkale Province (Turkey), numerous patients were referred to other specialities, with the highest referrals to orthopaedics, 14.8 % (n=118), neurosurgery 8.1 % (n=65), and thoracic diseases 2.3 % (n=18) clinics amongst many other specialities such as general surgery, plastic surgery unit and the cardiovascular unit, etc.[21] The referral rate in this configuration was 61% (n=307).

Informed consent for surgery and anaesthesia is a key concept that should ideally be practised while on the ward. In this study, it was revealed that the patients were not satisfied with the details provided and only 14% (n=70) of patients had been provided with details up to a neutral level or up to a satisfactory level. There are a few studies available to gather data on this subject. Tamire stated that patients were informed about only certain aspects of informed consent though there had been an overall satisfactory approach, i.e. 54% of a total of 139 patients. [22]

To gain a better understanding of risk factors and other associated factors, in-depth, extensive, and multi-centre research is strongly recommended in developing countries, and should also be a priority. Understanding the nature of pedestrian collisions requires extensive research. In general, data on non-motorized road users, such as pedestrians, are insufficient. [23] This study was able to determine the frequency and a variety of statistically significant aspects of pedestrian traffic injuries, as well as other related issues, to close the knowledge gap

surrounding pedestrian traffic injuries at least to a certain extent.

Conclusions

The purpose of this study was to examine significant statistics about vehicle-pedestrian collisions to mitigate such incidents and to gain knowledge about a few related medico-legal issues. Pedestrians are the most vulnerable road users, and by addressing these incidents, a significant economic burden can be eliminated while also ensuring the commuters' quality of life in Sri Lanka. A judicial medical officer assists the judiciary, despite the general public's lack of knowledge about such matters.

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