

Road Traffic Injuries: Quality Of Pre And Post Hospital Care In Pakistan

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Abstract

Background: Road traffic injuries (RTIs) are leading cause of unintentional injuries and death across the globe. Road traffic crashes (RTCs) are neglected public health issue specially in low and middle income countries. **Aims:** The study aims to investigate risk factors of RTCs and assess quality of pre and post hospital care. **Methods:** A cross sectional study was conducted in Lahore, Pakistan from July 2022 – December 2022. Randomly selected 300 patients were interviewed using structured questionnaire at four purposively selected major tertiary care hospitals of Lahore. Binary logistic regression was used to find association between risk factors and injury severity ($P < 0.05$). **Results:** Data analysis showed that age groups 16–30 years (27%), older than 55 years (27%) comprised substantial proportion. A total of 65% RTCs attributed to human errors/factors. Most road crash victims (88% and 87%, respectively) were not wearing helmets and didn't hold a valid driver's license. According to injury severity score, 75% of victims had severe injury. Odds of severe injury were more among aged more than 55 years and human error attributed RTCs. There was significant gap between perception and expectation of patients receiving healthcare services ($P < 0.05$). **Conclusion:** This is first study in Pakistan that examine quality of pre and post hospital care of RCVs. Significant quality gaps were found in pre and post hospital care of RCVs as per Servqual model that need to be addressed. Serious efforts are required to reduce growing burden of RTCs in Pakistan.

Key-words: Road traffic Injury, quality of care, pre hospital care, post hospital care, Pakistan, rehabilitative-care

Introduction

Road traffic injuries (RTIs) are growing concern in today's world. It has become a public health concern but is neglected and require attention and

sustainable efforts to prevent it (WHO, 2022). Road traffic crashes (RTCs) are main cause of injury-related disability-adjusted life years (DALYs). Therefore, it causes social and

economic burden on society (Bachani AM, 2017). Children and adults aged 5-49 years are mostly affected in road traffic injuries. Every year around 1.2 million people die due to RTCs and non-fatal injuries from RTCs lead to disabilities that effect between 20 and 50 million people every year. It causes economic loss to individuals, families and nation due to reduce productivity, cost of treatment and family member taking time off to care the injured or disabled one (WHO, 2022). In developing nations, RTCs are a substantial, but avoidable factor of death, disability, and financial loss (Razzak & Luby, 1998).

Pakistan, an economically developing country with joint family system where one or two member's incomes are important to run family. Therefore, they have to go out of homes and face same kind of road traffic problem; crashes, injuries, disabilities, fatalities (Hammad et al., 2019). Vehicle population of the country has grown much faster pace than road infrastructure and economy (Younis et al., 2019). Fractures or concussions accounted for one-fifth of all injuries. Injury severity and results were worse for people aged 45 years and older in Rawalpindi, Pakistan (Farooq, Majeed, Malik, Razzak, & Khan, 2011). Pakistan develops its National Road Safety Strategy 2018-2030 to tackle these increasing issues of road crashes, injuries and disabilities (Ministry of National Health Services, 2018). Road crash victims (RCVs) may face discrimination in their access to health care, education, employment possibilities, and disability support. (WHO, 2011).

Lack of effective pre-hospital treatment, delays in crash detection, and delays in getting injured people to a medical facility are a few of the key factors that can affect outcome of injuries (Woyessa, Heyi, Ture, & Moti, 2021). Preparation of healthcare facilities is essential to lowering the danger and damaging effects of

emergencies and disasters (Safarpour et al., 2022).

Objectives:

- To investigate risk factors related with RTCs and injuries.
- To evaluate the quality of pre-hospital care received by the victims of RTCs in Lahore Pakistan.
- To evaluate the quality of post-hospital care (i.e. emergency, indoor and rehabilitation services) received by the victims of road traffic crashes in Lahore Pakistan.

Methods and materials:

A cross sectional study conducted in purposively selected four major tertiary care public hospitals of Lahore (Mayo Hospital, Services Hospital, Jinnah Hospital and General Hospital) to investigate the different risk factors and how they are associated with RTIs. Study also assessed the quality of care using Servqual model, both pre and post hospital care provided to road crash victims in selected hospitals. The study's population consisted of all age groups {1-15 (children), 16-30, 31-45, 46-55 and older than 55 in years} of injured patients who were shifted to the selected hospitals. Data was collected with structured questionnaire having two parts. One was related to risk factors of road crashes, characteristics and injury severity. Other part of questionnaire was Servqual model having five dimensions (tangibility, empathy, assurance, reliability, responsiveness) with 22 items. The Servqual scale, which is used to gauge service quality, was developed by Parasuraman et al. based on this perspective. A service quality gap occurs when expectations are higher than perceptions (Teshnizi, Aghamolaei, Kahnouji, Teshnizi, & Ghani, 2018). A five-score Likert scale (1 = strongly disagree to 5 = strongly agree) used about their perception and expectation on 22 items. Modified Servqual questionnaire was used

to assess the quality of pre-hospital care. Pilot testing was conducted to check the reliability and validity of the research instruments. Based on the results of pilot testing, questionnaire was updated. The data collection was conducted in October-November 2022. A sample of 300 patients was collected from selected tertiary care hospitals of Lahore. Data was entered into SPSS software version 25 for analysis. Descriptive outputs were used to describe frequencies, means and standard deviation. Injury Severity score was calculated using Bakers and colleague's injury severity score (ISS).

$$ISS = \text{highest1}^2 + \text{highest2}^2 + \text{highest3}^2$$

ISS ranged from 1 to 75. If any body part had score of 6, then ISS had highest value of 75. Injury severity score < 9 indicated minor, 9-15 (moderate), 16-24 (severe) and ≥ 25 (very severe) (Stevenson, Segui-Gomez, Lescohier, Di Scala, & McDonald-Smith, 2001).

Binary logistic regression was used to find association between risk factors and severity of injury ($P < 0.05$). Odd ratio and 95% confidence interval was used to measure association of variables with severity of injury. Quality gap was calculated through mean difference of perception and expectation of road crash victims. Wilcoxon test was used to find significance of mean differences ($P < 0.05$).

Results:

In total, 300 RCVs interviewed using the self-administrated questionnaire. percentages

Table 1: Descriptive Statistics

Characteristics:	N	%	Characteristics:	N	%
Age (Years)	300		Economic Status	300	
1-15	23	7.7	Low income	146	48.7
16-30	82	27.3	Middle income	151	50.3
31-45	57	19.0	High income	3	1.0
46-55	57	19.0	Residence		

mentioned in table. Descriptive statistics showed that only 28% of study population received rehabilitative care that only included physiotherapy sessions (**Table 1**).

Servqual model perspective was used to analyze the quality gap of pre-hospital care through the mean score differences of perception and expectation of RCVs. We used modified Servqual model to analyze the quality gap of pre-hospital. Tangibility (3 items), empathy (3 items), assurance (3 items), reliability (1 item) and responsiveness (2 items) were used to identify the gap of quality. Wilcoxon test was used to examine significance ($P < 0.05$) (**Table 2**).

Servqual five dimensions (Tangibility, 4 items; empathy, 4 items; assurance, 4 items; reliability, 5 items; responsiveness, 4 items) for quality of emergency care were analyzed to identify the quality gap between perception and expectation of RCVs. Wilcoxon test for all five dimensions showed significant mean difference of perception and expectation in table: 3. ($P < 0.05$) (**Table 3**).

The study assessed quality of indoor facility and care using Servqual model of quality gap between perception and expectation represented in ($P < 0.05$) (**Table 4**).

Around 28% of RCVs received physical therapy as a part of rehabilitative care. These all victims had been asked about their perception and expectation of five dimension of Servqual model represented in There was significant mean difference in all five dimension 's perception and expectation ($P < 0.05$) (**Table 5**).

more than 55	81	27.0	Urban	179	59.7
Gender			Rural	121	40.3
Male	192	64.0	Reason of crash		
Female	108	36.0	Human error	195	65.0
Level of Education			Vehicle issue	54	18.0
No schooling	114	38.0	Infrastructure issue	26	8.7
Primary school	63	21.0	Fatalism	25	8.3
Middle school	41	13.7	Human error during crash		
Secondary school	67	22.3	Over-speeding	129	43.0
Undergraduate	15	5.0	One-way violation	53	17.7
Occupation			Signal violation	5	1.7
Government employ	9	3.0	Mobile phone use	2	0.7
Businessman	49	16.3	Drink and drive	6	2.0
Housewife	95	31.7	Total	195	65.0
Student	39	13.0	Missing System	105	35.0
Farmer	12	4.0	Vehicle issue during crash		
Others. laborers, etc.	96	32.0	Brake failure	52	17.3
Number of injury			Tyre burst	2	0.7
Single injury	123	41.0	Total	54	18.0
Multiple injury	177	59.0	Missing System	246	82.0
Type of injury			Who was the first responder at road crash scene?		
Fracture	188	62.7	Rescue 1122	241	80.3
Spinal Cord Injury	46	15.3	Private Ambulance	5	1.7
Traumatic Brain Injury/Head Injury	66	22.0	Private vehicle driver	25	8.3
Involvement of Body parts			Bystander	29	9.7
Upper extremity	32	10.7	Mode of transportation used to reach hospital		
Lower extremity	109	36.3	Rescue 1122 Ambulance	241	80.3
Both upper and lower extremities	50	16.7	Private Ambulance	8	2.7
Head and Neck	109	36.3	Private vehicle	51	17.0
Presence of open wound			Total estimated time from road crash happening to reach the hospital		
Present	130	56.7	20-40 mints	82	27.3
Not present	170	43.3	40-60 mints	109	36.3
Severity of injury			Driver	129	43.0
Moderate	76	25.3	Did you receive any first aid at road crash scene?		
Severe	224	74.7	Yes	242	80.7
Total (N)	300		No	58	19.3

Infrastructure issue during crash	300		Time elapsed until help arrived in minutes?		
Potholes on the road	4	1.3	Less than 7 minutes	47	15.7
Slipper road	22	7.3	7 minutes	17	5.7
Total	26	8.7	8-15 minutes	143	47.7
Missing System	274	91.3	15-30 minutes	87	29.0
Time of crash			More than 30 minutes	6	2.0
			Estimated travel time from crash scene to hospital	N	%
Morning	43	14.3	1-10 mints	16	5.3
Afternoon	87	29.0	11-20 mints	60	20.0
Evening	88	29.3	21-30 mints	116	38.7
Night	82	27.3	31-40 mints	72	24.0
Vehicle involved in crash			41-50 mints	17	5.7
Motorcycle vs Motorcycle	62	20.7	51-60 mints	4	1.3
Motorcycle vs Car	33	11.0	Over an hour	15	5.0
Motorcycle vs Pedestrian	48	16.0			
Motorcycle vs Rickshaw	40	13.3			
Tractor trolley vs Motorcycle	8	2.7			
Car Vs Pedestrian	69	23.0			
Car vs Tractor trolley	2	0.7			
Car vs Heavy Vehicle	1	0.3			
Motorcycle vs Heavy Vehicle	6	2.0			
Single Vehicle vs infrastructure	31	10.3			
Victim Role					
Pedestrian	110	36.7			
Passengers	61	20.3			

Table 2: Quality Gap of services provided by Pre-Hospital Staff (Rescue 1122) = mean score difference of perception and expectation

Dimensions and components	N	Perception ± SD	Expectation ± SD	Gap	p-values
Tangibility					
Modern and up-to-date equipment should be used during Pre-hospital care.	242	3.4 ± 0.6	4.8 ± 0.3	-1.4	

When providing pre-hospital care, environment is clean and comfortable.	242	3.5 ± 0.9	4.8 ± 0.4	-1.2	
Pre-hospital care staff should appear neat and well dressed.	242	4.1 ± 0.4	4.9 ± 0.3	-0.8	
Valid N	242				
Total:		3.7 ± 0.5	4.8 ± 0.3	-1.2	0.000
Empathy					
Pre-hospital staff give you proper attention.	242	4.0 ± 0.7	4.9 ± 0.3	-0.9	
Pre-hospital staff is aware of your need.	242	4.1 ± 0.7	4.8 ± 0.4	-0.4	
Pre-hospital staff cares about your well-being.	242	4.1 ± 0.7	4.9 ± 0.3	-0.3	
Valid N	242				
Total:		4.0 ± 0.7	4.9 ± 0.2	-0.8	0.000
Assurance					
You can trust on the Pre-hospital staff.	242	4.1 ± 0.7	4.8 ± 0.4	-0.8	
You feel safe while dealing with pre-hospital staff.	242	4.1 ± 0.7	4.8 ± 0.4	-0.7	
Pre-hospital staff is polite.	242	4.2 ± 0.7	4.9 ± 0.2	-0.8	
Valid N	242				
Total:		4.1 ± 0.6	4.9 ± 0.2	-0.8	0.000
Reliability					
Pre-hospital staff record any data during provision of services.	242	3.7 ± 0.7	4.9 ± 0.4	-1.1	0.000
Valid N	242				
Responsiveness					
You receive prompt service from pre-hospital staff.	242	4.0 ± 0.7	4.9 ± 0.3	-0.9	
Pre-hospital staff was always willing to help patients	242	4.1 ± 0.6	4.8 ± 0.4	-0.8	
Valid N	242				
Total:		4.0 ± 0.6	4.9 ± 0.3	-0.8	0.000

Table 3: Quality Gap of services provided by emergency staff of hospital = mean score difference of perception and expectation

Dimensions and components	N	Perception \pm SD	Expectation \pm SD	Gap	p-values
Tangibility					
Modern and up-to-date equipment should be used for emergency care in the hospital.	300	3.0 \pm 0.6	4.7 \pm 0.5	-1.8	
Environment of emergency department should be clean and comfortable.	300	3.1 \pm 1.0	4.6 \pm 0.5	-1.6	
Emergency care staff appear neat and well dressed.	300	3.8 \pm 0.6	4.8 \pm 0.4	-1	
Emergency department physical facilities should be visually appealing.	300	2.2 \pm 0.5	4.7 \pm 0.4	-2.6	
Total:		3.0 \pm 0.5	4.7 \pm 0.3	-1.7	0.000
Empathy					
Emergency care staff gives you individual attention.	300	3.1 \pm 1.0	4.7 \pm 0.5	-1.7	
Staff of emergency care know what your need are?	300	3.1 \pm 1.0	4.8 \pm 0.4	-1.7	
Emergency care staff genuinely cares about your well-being.	300	3.1 \pm 1.0	4.9 \pm 0.3	-1.8	
The emergency department operated during hours that were convenient for all patients.	300	3.2 \pm 1.0	4.8 \pm 0.4	-1.6	
Total:		3.1 \pm 0.9	4.8 \pm 0.3	-1.7	0.000
Assurance					
You can trust on the staff of this emergency department of hospital.	300	3.1 \pm 1.0	4.8 \pm 0.4	-1.7	
You feel safe while dealing with emergency care staff.	300	3.1 \pm 1.0	4.7 \pm 0.5	-1.6	
Staff of emergency care are polite.	300	3.1 \pm 1.0	4.9 \pm 0.3	-1.8	
Staff of emergency got sufficient support from hospital to do their jobs well.	300	3.1 \pm 0.9	4.7 \pm 0.4	-1.6	
Total:		3.1 \pm 1.0	4.8 \pm 0.3	-1.7	0.000
Reliability					
When emergency care staff promised to do something, it did at appointed time.	300	2.9 \pm 1.0	4.9 \pm 0.3	-1.9	

Emergency department was understanding and reassuring when you're having issues.	300	3.0 ± 1.0	4.7 ± 0.5	-1.7	
Services provided at appointed time by emergency department.	300	3.0 ± 1.0	4.9 ± 0.3	-1.9	
Emergency department provided its services at promised time.	300	3.0 ± 1.1	4.9 ± 0.3	-1.9	
Emergency department maintained patient's data.	300	3.5 ± 0.9	4.9 ± 0.3	-1.4	
Total:		3.1 ± 0.9	4.8 ± 0.2	-1.8	0.000
Responsiveness					
Emergency department told patients exactly when they performed their services.	300	3.0 ± 1.0	4.8 ± 0.4	-1.8	
You received on time service from staff of emergency.	300	3.1 ± 1.0	4.8 ± 0.4	-1.7	
Staff of Emergency was always willing to aid patients	300	3.1 ± 1.0	4.9 ± 0.4	-1.8	
Staff of emergency was always available to respond to patients requests promptly.	300	3.1 ± 1.0	4.9 ± 0.3	-1.8	
Total:		3.1 ± 1.0	4.8 ± 0.2	-1.8	0.000

Table 4: Quality Gap of services provided by hospital indoor care staff = mean score difference of perception and expectation

Dimensions and components	N	Perception ± SD	Expectation ± SD	Gap	p-values
Tangibility					
Modern and up-to-date equipment should be used in Indoor of hospital.	300	3.1 ± 0.6	4.6 ± 0.5	-1.5	
Environment of Indoor should be clean and comfortable.	300	3.0 ± 1.0	4.8 ± 0.4	-1.9	
Indoor staff appear neat and well dressed.	300	3.8 ± 0.6	4.7 ± 0.4	-0.9	
Indoor physical facilities should be visually appealing.	300	2.0 ± 0.3	4.9 ± 0.3	-2.8	
Total:		3.0 ± 0.4	4.8 ± 0.3	-1.8	0.000
Empathy					
Indoor staff gives you individual attention.	300	3.1 ± 1.0	4.7 ± 0.4	-1.7	
Indoor staff know what your need are?	300	3.1 ± 1.1	4.9 ± 0.4	-1.7	
Indoor staff genuinely cares about your well-being.	300	3.2 ± 1.0	4.7 ± 0.5	-1.6	

Indoor has operating hours convenient to all their patients.	300	3.2 ± 1.0	4.9 ± 0.3	-1.8	
Total:		3.1 ± 1.0	4.8 ± 0.2	-1.7	0.000
Assurance					
You can trust on the Indoor staff of hospital.	300	3.2 ± 1.0	4.8 ± 0.4	-1.7	
You feel safe while dealing with Indoor staff.	300	3.2 ± 1.0	4.9 ± 0.4	-1.7	
Staff of indoor is polite.	300	3.2 ± 1.1	4.8 ± 0.4	-1.6	
Indoor staff got sufficient support from hospital to do their jobs well.	300	3.3 ± 0.9	4.9 ± 0.3	-1.6	
Total:		3.2 ± 1.0	4.8 ± 0.3	-1.7	0.000
Reliability					
When Indoor staff promised to do something, it did at appointed time.	300	3.2 ± 1.0	4.8 ± 0.4	-1.7	
Indoor department is understanding and reassuring when you're having issues.	300	3.2 ± 1.0	4.9 ± 0.3	-1.7	
Services are provided at appointed time by Indoor department.	300	3.1 ± 1.0	4.9 ± 0.3	-1.7	
Indoor department provided its services at promised time.	300	3.2 ± 1.1	4.8 ± 0.4	-1.7	
Indoor department maintain patient's data.	300	3.6 ± 0.8	4.8 ± 0.4	-1.2	
Total:		3.3 ± 0.9	4.8 ± 0.3	-1.6	0.000
Responsiveness					
Indoor department told patients exactly when they performed their services.	300	3.1 ± 1.0	4.8 ± 0.4	-1.7	
You received on time service from staff of Indoor.	300	3.1 ± 1.0	4.9 ± 0.4	-1.7	
Indoor staff was willing to aid patients	300	3.1 ± 1.0	4.9 ± 0.3	-1.8	
Indoor staff is always available to respond to patients requests promptly.	300	3.1 ± 1.0	4.9 ± 0.3	-1.8	
Total:		3.1 ± 1.0	4.9 ± 0.4	-1.8	0.000

Table 5: Quality Gap of services provided by indoor rehabilitative staff = mean score difference of perception and expectation

Dimensions and components	N	Perception ± SD	Expectation ± SD	Gap	p-values
Tangibility					

Modern and up-to-date equipment should be used during rehabilitative care.	83	3.2 ± 0.7	4.5 ± 0.5	-1.3	
When providing rehabilitative care, environment is clean and comfortable.	83	4.0 ± 0.6	4.9 ± 0.1	-0.9	
Rehabilitative staff should appear neat and well dressed.	83	3.9 ± 0.4	4.5 ± 0.5	-0.6	
Physical facilities during rehabilitative care should be visually appealing.	83	2.5 ± 1.1	4.8 ± 0.4	-2.3	
Total:		3.4 ± 0.5	4.7 ± 0.2	-1.3	0.000
Empathy					
Rehabilitative staff give you individual attention.	83	3.9 ± 0.4	4.4 ± 0.5	-0.6	
Rehabilitative staff know what your needs are for rehabilitation?	83	4.0 ± 0.6	5.0 ± 0.1	-1.0	
The Rehabilitative staff cares about your well-being.	83	3.9 ± 0.4	4.7 ± 0.5	-0.5	
Rehabilitation care operating hours convenient to all their patients.	83	3.1 ± 1.2	4.8 ± 0.4	-0.4	
Total:		3.7 ± 0.5	4.7 ± 0.2	-1.0	0.000
Assurance					
You can trust on the Rehabilitative staff of this hospital.	83	3.9 ± 0.4	4.5 ± 0.5	-0.6	
You feel safe while dealing with Rehabilitative staff.	83	4.0 ± 0.6	4.8 ± 0.4	-0.8	
Rehabilitative staff is polite.	83	3.9 ± 0.4	4.8 ± 0.4	-1.0	
Rehabilitative staff got sufficient support from hospital to do their jobs well.	83	3.8 ± 0.4	4.8 ± 0.4	-0.9	
Total:		3.9 ± 0.4	4.7 ± 0.2	-0.8	0.000
Reliability					
When rehabilitative team promised to do something, it did at appointed time.	83	3.4 ± 0.6	4.6 ± 0.5	-1.1	
Rehabilitative staff is understanding and reassuring when you're having issues.	83	3.7 ± 0.5	5.0 ± 0.2	-1.3	
services are provided at appointed time by rehabilitative team.	83	3.1 ± 0.9	4.6 ± 0.5	-1.5	
Rehabilitative team provided its services at promised time.	83	3.4 ± 0.8	5.0 ± 0.1	-1.6	

Rehabilitative staff keeps it record accurately.	83	3.3 ± 0.8	4.7 ± 0.5	-1.4	
Total:		3.4 ± 0.5	4.8 ± 0.2	-1.4	0.000
Responsiveness					
Rehabilitative staff told patients exactly when they performed their services.	83	3.0 ± 0.9	4.8 ± 0.4	-1.9	
You received on time service from Rehabilitative staff.	83	3.1 ± 1.0	4.7 ± 0.5	-1.6	
Rehabilitative staff was willing to aid patients	83	3.9 ± 0.4	4.9 ± 0.3	-1.0	
Rehabilitative staff is always available to respond to patients requests promptly.	83	4.0 ± 0.0	5.0 ± 0.1	-1.0	
Total:		3.5 ± 0.5	4.9 ± 0.1	-1.4	0.000

Discussion:

In this study most of RCVs were young in age group 16-30 years and people aged more than 55 years. Reason behind involvement of young age in RTCs might be lack of experience of driving and thrill seeking behavior. Mostly victims of more than 55 years' age group were pedestrian and hit by car/four-wheeler or motorcycle.

A study conducted by Khan UR et al., in Karachi, Pakistan also revealed that major portion of RCVs were male motorcyclists (Khan, Razzak, Jooma, & Wörnberg, 2022).

Our study concluded that males are at more risk of RTCs than females. The reason behind more involvement of male might be increased outdoor activities as in our culture male are responsible for household expenses. Similar results were found in the study of United States suggested contrary to this study that women had more risk of RTCs due to increasing behavior of driving and risk taking (Cullen et al., 2021) -(Khurshid, Sohail, Khurshid, Shah, & Jaffry, 2021).

Road crash victims with lesser education or illiterate were more prone to road crashes in this study. Lesser education might be a risk factor to

be more involved in road crashes, due to lack of awareness about road safety and traffic rules. A previous study assessed age and gender as a factor related to road crashes and it also endorsed that victims with no or less education and young age were more likely to be involved in road crashes (Sami et al., 2013)-(Rabbani et al., 2021). Laborer and others low income groups were more reported in this study. Probably due to fact that low income professionals mostly use motorcycle for their transport that constituted about 70% of total vehicles in Lahore (Tahir, 2018). A study conducted in India also endorsed that risk of road crashes is higher among low and middle income victims (S. R. Shrivastava, P. Pandian, & P. S. J. J. o. n. i. r. p. Shrivastava, 2014).

In this study most RTCs were attributed to human error such as overspending, one-way violation and signal violations etc. Over-speeding and one-way violation might be due to younger age, hurry and thrill. A study in Ghana also revealed that over speeding is contributing factor of road crashes (Ackaah, Adonteng, & promotion, 2011). Majority of RCVs driving motorbike did not have their valid driving license. (Khan et al., 2022; S. R. Shrivastava, P. Pandian, & P. S. Shrivastava, 2014; Woyessa et al., 2021).

Quality of pre-hospital was analyzed with Golden hour and Servqual model perspectives. About 36% of study participants were shifted to hospital from the crash scene in over one hour. They were not transported to hospital in Golden hour. Golden hour is the time spent while shifting the RCVs from road crash scene to hospital. Greater the time span from the happening of road crashes to reach hospital, greater might be chance of complications proven by our study. Moreover, a study by Hsieh S-L et al., also suggested that if the victim would be transported for definitive care in less time, it increased the chance of survival and less complications (Hsieh et al., 2022).

Servqual model with its five dimension was used to assess the quality of pre-hospital care. A significant difference was found between perception and expectation in all five dimensions of Servqual model. Tangibility had slightly higher difference between perception and expectation than other dimension. Prior study in Qatar evaluating the quality of ambulance staff revealed higher quality gap in reliability and tangibility as in this study (Carolus et al., 2022). There is significant mean difference of perception and expectation in all five dimensions of Servqual model for emergency care. Reliability and responsiveness mean differences of perception and expectation had higher gap (-1.8) than rest of the dimensions. Prior study in Iran also indicated less satisfaction in responsiveness and higher in tangibility (Mohammadi-Sardo & Salehi, 2019).

Conclusion:

Based on this study, RCVs with low and middle income economic status were reported. Human error was major reason of road crashes. One-way violation and over-speeding was major factor of human error that showed that people were not properly sensitized about the consequences of road crashes. Majority of RCVs, driving motorcycles were not wearing helmet and did not

have their valid driving license. Drivers and pedestrian were at more risk of road crashes. Majority of RCVs were with severe injury based on injury severity score (ISS). In terms of quality of care, there was statistically significant difference between RCVs mean of perception and expectation in all five dimension of Servqual model and in all four (pre-hospital, emergency, indoor, rehabilitation) study areas.

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