EVALUATING MOTORCYLST'S RISK PERCEPTION REGARDING ROAD ACCIDENTS

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APPROVAL

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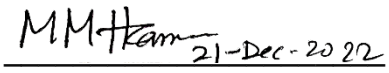

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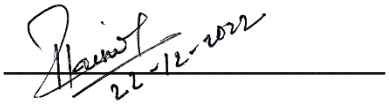

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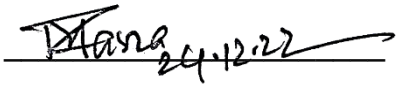

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DEDICATED TO MY FAMILY

Father & Mother

Their continuous inspirations made this effort possible

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Objective

The aim of this study is to investigate motorcycle risks related to road accidents through a survey conducted among motorcyclists. As a result, number of motorcycles are increasing which obviously lead to more motorcycle related accidents. In this study, we performed a question survey related to the motorcycle accident risk perception among the motorcyclists. Total 131 interviews have been conducted through field visit by a questionnaire form.

Abstract

Motorcycle accident in Bangladesh is increasing over years. There were 19% motorcycle related accidents in 2019 and were increased to 27% in 2020, which is very alarming. Like many other developing countries of Asia, number of motorcycle users are increasing recently. Specially in Dhaka city, Bangladesh, mobile application-based ride sharing service gets much popularity. Now large number of young people take ride sharing bike as their source of income. As a result, number of motorcycles are increasing which obviously lead to more motorcycle related accidents. In this study, we performed a question survey related to the motorcycle accident risk perception among the motorcyclists. Total 131 interviews have been conducted through field visit by a questionnaire form. We considered total 19 factors of 5 different categories for motorcycle accident risk assessment. The factors were—Reckless driving of other vehicles (F1), Not paying attention to motorcycles (F2), Aggressive behavior by other road users (F3), Violation of traffic rules by other road users (F4), Reckless riding of motorcyclists (F5), Not paying attention to other vehicles (F6), Aggressive behavior by motorcyclists (F7), Violation of traffic rules by motorcyclists (F8), Unmaintained road surfaces (F9), Potholes (F10), Slippery road surface (F11), No pavement marking (F12), Road design does not follow specifications (F13), Unsafe road design (F14), Unsuitable road design (F15), Road infrastructure does not follow specifications (F16), Unmaintained road infrastructure (F17), Unsafe road infrastructure (F18) and Unsuitable road infrastructure (F19). The questions related to the factors were close ended and multiple-choice type. The choices were lack of influence, small influence, moderate influence, large influence and very large influence with scale 0 to 4 subsequently. Aggressive behavior by motorcyclists (F7), Violation of traffic rules by motorcyclists (F8) and Reckless riding of motorcyclists (F5) were ranked top three influencing factors for motorcycle accident risk. Condition of road surface related factors, such as, Unmaintained Road surfaces (F9), Potholes (F10), Slippery Road surface (F11) and No pavement marking (F12) reveled as least important issues in this regard. Our study will help concerned authority to list the action plan to countermeasure motorcycle accident in priority basis. Proper implementation of traffic rules, monitoring driving license scheme, campaign for awareness among public will ensure road safety.

Chapter 01

Introduction

1.1 General

Increasing number of motorcycles in Bangladesh leads to increase in number of motorcycle related accidents. Motorcycles are subjected to higher rate of fatal accidents comparing among different modes of transport. Like others, motorcycle accidents cost enormous losses in terms of deaths, injuries and damages in every year. According to Bangladesh road transport authority (BRTA) the rate of motorcycle accidents among the total accidents were 19% and 27% in 2019 and 2020 respectively.

1.2 Background

Motorcycle is one of most popular mode of transportation in Bangladesh. Large number of motorcycles is playing in the roads of the major cities in Bangladesh. Due to recent trend of ridesharing, motorcycle is becoming more popular. With the increase in number of motorcycle usage, the risk of motorcycle is also increasing. Motorcyclist are more vulnerable compare to heavy vehicle like bus, truck. Therefore, in order to ensure overall road safety, transportation engineers need to give more attention for motorcycle safety. The aim of this study is to investigate motorcycle risks related to road accidents through a survey conducted among motorcyclists.

1.3 Work Plan

Prepare a questionnaire form by pilot survey on interviewing motorcyclists and studying literature review. Conduct interviews among motorcyclists and store data through hardcopy and google form Descriptive analysis and graphical representations for demographics and motorcycle accident factors. Convert the

categorical opinions of motorcycle accident factors into numerical scale. Rank the motorcycle accident factors based on weightage and make recommendations for the corresponding countermeasures.

1.4 Summary

An extensive survey on motorcyclists can help to identify potential accident risks related to motorcycles. The study addresses motorcyclists and riders' safety, which is a challenge to the accident research professionals. The question survey will help to understand current situation for motorcycle riding, challenges of motor cycle safety and policy implementation regarding the effective countermeasures for road safety.

Chapter2

Literature Review

2.1 General

The previous chapter discusses introduction related to motorcycle risk assessment, its importance and background. This chapter discusses literature review of the study.

2.2 Prior studies

Various researches have been performed previously on the factors of motorcycle accident risk assessment. Following prior research are mentioned here as literature review of the study.

References	Topics	Remarks
Konkor et al. (2019)	Peoples' perceptions of motorcycle accident risks in Ghana	Marked over speeding and driving under influence are important features
Shajith et al. (2019)	Assess risk factors for Motorcycle fatal accidents in Sri Lanka	Mid-block section of roads are most risky for motorcycle accidents
Oltaye et al. (2021)	Correlate motorcycle accidents with gender and age group in Ethiopia	Use hospital database and marked speeding involvement in motorcycle accidents

References	Topics	Remarks
Akter and Pervez (2019)	Evaluate motorcycle accident-related injury characteristics in Dhaka	Suggested to wear helmet to avoid fatal injury.
Abusini and Ambarwati (2018)	Used Generalized Linear Model to interpret motorcycle accidents	Road geometry factors have correlation with motorcycle accidents

2.3 Factors of motorcycle accidents

Several factors are considered in various research papers for the motorcycle accidents. Some of them are: Reckless driving of other vehicles, Not paying attention to motorcycles, Aggressive behavior by other road users, Violation of traffic rules by other road users, Reckless riding of motorcyclists (F5), Not paying attention to other vehicles (F6), Aggressive behavior by motorcyclists (F7), Violation of traffic rules by motorcyclists (F8), Unmaintained road surfaces (F9), Potholes (F10), Slippery road surface (F11), No pavement marking (F12), Road design does not follow specifications, Unsafe road design (F14), Unsuitable road design (F15), Road infrastructure does not follow specifications (F16), Unmaintained road infrastructure (F17), Unsafe road infrastructure (F18) and Unsuitable road infrastructure. Those factors are divided into some categories. Such as--Attitude of other road users, Attitude of motorcyclists, Condition of road surface, Condition of road design and Condition of the road infrastructure.

1.4 Other research studies

The study can be extended for accident risk assessment for other types of road users, such as, pedestrian, non-motorized vehicle and cars. The survey can be performed on large scale community and wide variety of people. Also, expertise opinions can be incorporated. Case by case accident investigation, accident history study will provide more valuable data related to motorcycle accidents. Mathematical models of the survey data will reveal more in-depth information.

2.5 Summary

Though demand for motorcycle riding increases day-by-day, it is not safe yet adequately. It is urgent to ensure motorcycle travel safe and smooth.

Chapter 3

Methodology

3.1 General

This chapter consists with survey design, data calculation, formulation related issue. This chapter followed by prior literature review chapter.

3.2 Survey Design

In total 19 factors of 5 categories are included in the question survey.

The categories are:

1. Attitude of other road users: Reckless driving of other vehicles (F1), Not paying attention to motorcycles (F2), Aggressive behavior by other road users (F3), Violation of traffic rules by other road users (F4)
2. Attitude of motorcyclists: Reckless riding of motorcyclists (F5), Not paying attention to other vehicles (F6), Aggressive behavior by motorcyclists (F7), Violation of traffic rules by motorcyclists (F8)
3. Condition of road surface: Unmaintained Road surfaces (F9), Potholes (F10), Slippery Road surface (F11), No pavement marking (F12)
4. Condition of road design: Road design does not follow specifications (F13), Unsafe Road design (F14), Unsuitable Road design (F15)
5. Condition of the road infrastructure: Road infrastructure does not follow specifications (F16), Unmaintained Road infrastructure (F17), Unsafe Road infrastructure (F18), Unsuitable Road infrastructure (F19)

All questions on the 19 motorcycle risk factors are close ended and each of those have 5 opinion categories and corresponding numerical scale.

Motorcycle related accident risk factors	
Opinion categories	Scale
Lack of influence	0
Small influence	1
Moderate influence	2
Large influence	3
Very large influence	4

General information included in the questionnaire are:

1. Age (categorized by 18-20, 21-30, 31-40 and >41)
2. Gender (categorized by male and female
3. Income (BDT) (categorized by <20k, 20-50k, >50k)
4. Distance travelled per day (km) (categorized by <10, 10-30, 31-50, >51)
5. Desired speed (km/hr) (categorized by <25, 25-40, 41-50, >51)
6. Riding duration per day (minutes) (categorized by <30, 31-60, 61-120, >120)

3.3 Calculation for the ranking of the factors

The influences of the motorcycle risk factors are ranked based on Average weighted value (AWV)

$$AWVi = \frac{\sum_{j=0}^{j=4} N_{ij} W_j}{N}$$

Where AWVi= Average weighted value for a accident risk factor i

j = opinions ranked 0 to 4 (lack of influence to very large influence)

Nij = number of responses in j-th opinion category for i-th risk factor

Wj = weightage of j-th opinion category

N = Total number of respondents (i.e. 131)

3.4 Summary

This chapter narrates methodology of the study which includes description of survey design. The next chapter deals with data collection details.

Chapter 4

Data Collection

4.1 General

The field data were collected through survey and interviewing motorcycle riders. A large number of people depend on motorcycles for their movement, so their needs should be considered with special attention.

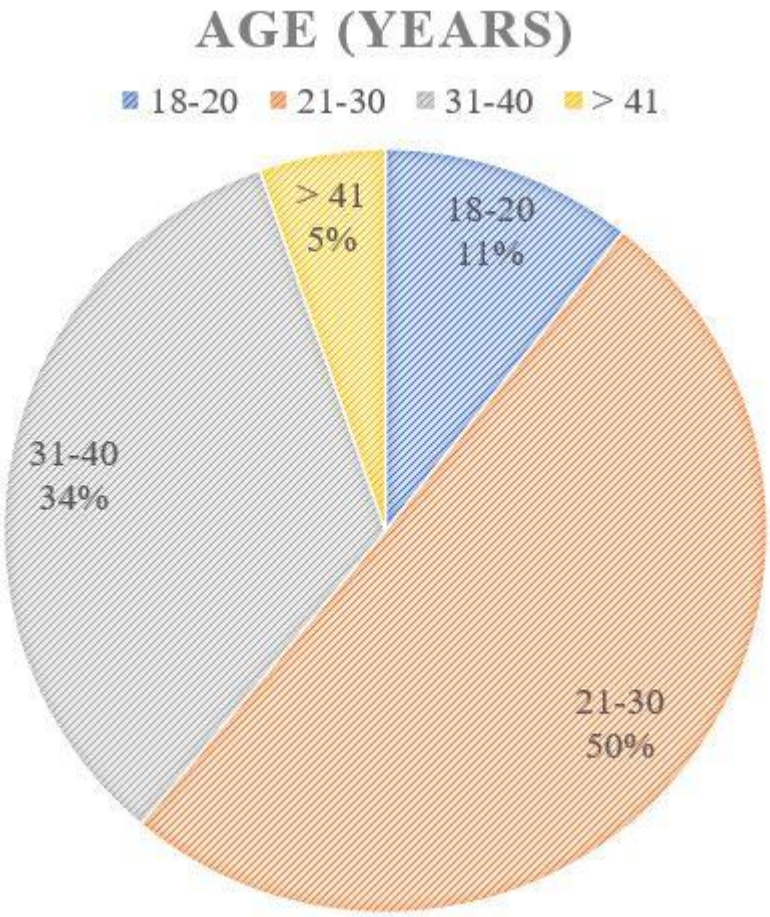
4.2 Survey

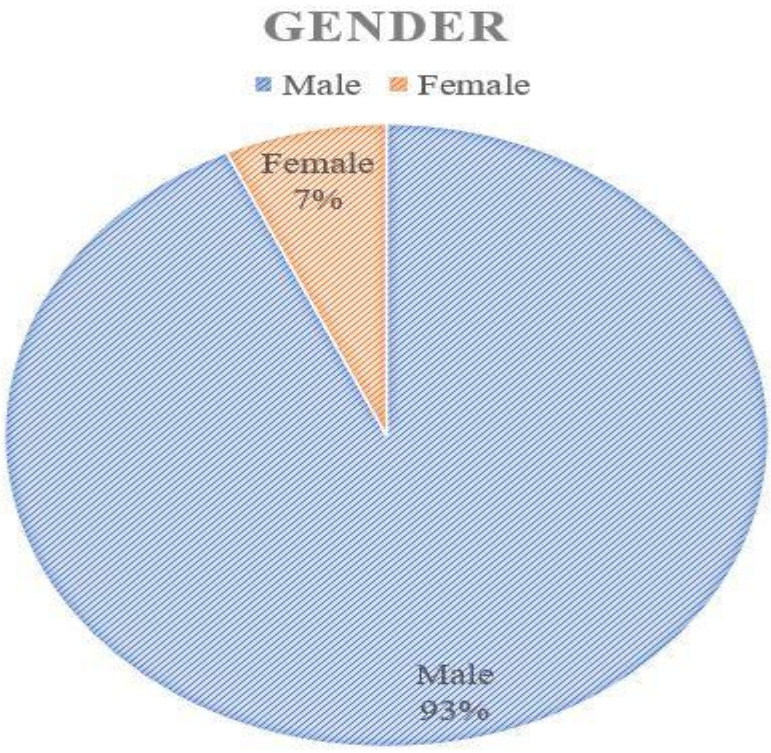
Following steps are followed for data collection:

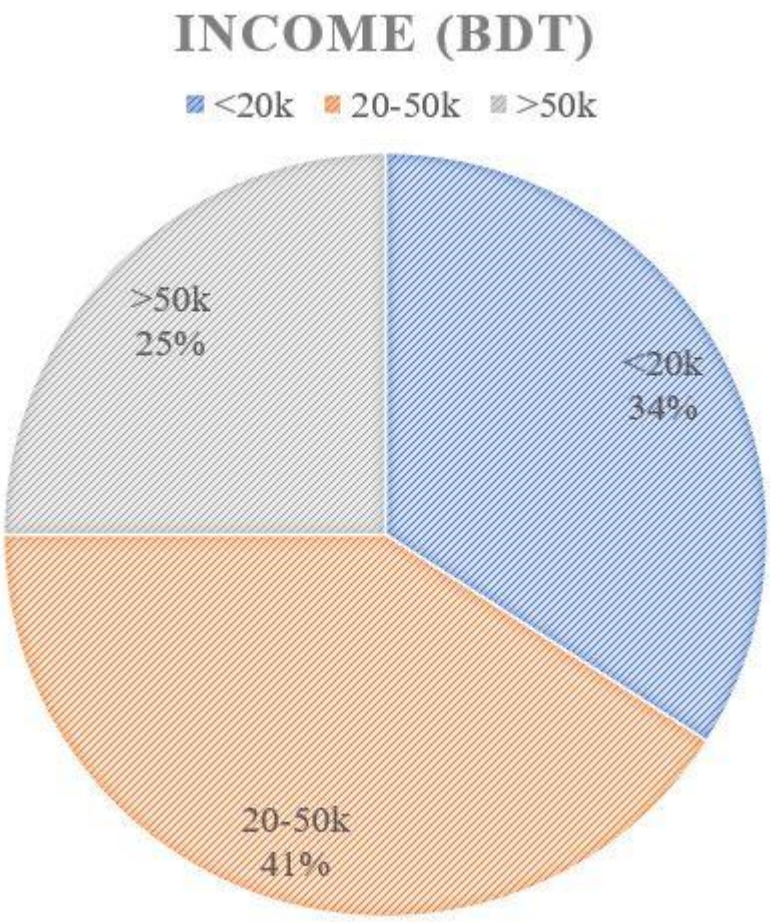
- The survey was performed on the mid of November 2021 through field interviews.
- 131 motorcyclists were interviewed for the survey and their information were recorded in the survey form.
- The entire survey was performed in different roads of Dhaka city.
- Later the recorded data were transferred to google form and MS Excel for further analysis

4.3 Demographic data

Half of the respondents are of age group 21-30 years. 41% respondents (motorcyclists) are in income group of 20-50k BDT monthly.







4.9 Summary

A large number of people depend on motorcycle for their movement, so their safety need to ensured. The next chapter discusses data analysis portion of the study.

Chapter 5

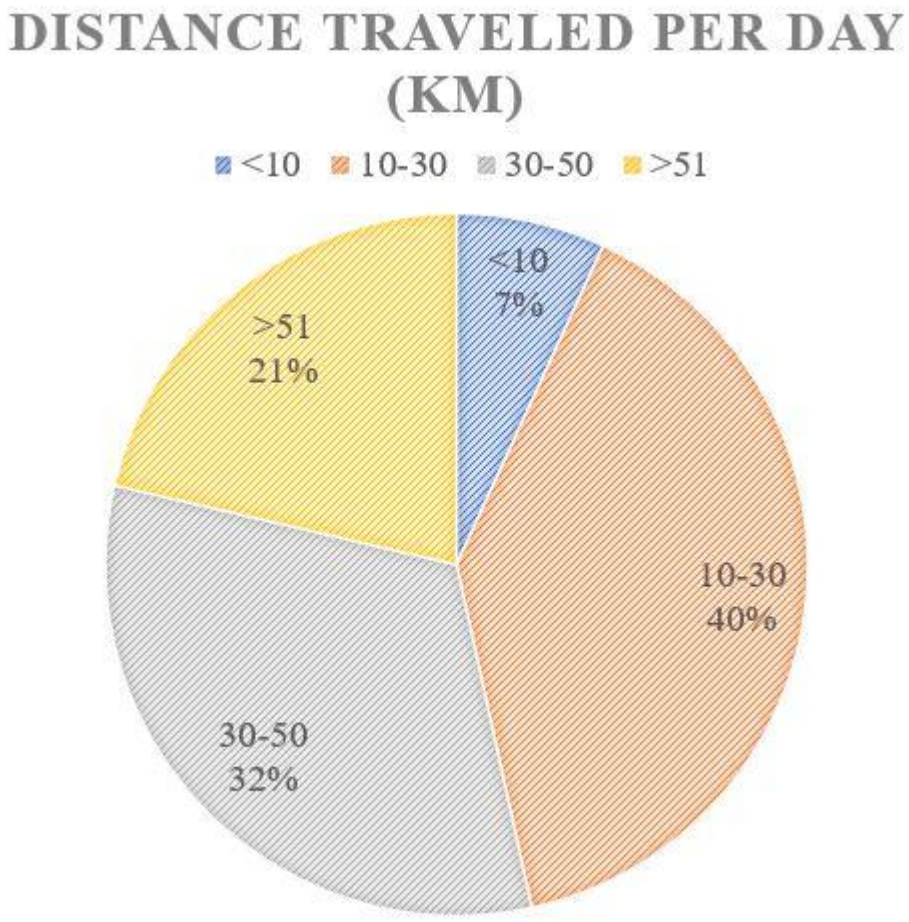
Data Analysis

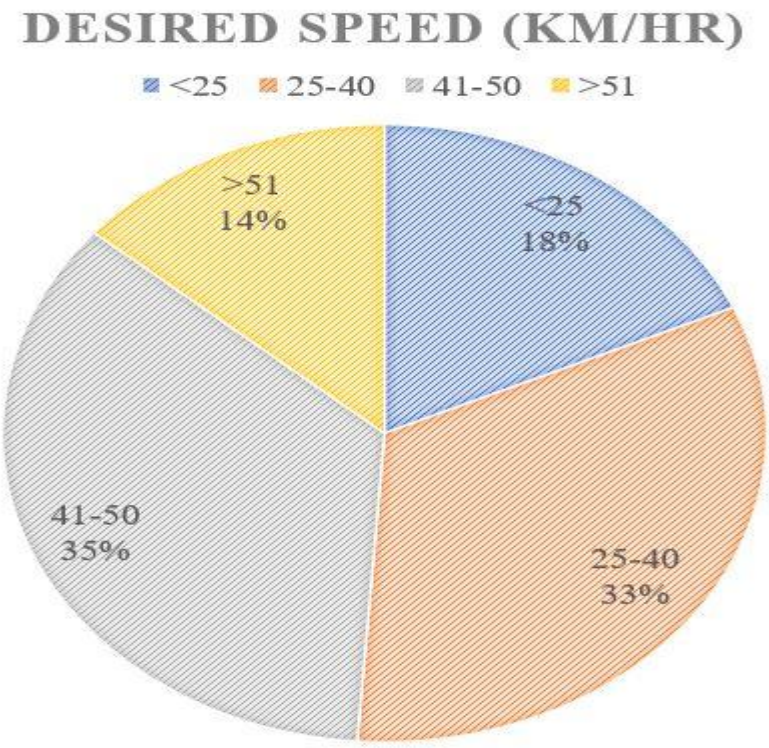
5.1 General

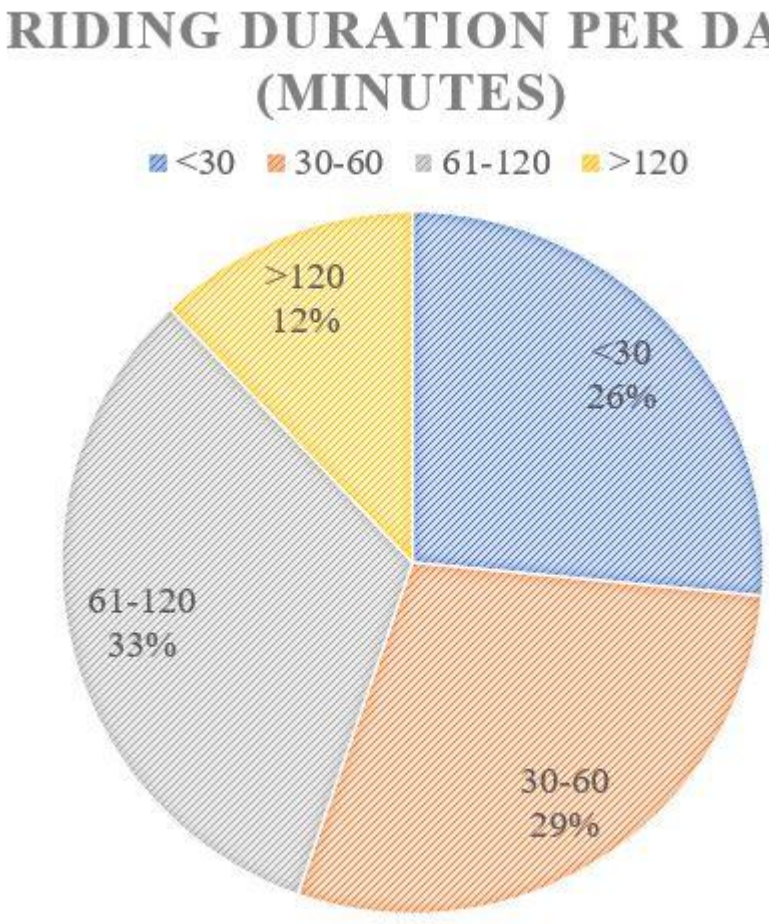
The collected data were analyzed through MS Excel worksheet. All data are converted to numerical variables. We ranked the factors based on average weighted value (AWV).

5.2 General information on motorcycle ride

40% motorcyclists travel 10-30km per day. Desired speed of the most motorcyclist is between 25-50km per hour. 33% respondents are riding on motorcycle > 1hour but <=2 hour daily.



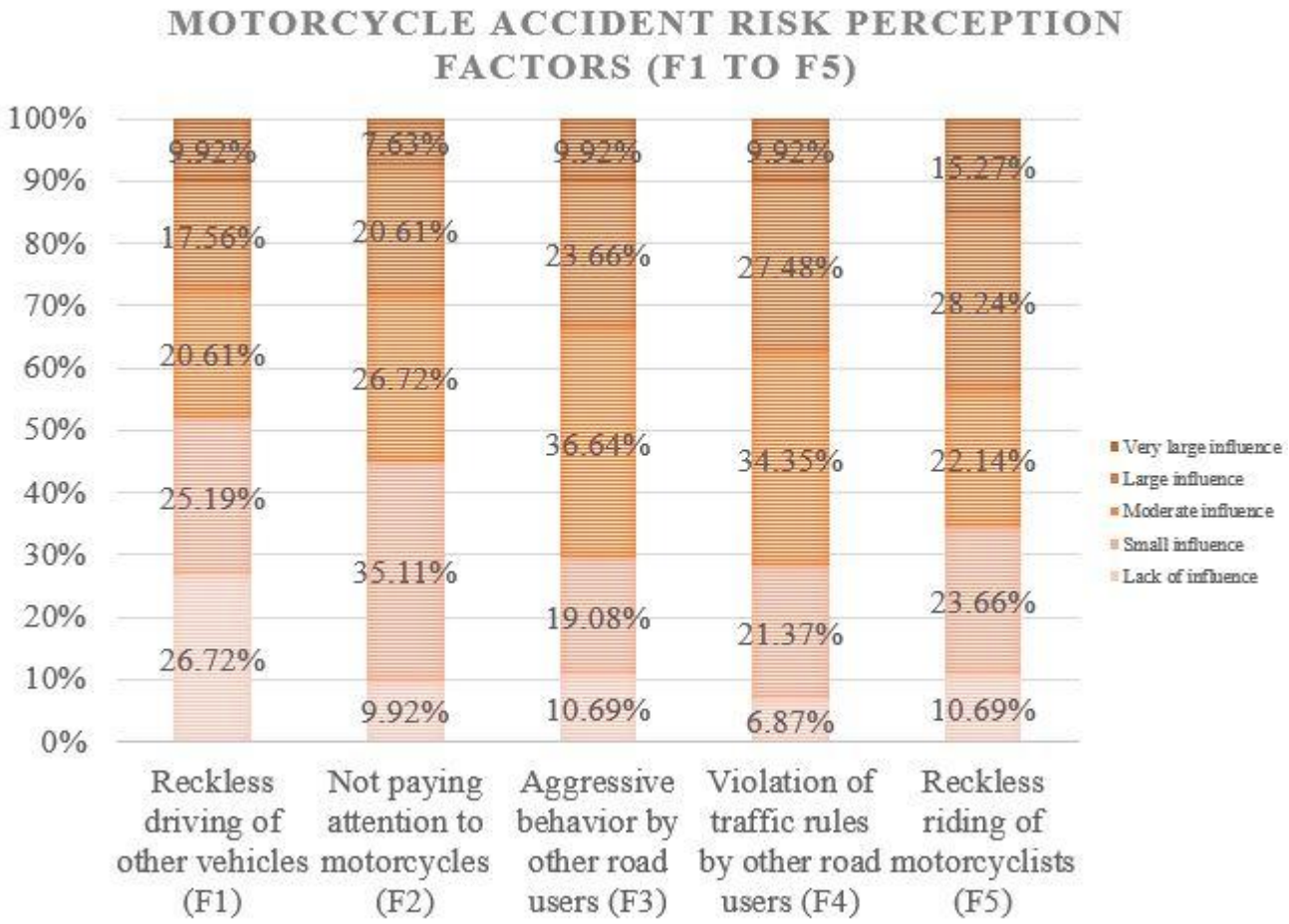




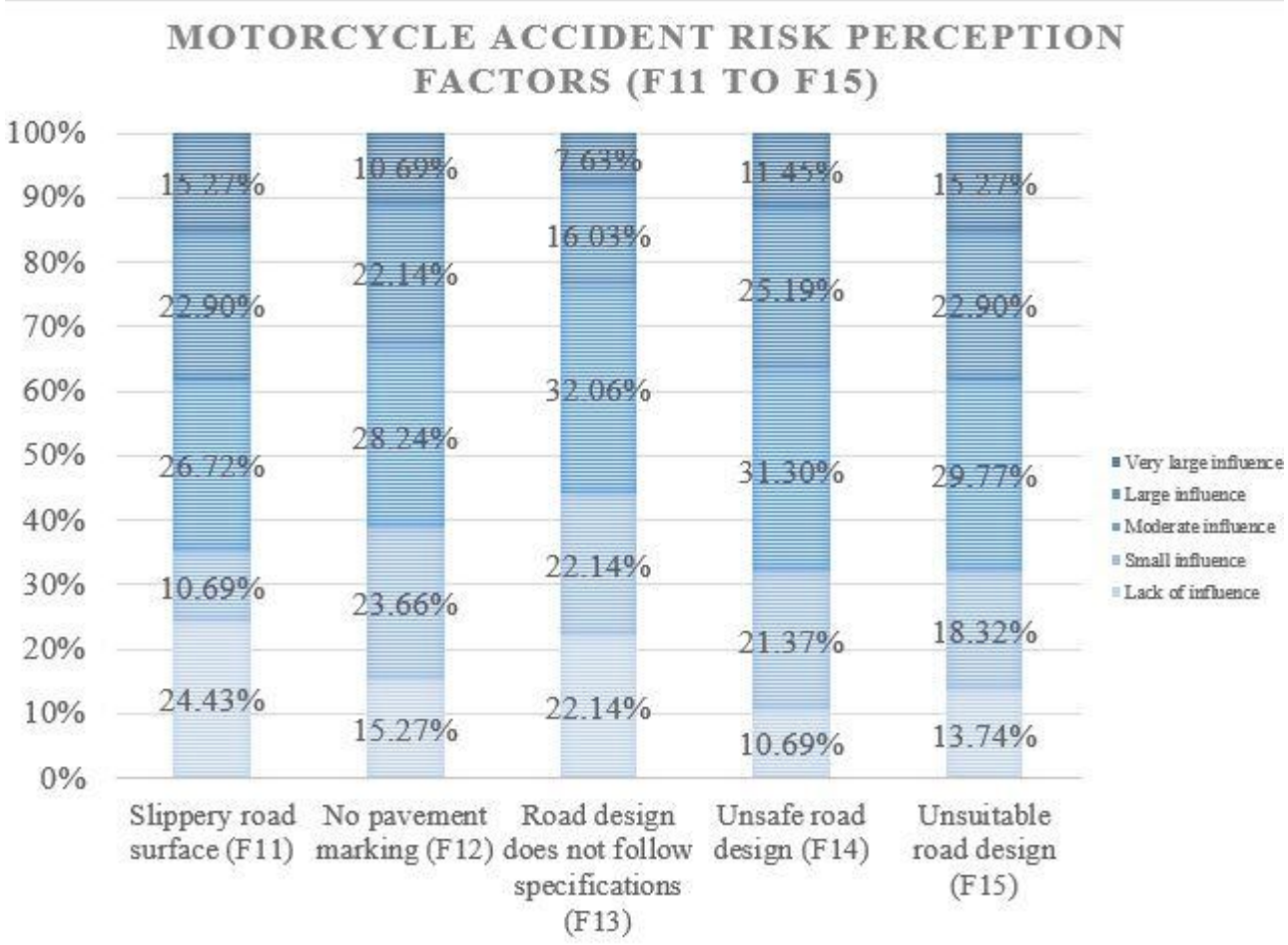
5.3 Studying influence factors

35.11% respondents marked ‘Not paying attention to motorcycles’ (F2) as small influence risk.

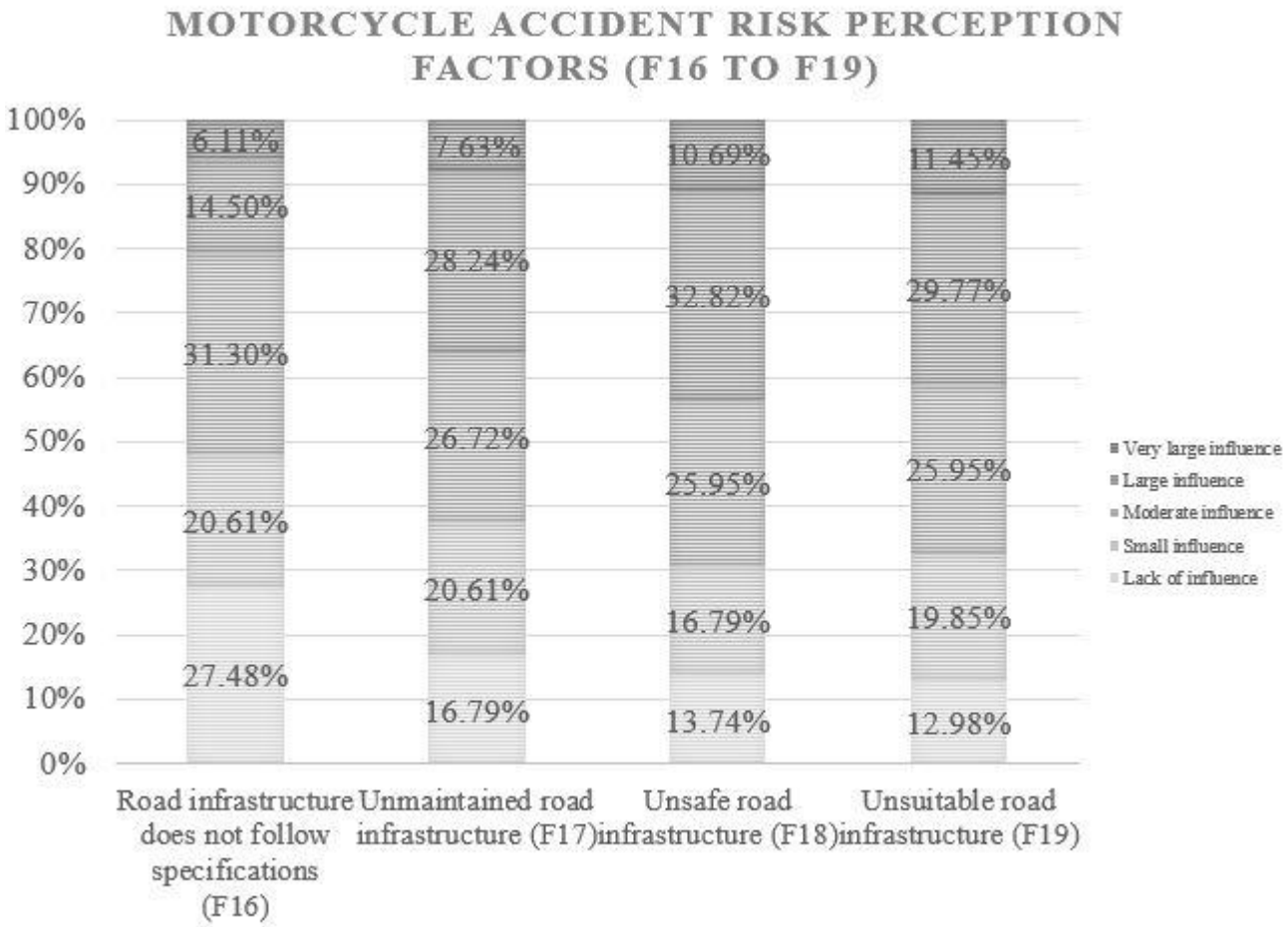
34.35% respondents considered ‘Violation of traffic rules by other road users’ (F4) as moderate influence risk.



- ‘Aggressive behavior by motorcyclist’ (F7) revealed as moderate influence risk by 31.30% respondents.
- ‘Potholes’ (F10) opinioned very large influence risk by only 11.45% responses.



- Only 15.27% respondents remarked ‘Slippery road surface’ (F11) as very large influence factor.
- 31.30% respondents considered ‘Unsafe road design’ (F14) as moderate influence factor for accident risk.



- ‘Unmaintained road infrastructure’ (F17) revealed as large influence risk by 28.24% respondents.
- ‘Unsuitable road infrastructure (F19) opinioned large influence risk by 29.77% responses.

Factors of motorcycle accident risk perception	AWV	Rank
Reckless driving of other vehicles (F1)	1.59	18
Not paying attention to motorcycles (F2)	1.81	16
Aggressive behavior by other road users (F3)	2.03	9
Violation of traffic rules by other road users (F4)	2.12	4
Reckless riding of motorcyclists (F5)	2.14	3
Not paying attention to other vehicles (F6)	1.90	13
Aggressive behavior by motorcyclists (F7)	2.31	1

Violation of traffic rules by motorcyclists (F8)	2.18	2
Unmaintained road surfaces (F9)	1.91	12

Factors those are ranked between 4-9 have AWV greater than >2 but <2 that is, moderate influence.

Ranks 1 to 3 all are related to driving behavior of motorcyclists.

Factors of motorcycle accident risk perception	AWV	Rank
Potholes (F10)	1.99	10
Slippery road surface (F11)	1.94	11
No pavement marking (F12)	1.89	14
Road design does not follow specifications (F13)	1.65	17
Unsafe road design (F14)	2.05	8
Unsuitable road design (F15)	2.08	6
Road infrastructure does not follow specifications (F16)	1.51	19
Unmaintained road infrastructure (F17)	1.89	14
Unsafe road infrastructure (F18)	2.10	5
Unsuitable road infrastructure (F19)	2.07	7

- Factors having Average weighted value (AWV) below 2, but greater than are small influence risk factors.
- Reckless driving of other vehicles (F1) and Road infrastructure does not follow specifications (F16) are marked least influential factors.

5.4 Summary

This chapter describes analysis od survey data and interpretation. The next chapter deals with recommendation and future remarks of the study.

Chapter - 6

Conclusions

6.1 General

An extensive survey on motorcyclists can help to identify potential accident risks related to motorcycles. The study addresses motorcyclists and riders' safety, which is a challenge to the accident research professionals. The question survey will help to understand current situation for motorcycle riding, challenges of motor cycle safety and policy implementation regarding the effective countermeasures for road safety.

6.2 Findings

Findings of the study are given in the following section:

- Aggressive behavior by motorcyclists (F7) was ranked 1st among all factors with AWV = 2.31.
- Violation of traffic rules by motorcyclists (F8) (AWV = 2.18) and Reckless riding of motorcyclists (F5) (AWV = 2.14) are ranked 2nd and 3rd most influential factors for motorcycle accident risk perception.
- Condition of road surface related factors, such as, Unmaintained road surfaces (F9), Potholes (F10), Slippery road surface (F11) and No pavement marking (F12) are marked least important factors.
- None of the factor individually have Average weighted value (AWV) more than 3 (Large influence) and none have less than 1 (Small influence) score.
- The average weighted value (AWV) ranges from Aggressive behavior by motorcyclists (F7) (AWV = 2.31) and Road infrastructure does not follow specifications (F16) (AWV = 1.51).
- Among the five different category of factors, Attitude of motorcyclists have greater influence compare to others.

6.3 Recommendations

Recommendations are:

Short term plan:

- Bangladesh Road Transport Authority (BRTA) need to develop modernize scheme to regulate driving license. The driving licensing system needs to be fair and strict.
- Motorcyclists need proper and adequate training before disbursing driving license.
- Monitoring reckless and aggressive behavior of drivers and enforce strict traffic rules where needed as per Road Transport Act 2018.

Long term plan:

- Mass awareness campaigns are required for road accident related danger and losses. Advertisement for the necessity of traffic rule obey among public should be publicize promptly.
- Identify blind spots, accident-prone locations in the roads and revise faulty road geometry based on extensive survey by the concerned expertise.
- Construction of separate lane for bike lane, where motorcycle traffic is high in numbers. This will segregate heavy vehicle from light and low speed vehicle and increase traffic safety.

6.6 Summary

Motorcycles are involved and vulnerable in road accidents more than other type of vehicles. Upward trend in ride sharing bike is one of the major reasons behind the alarming increase in the number of accidents recently. Increased number of motorcycle related accidents is worrying. Campaign, workshop and training will aware road users for road accident. BRTA and law enforcement agencies need to strict towards driving license monitoring and traffic discipline maintenance.

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APPENDIX

Dataset sample

Age (years)	Gender	Income (BDT)	Distance traveled per day (km)	Desired speed (km/hr)	Riding duration per day (minutes)	Reckless driving of other vehicles	Not paying attention to motorcycles	Aggressive behavior by other road users	Violation of traffic rules by other road users
31-40	Male	20-50k	<10	25-40	30-60	Large influence	Moderate influence	Small influence	Moderate influence
21-30	Male	<20k	<10	41-50	<30	Small influence	Moderate influence	Large influence	Very large influence
31-40	Male	20-50k	30-Oct	25-40	61-120	Large influence	Large influence	Large influence	Small influence
18-20	Male	<20k	30-50	25-40	30-60	Very large influence	Large influence	Moderate influence	Moderate influence
31-40	Male	>50k	30-50	41-50	30-60	Large influence	Moderate influence	Moderate influence	Moderate influence
31-40	Female	20-50k	30-50	41-50	30-60	Small influence	Moderate influence	Large influence	Very large influence
21-30	Male	20-50k	30-Oct	25-40	30-60	Large influence	Very large influence	Small influence	Small influence
21-30	Male	<20k	30-Oct	>51	30-60	Large influence	Very large influence	Large influence	Small influence
21-30	Male	<20k	30-Oct	25-40	30-60	Large influence	Large influence	Moderate influence	Small influence
21-30	Male	>50k	30-50	41-50	61-120	Very large influence	Large influence	Large influence	Large influence
>41	Male	>50k	30-50	25-40	30-60	Very large influence	Large influence	Moderate influence	Small influence
31-40	Male	20-50k	<10	25-40	30-60	Moderate influence	Large influence	Moderate influence	Very large influence
18-20	Male	<20k	30-Oct	41-50	61-120	Small influence	Small influence	Large influence	Lack of influence
21-30	Female	<20k	30-Oct	41-50	<30	Large influence	Moderate influence	Moderate influence	Large influence

	e								
>41	Male	>50k	>51	41-50	>120	Moderate influence	Moderate influence	Large influence	Lack of influence
21-30	Male	<20k	30-Oct	>51	<30	Very large influence	Small influence	Large influence	Large influence
21-30	Male	20-50k	30-Oct	41-50	30-60	Large influence	Large influence	Very large influence	Lack of influence
18-20	Male	<20k	30-50	41-50	61-120	Large influence	Moderate influence	Small influence	Lack of influence
21-30	Male	<20k	30-Oct	25-40	<30	Very large influence	Large influence	Very large influence	Moderate influence
21-30	Male	20-50k	30-Oct	25-40	61-120	Small influence	Moderate influence	Moderate influence	Large influence
31-40	Male	20-50k	<10	25-40	<30	Large influence	Small influence	Moderate influence	Very large influence
21-30	Male	<20k	30-Oct	25-40	61-120	Small influence	Small influence	Large influence	Large influence
21-30	Male	20-50k	30-Oct	<25	30-60	Lack of influence	Moderate influence	Large influence	Large influence
18-20	Male	>50k	>51	>51	<30	Large influence	Moderate influence	Very large influence	Very large influence
>41	Fem ale	<20k	>51	25-40	>120	Large influence	Moderate influence	Very large influence	Very large influence
31-40	Fem ale	>50k	30-50	>51	>120	Moderate influence	Large influence	Small influence	Very large influence
31-40	Fem ale	<20k	30-Oct	25-40	30-60	Small influence	Moderate influence	Moderate influence	Large influence
31-40	Male	20-50k	30-50	41-50	30-60	Small influence	Moderate influence	Large influence	Large influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Lack of influence	Small influence	Moderate influence
21-	M	<20	30-Oct	<25	<30	Lack of	Moderate	Lack of	Small

30	ale	k				influence	influence	influence	influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Moderate influence	Lack of influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Small influence	Lack of influence
21-30	Male	20-50k	30-50	25-40	61-120	Very large influence	Moderate influence	Large influence	Moderate influence
31-40	Male	20-50k	30-50	41-50	61-120	Lack of influence	Moderate influence	Moderate influence	Moderate influence
31-40	Female	<20k	>51	>51	61-120	Small influence	Small influence	Small influence	Small influence
21-30	Male	20-50k	30-Oct	41-50	>120	Moderate influence	Moderate influence	Large influence	Large influence
21-30	Male	20-50k	30-Oct	25-40	61-120	Moderate influence	Large influence	Moderate influence	Moderate influence
21-30	Male	20-50k	>51	>51	>120	Small influence	Small influence	Lack of influence	Small influence
18-20	Male	20-50k	30-50	25-40	30-60	Moderate influence	Small influence	Lack of influence	Lack of influence
18-20	Male	<20k	30-50	41-50	61-120	Lack of influence	Small influence	Large influence	Moderate influence
18-20	Male	>50k	>51	41-50	61-120	Small influence	Small influence	Small influence	Small influence
21-30	Male	>50k	>51	>51	<30	Lack of influence	Moderate influence	Lack of influence	Large influence
21-30	Male	>50k	30-50	41-50	61-120	Lack of influence	Lack of influence	Moderate influence	Lack of influence
18-20	Male	20-50k	30-Oct	41-50	<30	Small influence	Small influence	Small influence	Moderate influence
21-30	Male	20-50k	>51	25-40	30-60	Small influence	Small influence	Small influence	Small influence
21-30	Male	20-50k	30-50	25-40	61-120	Small influence	Moderate influence	Moderate influence	Moderate influence

31-40	Male	20-50k	30-50	41-50	>120	Large influence	Large influence	Moderate influence	Large influence
31-40	Male	>50k	>51	41-50	61-120	Small influence	Large influence	Moderate influence	Moderate influence
21-30	Male	20-50k	30-50	41-50	61-120	Small influence	Small influence	Very large influence	Moderate influence
21-30	Male	20-50k	>51	>51	61-120	Moderate influence	Small influence	Small influence	Small influence
31-40	Male	20-50k	30-50	25-40	61-120	Moderate influence	Moderate influence	Very large influence	Large influence
21-30	Male	20-50k	>51	41-50	30-60	Moderate influence	Moderate influence	Small influence	Small influence
21-30	Fem ale	>50k	>51	>51	>120	Large influence	Moderate influence	Moderate influence	Moderate influence
18-20	Male	20-50k	30-Oct	25-40	30-60	Lack of influence	Small influence	Small influence	Small influence
21-30	Male	20-50k	30-Oct	25-40	30-60	Small influence	Small influence	Small influence	Moderate influence
>41	Male	>50k	>51	<25	<30	Lack of influence	Lack of influence	Large influence	Small influence
31-40	Male	20-50k	>51	25-40	61-120	Moderate influence	Large influence	Large influence	Moderate influence
21-30	Male	20-50k	30-50	25-40	30-60	Small influence	Small influence	Moderate influence	Large influence
31-40	Male	>50k	30-50	>51	30-60	Moderate influence	Small influence	Moderate influence	Large influence
21-30	Male	>50k	30-Oct	>51	>120	Large influence	Large influence	Large influence	Large influence
21-30	Male	20-50k	>51	41-50	30-60	Small influence	Large influence	Large influence	Large influence
31-40	Male	20-50k	30-50	41-50	61-120	Small influence	Moderate influence	Moderate influence	Large influence
21-30	Mal	20-50k	30-50	25-40	<30	Moderate influence	Lack of influence	Moderate influence	Large influence

	e								
31-40	Male	20-50k	>51	>51	>120	Moderate influence	Small influence	Large influence	Large influence
21-30	Male	>50k	30-50	41-50	30-60	Very large influence	Large influence	Small influence	Moderate influence
21-30	Male	>50k	30-Oct	41-50	30-60	Small influence	Lack of influence	Small influence	Moderate influence
>41	Male	>50k	30-50	41-50	61-120	Moderate influence	Very large influence	Large influence	Small influence
31-40	Male	<20k	30-50	25-40	30-60	Moderate influence	Large influence	Small influence	Lack of influence
21-30	Male	20-50k	30-50	>51	30-60	Moderate influence	Lack of influence	Lack of influence	Large influence
31-40	Male	>50k	>51	41-50	30-60	Small influence	Large influence	Moderate influence	Moderate influence
31-40	Male	>50k	30-50	41-50	61-120	Lack of influence	Small influence	Moderate influence	Large influence
31-40	Male	>50k	>51	41-50	61-120	Small influence	Large influence	Moderate influence	Small influence
21-30	Male	20-50k	>51	>51	61-120	Small influence	Moderate influence	Large influence	Small influence
18-20	Male	20-50k	30-Oct	41-50	<30	Moderate influence	Small influence	Lack of influence	Large influence
31-40	Male	>50k	30-50	41-50	61-120	Moderate influence	Small influence	Large influence	Large influence
18-20	Male	20-50k	30-50	41-50	>120	Large influence	Small influence	Moderate influence	Very large influence
21-30	Male	>50k	30-Oct	41-50	30-60	Moderate influence	Small influence	Moderate influence	Large influence
31-40	Male	>50k	<10	41-50	61-120	Lack of influence	Very large influence	Moderate influence	Moderate influence
31-40	Male	20-50k	30-50	41-50	61-120	Small influence	Large influence	Moderate influence	Moderate influence
21-30	Mal	20-50k	>51	25-40	>120	Large influence	Very large influence	Small influence	Large influence

	e								
	M								
31-40	ale	20-50k	>51	25-40	61-120	Very large influence	Small influence	Large influence	Moderate influence
	M								
21-30	ale	20-50k	30-50	25-40	>120	Moderate influence	Very large influence	Moderate influence	Very large influence
	M								
31-40	ale	>50k	30-Oct	<25	<30	Lack of influence	Lack of influence	Small influence	Lack of influence
	M								
31-40	ale	>50k	30-50	41-50	61-120	Large influence	Moderate influence	Moderate influence	Small influence
	M								
31-40	ale	>50k	30-50	41-50	30-60	Small influence	Moderate influence	Large influence	Moderate influence
	M								
31-40	ale	20-50k	30-50	25-40	30-60	Small influence	Small influence	Lack of influence	Lack of influence
	M								
31-40	ale	20-50k	30-50	41-50	61-120	Large influence	Large influence	Small influence	Moderate influence
	M								
>41	ale	>50k	30-50	41-50	61-120	Moderate influence	Moderate influence	Moderate influence	Small influence
	M								
31-40	ale	>50k	30-50	41-50	>120	Large influence	Moderate influence	Large influence	Moderate influence
	M								
21-30	ale	<20k	30-Oct	>51	>120	Large influence	Very large influence	Moderate influence	Small influence
	M								
>41	ale	20-50k	>51	>51	>120	Large influence	Very large influence	Very large influence	Moderate influence
	M								
31-40	ale	20-50k	30-50	41-50	61-120	Small influence	Small influence	Large influence	Small influence
	M								
31-40	ale	20-50k	30-Oct	41-50	61-120	Moderate influence	Small influence	Moderate influence	Very large influence
	M								
21-30	ale	20-50k	30-50	25-40	30-60	Very large influence	Small influence	Large influence	Small influence
	M								
31-40	ale	>50k	>51	41-50	30-60	Lack of influence	Lack of influence	Lack of influence	Moderate influence
	M								
31-40	ale	20-50k	>51	41-50	61-120	Moderate influence	Large influence	Small influence	Moderate influence
21-30	Mal	<20k	>51	25-40	61-120	Small influence	Moderate influence	Moderate influence	Small influence

	e								
31-40	Male	>50k	30-Oct	>51	61-120	Lack of influence	Very large influence	Moderate influence	Moderate influence
21-30	Male	>50k	<10	25-40	30-60	Small influence	Small influence	Moderate influence	Very large influence
21-30	Fem ale	20-50k	>51	41-50	61-120	Small influence	Small influence	Moderate influence	Large influence
18-20	Male	>50k	30-Oct	25-40	61-120	Lack of influence	Small influence	Large influence	Large influence
21-30	Male	<20k	30-50	25-40	61-120	Lack of influence	Lack of influence	Large influence	Moderate influence
31-40	Male	20-50k	30-50	25-40	<30	Lack of influence	Lack of influence	Moderate influence	Very large influence
31-40	Male	20-50k	>51	25-40	<30	Small influence	Moderate influence	Large influence	Small influence
31-40	Male	20-50k	<10	25-40	61-120	Moderate influence	Large influence	Very large influence	Very large influence
31-40	Male	20-50k	30-Oct	41-50	30-60	Small influence	Large influence	Large influence	Large influence
21-30	Male	>50k	>51	41-50	>120	Lack of influence	Small influence	Moderate influence	Moderate influence
21-30	Male	<20k	<10	<25	30-60	Large influence	Large influence	Large influence	Moderate influence
31-40	Male	<20k	30-Oct	25-40	61-120	Lack of influence	Lack of influence	Large influence	Small influence
21-30	Male	20-50k	30-50	>51	61-120	Small influence	Very large influence	Moderate influence	Moderate influence
18-20	Male	20-50k	30-Oct	25-40	30-60	Moderate influence	Small influence	Small influence	Small influence
18-20	Male	<20k	<10	25-40	30-60	Moderate influence	Moderate influence	Moderate influence	Large influence
31-40	Male	<20k	30-50	25-40	30-60	Very large influence	Large influence	Lack of influence	Moderate influence
21-	M	<20	30-Oct	25-40	61-120	Very large	Large	Moderate	Small

30	Male	k				influence	influence	influence	influence
31-40	Male	<20k	30-Oct	25-40	30-60	Moderate influence	Moderate influence	Moderate influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Moderate influence	Lack of influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Lack of influence	Small influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Lack of influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Lack of influence	Lack of influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Moderate influence	Large influence
21-30	Male	<20k	30-Oct	<25	<30	Very large influence	Small influence	Lack of influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Very large influence	Lack of influence	Small influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Moderate influence	Lack of influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Lack of influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Moderate influence	Small influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Moderate influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Lack of influence	Moderate influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Small influence	Lack of influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Small influence	Moderate influence	Lack of influence
21-30	Male	<20k	30-Oct	<25	<30	Lack of influence	Moderate influence	Small influence	Moderate influence
21-	M	<20	30-Oct	<25	<30	Lack of	Small	Moderate	Lack of

30	al k e			influence	influence	influence	influence	

Reckless riding of motorcyclists	Not paying attention to other vehicles	Aggressive behavior by motorcyclists	Violation of traffic rules by motorcyclists	Unmaintained road surfaces	Potholes	Slippery road surface	No pavement marking
Large influence	Very large influence	Very large influence	Moderate influence	Moderate influence	Small influence	Large influence	Lack of influence
Large influence	Small influence	Small influence	Moderate influence	Lack of influence	Small influence	Moderate influence	Lack of influence
Very large influence	Small influence	Moderate influence	Moderate influence	Large influence	Very large influence	Very large influence	Small influence
Moderate influence	Large influence	Very large influence	Large influence	Moderate influence	Large influence	Large influence	Small influence
Large influence	Large influence	Large influence	Moderate influence	Moderate influence	Moderate influence	Large influence	Small influence
Large influence	Moderate influence	Moderate influence	Large influence	Very large influence	Very large influence	Very large influence	Small influence
Large influence	Large influence	Large influence	Large influence	Large influence	Large influence	Large influence	Small influence
Moderate influence	Large influence	Large influence	Moderate influence	Large influence	Large influence	Very large influence	Moderate influence
Large influence	Moderate influence	Moderate influence	Very large influence	Large influence	Moderate influence	Large influence	Small influence
Large influence	Moderate influence	Large influence	Large influence	Moderate influence	Large influence	Large influence	Small influence
Very large influence	Large influence	Large influence	Moderate influence	Very large influence	Large influence	Very large influence	Lack of influence
Very large influence	Large influence	Very large influence	Very large influence	Moderate influence	Large influence	Very large influence	Small influence
Large influence	Moderate influence	Large influence	Very large influence	Lack of influence	Very large influence	Very large influence	Lack of influence
Large influence	Very large influence	Very large influence	Moderate influence	Moderate influence	Large influence	Very large influence	Small influence
Large influence	Moderate influence	Large influence	Very large influence	Small influence	Moderate influence	Large influence	Lack of influence
Very large influence	Moderate influence	Very large influence	Large influence	Very large influence	Very large influence	Large influence	Small influence
Lack of influence	Large influence	Large influence	Lack of influence	Moderate influence	Small influence	Large influence	Small influence
Small influence	Large influence	Large influence	Small influence	Very large influence	Large influence	Very large influence	Small influence
Large influence	Large influence	Very large influence	Large influence	Moderate influence	Large influence	Large influence	Moderate influence
Large influence	Large influence	Large influence	Large influence	Large influence	Large influence	Large influence	Large influence
Lack of	Moderate	Moderate	Large	Moderate	Large	Large	Large

influence	influence	influence	influence	influence	influence	influence	influence
Very large influence	Small influence	Moderate influence	Large influence	Very large influence	Large influence	Small influence	Moderate influence
Lack of influence	Lack of influence	Large influence	Large influence	Moderate influence	Lack of influence	Moderate influence	Lack of influence
Small influence	Moderate influence	Moderate influence	Small influence	Large influence	Large influence	Moderate influence	Moderate influence
Small influence	Very large influence	Moderate influence	Very large influence	Moderate influence	Moderate influence	Large influence	Very large influence
Lack of influence	Lack of influence	Large influence	Large influence	Large influence	Large influence	Large influence	Large influence
Moderate influence	Large influence	Large influence	Moderate influence	Moderate influence	Small influence	Very large influence	Very large influence
Large influence	Large influence	Large influence	Large influence	Large influence	Moderate influence	Moderate influence	Moderate influence
Small influence	Small influence	Moderate influence	Moderate influence	Large influence	Lack of influence	Moderate influence	Lack of influence
Moderate influence	Small influence	Lack of influence	Large influence	Small influence	Lack of influence	Lack of influence	Moderate influence
Large influence	Small influence	Large influence	Lack of influence	Moderate influence	Small influence	Lack of influence	Moderate influence
Moderate influence	Moderate influence	Large influence	Moderate influence	Lack of influence	Small influence	Moderate influence	Moderate influence
Moderate influence	Small influence	Very large influence	Very large influence	Moderate influence	Very large influence	Very large influence	Very large influence
Lack of influence	Lack of influence	Lack of influence	Lack of influence	Moderate influence	Large influence	Moderate influence	Large influence
Large influence	Large influence	Large influence	Large influence	Large influence	Large influence	Large influence	Large influence
Large influence	Moderate influence	Large influence	Moderate influence	Moderate influence	Small influence	Lack of influence	Small influence
Moderate influence	Large influence	Large influence	Moderate influence	Small influence	Moderate influence	Small influence	Very large influence
Small influence	Moderate influence	Small influence	Lack of influence	Lack of influence	Lack of influence	Lack of influence	Lack of influence
Moderate influence	Small influence	Small influence	Lack of influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence
Small influence	Lack of influence	Lack of influence	Small influence	Small influence	Small influence	Small influence	Small influence
Lack of influence	Lack of influence	Lack of influence	Small influence	Moderate influence	Moderate influence	Moderate influence	Large influence
Small influence	Small influence	Small influence	Moderate influence	Small influence	Small influence	Large influence	Small influence
Lack of influence	Lack of influence	Lack of influence	Moderate influence	Small influence	Small influence	Moderate influence	Large influence
Small influence	Moderate influence	Moderate influence	Large influence	Moderate influence	Large influence	Large influence	Very large influence
Large influence	Moderate influence	Small influence	Lack of influence	Moderate influence	Small influence	Moderate influence	Lack of influence
Moderate influence	Lack of influence	Moderate influence	Moderate influence	Large influence	Small influence	Moderate influence	Small influence

Moderate influence	Moderate influence	Large influence	Large influence	Moderate influence	Moderate influence	Large influence	Large influence
Moderate influence	Large influence	Very large influence	Moderate influence	Large influence	Moderate influence	Moderate influence	Moderate influence
Moderate influence	Large influence	Small influence	Moderate influence	Small influence	Moderate influence	Large influence	Large influence
Large influence	Moderate influence	Very large influence	Large influence	Large influence	Moderate influence	Moderate influence	Large influence
Lack of influence	Large influence	Moderate influence	Small influence	Moderate influence	Very large influence	Moderate influence	Very large influence
Large influence	Large influence	Moderate influence	Large influence	Moderate influence	Very large influence	Very large influence	Very large influence
Small influence	Moderate influence	Very large influence	Large influence	Small influence	Large influence	Very large influence	Large influence
Small influence	Small influence	Large influence	Very large influence	Moderate influence	Moderate influence	Large influence	Lack of influence
Small influence	Small influence	Small influence	Moderate influence	Large influence	Moderate influence	Large influence	Moderate influence
Small influence	Small influence	Moderate influence	Moderate influence	Small influence	Small influence	Large influence	Large influence
Moderate influence	Small influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence
Moderate influence	Small influence	Small influence	Large influence	Moderate influence	Very large influence	Very large influence	Large influence
Small influence	Moderate influence	Lack of influence	Moderate influence	Moderate influence	Small influence	Moderate influence	Very large influence
Small influence	Large influence	Moderate influence	Large influence	Small influence	Moderate influence	Lack of influence	Moderate influence
Large influence	Lack of influence	Large influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence	Small influence
Large influence	Large influence	Moderate influence	Large influence	Large influence	Moderate influence	Moderate influence	Moderate influence
Lack of influence	Small influence	Small influence	Moderate influence	Moderate influence	Moderate influence	Lack of influence	Large influence
Small influence	Very large influence	Very large influence	Moderate influence	Small influence	Moderate influence	Moderate influence	Moderate influence
Large influence	Large influence	Small influence	Lack of influence	Lack of influence	Small influence	Moderate influence	Moderate influence
Large influence	Small influence	Small influence	Small influence	Very large influence	Small influence	Moderate influence	Moderate influence
Small influence	Large influence	Moderate influence	Moderate influence	Moderate influence	Small influence	Very large influence	Lack of influence
Small influence	Moderate influence	Moderate influence	Small influence	Lack of influence	Very large influence	Large influence	Small influence
Lack of influence	Moderate influence	Very large influence	Large influence	Small influence	Large influence	Large influence	Small influence
Moderate influence	Very large influence	Large influence	Moderate influence	Large influence	Lack of influence	Small influence	Moderate influence
Very large influence	Very large influence	Large influence	Moderate influence	Small influence	Lack of influence	Small influence	Moderate influence
Moderate	Small	Very large	Moderate	Small	Large	Very large	Lack of

influence	influence	influence	influence	influence	influence	influence	influence
Lack of influence	Large influence	Very large influence	Large influence	Moderate influence	Small influence	Very large influence	Moderate influence
Large influence	Small influence	Moderate influence	Large influence	Lack of influence	Moderate influence	Large influence	Very large influence
Large influence	Large influence	Large influence	Small influence	Moderate influence	Small influence	Large influence	Moderate influence
Very large influence	Lack of influence	Moderate influence	Lack of influence	Moderate influence	Lack of influence	Moderate influence	Small influence
Large influence	Moderate influence	Large influence	Small influence	Moderate influence	Lack of influence	Very large influence	Large influence
Large influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence	Large influence	Large influence	Large influence
Moderate influence	Moderate influence	Moderate influence	Very large influence	Small influence	Large influence	Small influence	Large influence
Moderate influence	Moderate influence	Moderate influence	Small influence	Small influence	Moderate influence	Large influence	Lack of influence
Moderate influence	Small influence	Small influence	Moderate influence	Moderate influence	Lack of influence	Lack of influence	Moderate influence
Very large influence	Moderate influence	Small influence	Small influence	Lack of influence	Very large influence	Small influence	Lack of influence
Small influence	Lack of influence	Moderate influence	Lack of influence	Moderate influence	Large influence	Lack of influence	Small influence
Small influence	Moderate influence	Moderate influence	Moderate influence	Large influence	Moderate influence	Moderate influence	Moderate influence
Lack of influence	Large influence	Small influence	Moderate influence	Small influence	Moderate influence	Lack of influence	Small influence

Moderate influence	Large influence	Small influence	Moderate influence	Small influence	Small influence	Small influence	Moderate influence
Moderate influence	Lack of influence	Large influence	Large influence	Small influence	Lack of influence	Small influence	Small influence

Large influence	Very large influence	Very large influence	Small influence	Moderate influence	Large influence	Large influence	Large influence
Small influence	Moderate influence	Large influence	Large influence	Moderate influence	Large influence	Moderate influence	Moderate influence

Large influence	Large influence	Large influence	Very large influence	Moderate influence	Moderate influence	Moderate influence	Moderate influence
Moderate influence	Moderate influence	Large influence	Large influence	Lack of influence	Large influence	Moderate influence	Large influence
Lack of influence	Large influence	Large influence	Very large influence	Small influence	Large influence	Moderate influence	Large influence
Very large influence	Small influence	Small influence	Small influence	Very large influence	Large influence	Lack of influence	Small influence
Small influence	Moderate influence	Lack of influence	Lack of influence	Large influence	Large influence	Large influence	Large influence
Small influence	Moderate influence	Large influence	Moderate influence	Moderate influence	Large influence	Small influence	Small influence
Lack of influence	Lack of influence	Small influence	Very large influence	Large influence	Very large influence	Very large influence	Very large influence
Small influence	Lack of influence	Small influence	Moderate influence	Large influence	Very large influence	Lack of influence	Very large influence
Small influence	Small influence	Moderate influence	Very large influence	Moderate influence	Large influence	Small influence	Moderate influence
Lack of influence	Lack of influence	Small influence	Lack of influence	Large influence	Very large influence	Large influence	Large influence
Lack of influence	Small influence	Large influence	Very large influence	Moderate influence	Moderate influence	Large influence	Moderate influence
Large influence	Small influence	Very large influence	Large influence	Small influence	Lack of influence	Lack of influence	Small influence
Moderate influence	Large influence	Very large influence	Lack of influence	Moderate influence	Small influence	Lack of influence	Small influence
Moderate influence	Lack of influence	Moderate influence	Lack of influence	Large influence	Lack of influence	Lack of influence	Large influence
Small influence	Moderate influence	Moderate influence	Small influence	Lack of influence	Lack of influence	Large influence	Moderate influence
Lack of influence	Small influence	Moderate influence	Lack of influence	Lack of influence	Moderate influence	Moderate influence	Lack of influence
Lack of influence	Small influence	Moderate influence	Small influence	Large influence	Lack of influence	Very large influence	Large influence
Lack of influence	Moderate influence	Lack of influence	Large influence	Lack of influence	Moderate influence	Large influence	Lack of influence
Small influence	Lack of influence	Moderate influence	Large influence	Moderate influence	Lack of influence	Very large influence	Lack of influence
Large influence	Lack of influence	Very large influence	Large influence	Very large influence	Lack of influence	Moderate influence	Small influence
Large influence	Very large influence	Small influence	Very large influence	Moderate influence	Large influence	Large influence	Lack of influence
Lack of influence	Large influence	Large influence	Very large influence	Lack of influence	Small influence	Lack of influence	Moderate influence
Moderate influence	Lack of influence	Large influence	Large influence	Small influence	Lack of influence	Small influence	Moderate influence
Moderate influence	Large influence	Large influence	Large influence	Lack of influence	Moderate influence	Small influence	Moderate influence
Moderate influence	Large influence	Lack of influence	Small influence	Moderate influence	Small influence	Lack of influence	Large influence
Small	Lack of	Lack of	Very large	Large	Moderate	Small	Large

influence	influence	influence	influence	influence	influence	influence	influence
Large influence	Lack of influence	Very large influence	Lack of influence	Small influence	Moderate influence	Lack of influence	Lack of influence

Road design does not follow specifications	Unsafe road design	Unsuitable road design	Road infrastructure does not follow specifications	Unmaintained road infrastructure	Unsafe road infrastructure	Unsuitable road infrastructure
Small influence	Moderate influence	Small influence	Lack of influence	Moderate influence	Large influence	Small influence
Lack of influence	Moderate influence	Moderate influence	Moderate influence	Large influence	Small influence	Small influence
Small influence	Large influence	Moderate influence	Small influence	Small influence	Small influence	Large influence
Small influence	Small influence	Large influence	Moderate influence	Moderate influence	Large influence	Small influence
Lack of influence	Small influence	Moderate influence	Lack of influence	Small influence	Small influence	Lack of influence