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Perception of motorcyclists on safe riding in Kota Kinabalu

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Abstract. Despite the high risks reflected from the annual road traffic casualties, motorcycles remain a popular mode of transport in Malaysia due to economic and ease-of-use factors. Therefore, various parties need to play their roles, make proper plans and take actions to accommodate the needs of the motorcyclists in Malaysia. Consequently, some fundamental basis on how motorcyclists interact with the road environment and other drivers was needed. For this reason, this study was to examine and assess motorcyclist perception towards safe riding regarding the road environments and other drivers' attitude and behaviour. A survey by distributing questionnaires among motorcyclists in Kota Kinabalu, Sabah was conducted and was analysed using Statistical Package for Social Science (SPSS) tools. It found that most motorcyclists, regardless of their demographic and riding background, perceive that poor road conditions such as road surface defects and slippery roads highly affect their safe motorcycling. Besides that, there was no statistically significant difference between motorcyclists' perceptions of positive and negative attitudes and behaviour. These findings also guide the development of any road safety initiatives and strategies, as well as for future studies specifically related to motorcycle concerns.

1. Introduction

For the past decades, private vehicle ownership has increased tremendously in Malaysia due to economic growth, rapid urban development, population growth, and inadequate public transport availability and services [1]. In Malaysia, the Ministry of Transport (MOT) [2] reported 29,666,187 registered vehicles until September 2018. The number increased by 56.7% compared to 2009 (18,993,237 registered vehicles in 2009).

This high number of motorcycle ownership is expected to grow due to some contributing factors, especially traffic congestion [3]. Besides that, convenient parking, low daily expenses, and inefficient public transportation systems also contribute to motorcycle usage. However, according to International Traffic Safety Data and Analysis Group (IRTAD) [4], Malaysia has high road mortality risk and 63%



of all fatalities are motorcyclists. Therefore, various comprehensive action plans have been done to fulfil the needs of motorcyclists in Malaysia, such as safety helmet standards, community-based programmes (CBP), and motorcycle lane programmes, to attain a mortality index of 2.0 per 10,000 registered vehicles by 2020 [5]. However, these are not enough because the fatalities by motorcycle accidents are continuously increasing every year [2]. Motorcyclists are often referred to as vulnerable road users as they have a higher accident and injury rate than other vehicles due to a lack of protection.

There are three elements to determine motorcycle safety; human factors, vehicle considerations, and road environment factors. Human factors were reported as one of the most significant contributors to road traffic accidents [6]. Nevertheless, according to Edquist et al. [7], differences in road width, road alignment, riding during wet/dry season, presence of intersections, and riding during day/night time could potentially affect motorcyclists' safety speed and decisions made in a given scenario. As a result, a safe and convenient road environment for motorcyclists was a key in reducing motorcycle deaths. Therefore, it is crucial to comprehend and investigate motorcyclists' attitudes toward a safe road environment to improve motorcycle safety, particularly in mixed traffic areas.

Furthermore, motorcycle accidents frequently occur either in single-vehicle collisions or in interactions with other vehicles [4]. Additionally, motorcyclists may split lanes or alter lanes during traffic congestion, causing them to travel between slow-moving vehicles and vehicles that are halted. Typically, most drivers do not expect these motorcyclists' behaviour. Not only that, sudden movements or lane changes by other vehicles might be dangerous to motorcyclists. Consequently, many studies mainly focused on attitude and behaviour between motorcyclists and road users, such as in Australia [8], Iran [9] and United Kingdom [10-12]. Chaiklin [13] mentioned that the behaviour depends on the attitude. An attitude refers to a person's mental view regarding how he/she thinks or feels about someone or something. Meanwhile, behaviour implies an individual or group's action, moves, conduct, or functions towards other persons. On the other hand, as related to motorcyclists, the attitude and behaviour are affected by their demographic and riding background, such as gender, age, riding experiences, license status and current rider status. For example, according to MIROS research, female riders have a greater accident rate than male riders [14]. Also, according to Haworth et al. [15], drivers with more experience respond faster and are better able to identify specific road elements that may pose a hazard to motorcyclists.

As a result, in order to assist authorities in improving motorcyclist safety, this study was to analyse motorcyclist perceptions of other drivers who may have the most significant impact on motorcyclist safety. Engineering-wise, this study assessed motorcyclists' perceptions of safe riding aids authorities to consider the expectations, perceptions, and needs of motorcyclists when developing and maintaining road facilities. Nevertheless, appropriate design or treatment promotes safe motorcycling in mixed traffic, particularly in urban areas.

2. Methodology

This study was conducted at Kota Kinabalu, Sabah (urban area). Road users, including motorcyclists, utilize the road network extensively to commute between cities for various purposes. The study area has a wide range of road networks, a large number of motorcyclists, and a variety of demographic backgrounds of the motorcyclists.

Ideally, questionnaires should be designed in sequence, with clearly marked transitions between sections, according to the objectives of the study [16]. The questionnaire comprised four sections; 1) Section A: Demographics and riding background, 2) Section B: Riders' perception towards road environment, 3) Section C: Riders' perception towards other driver's attitudes and behaviour, and 4) Section D, riders' perceptions of their riding. Section A had 12 questions consisting of the respondents' backgrounds such as their gender, age, working sector, education, current road status, riding experience, etc. The respondents' recent traffic infringement notices and accident experiences were also included.

Meanwhile, Section B was divided into two sub-sections. First sub-sections (B1) had five (5) questions on road condition problems with ranking numbers. Number 1 represented the most affecting, and 5 was the least affecting. Second sub-section (B2) consisted of 13 questions to determine

respondents' perception towards geometry and situation of the road. The answers were likert scale answer; 'very dangerous', 'dangerous', 'neutral', 'safe', and 'very safe'.

Section C had 18 questions that measure how drivers perceive motorcyclists' attitudes and behaviour. The answers also in likert scale; 'strongly disagree', 'disagree', 'neutral', 'agree', and 'strongly agree'.

In last section, Section D was divided into two (2) sub-sections. First sub-section (D1) concerned with motorcycle riders' perceptions of their riding, while second sub-section (D2) described the motorcycle riders' behaviour in general. In Section D1, respondents were given five (5) options with likert scale; 'very low', 'low', 'neutral', 'high', and 'very high'. Meanwhile, in Section D2, the likert scale was classed as 'never, seldom, sometimes, often, and always.'

A sample size of study represents the population. The number of samples or sample size can be calculated in various ways. However, this study used a simplified proportions calculation based on Yamane's formula [17]. With a population of 391,683 (registered motorcycles), confidence level at 95% and 10% level of precision, thus at least 100 samples size was chosen.

The questionnaires were distributed using Google survey forms for data collection to be stored and retrieved automatically. At the same time, the survey was also carried out manually by approaching the respondents and asking their willingness to participate and share opinions on the survey's subject matters. The information was compiled and documented into Microsoft Excel before being exported to the Statistical Package for Social Science (SPSS) software for further analysis. SPSS was evaluated the data according to the study's objectives. The results were then displayed in the form of a chart or table. Following that, inferential statistics such as the independent t-test, analysis of variance (ANOVA), Mann-Whitney test, Kruskal Wallis, and chi-square test were performed on the structured data.

3. Experimental results

3.1. Positioning tables

There were 186 respondents participated in this survey. Table 1 shows in more detail how the sample was stratified in terms of gender, age, current user status, driving experiences and so on. It is clearly shown that more than half of the respondents are male which made up of 70.4% or 131 respondents. Unfortunately, only 29.6% of the total respondents are female as it is pretty hard to find female rider especially in the coverage of study area. However, this data is adequate and in line with the statistic by MOT [2] that 36% of active drivers (including riders) in Sabah are female drivers. Further analysis with this group will be explained more in the following section.

In term of age group, results show that most respondents are within the age of 21 to 30 years old, which comprise of 64% of the respondents. It is undoubtedly since 46.8% of respondents are currently student by profession. Majority of respondents are also well educated with only 1.6% of them are educated up to primary level.

Furthermore, 70% or 130 respondents are currently rider and driver (dual driver), followed by 21% respondents' who are rider and pedestrian and the rest 9% are rider only. From Table 1 also, it can be seen that most of the respondents have a full license comprise of 58.6% or 109 respondents. Surprisingly there are 28.5% respondents have no riding license and statistically found that most of them are dual on-road status (driver and rider / pedestrian). Besides, two (2) or 1.1% respondents have an expired / suspended driving license.

Moreover, respondents were also asked on their motorcycle's engine capacity and result shows that most of them (54.8%) are riding on motorcycle with less than or equal to 125cc. About 33% of respondents riding with motorcycle between 125cc to 250cc and interestingly found that, 12% of respondents are riding a motorcycle with an engine capacity of more than 250cc. Other than that, study also found that riding experiences among respondents are well tabulated. Result shows that 34.9% or 65 of respondents' have a riding experience of less than two (2) years. The data followed by those who riding between two (2) to five (5) years and more than 10 years with 25.8% and 23.1% respectively. The least (16%) was riders between six (6) to 10 years riding experiences. Riding frequencies of respondents also being asked in the questionnaires and noticed that most of the respondent are riding almost every

day, which contribute 30.6% of the total respondents. However, the same figure also for respondents who rode once in two (2) weeks or less. The statistic followed by respondents who rode 4-5 days per week (12.9%), 2-3 days per week (17.2%) and 9.1% who rode at least once in a week.

In addition, from table 1, it shows that 51.1% or 95 of respondents using their motorcycle for recreational purposes. Then, some of them (32.3%) purposely using theirs for working and the remaining 16.7% respondents used their motorcycles for other purposes. Nevertheless, further analysis for this category was not conducted due to the low priority of analysing them in this study.

Finally, respondents' experiences on traffic infringement notices and accidents within two years back were also being asked. It was found that majority of respondents (84.4% or 157 respondents) have never received any traffic summons or notices while 10.8% respondents have received 1 or 2 notices. Five respondents have received 3 or 4 notices and four (4) respondents have received at least or more than five traffic notices. It was also found that 55.4% or 103 respondents have not experienced any accident or near miss accident within this last two years. Meanwhile, 31.2% respondents have experienced 1 or 2 accidents, 9.7% have 3 to 4 times and 3.8% respondents have experienced at least or more than 5 accidents.

Table 1. Respondents' demographic and riding background (N = 186).

Demographic	Frequencies (n)	%
Gender		
Male	131	70
Female	55	30
Age group (years)		
< 20	6	3.2
21–30	119	64
31-40	36	19.4
41-50	23	12.4
51-60	2	1.1
> 60		
Working sector		
Government	56	30.1
Private	33	17.7
Self-employed	6	3.2
Unemployed	4	2.2
Student	87	46.8
Education level		
Primary	3	1.6
Secondary	87	46.8
College/Institute	38	20.4
University	58	31.2
On-road user status		
Rider only	17	9
Rider and driver	130	70
Rider and pedestrian	39	21
License status		
None	53	28.5
Probationary	10	5.4
Learner	12	6.5

Full	109	58.6
Expired/suspended	2	1.1
Engine capacity (c.c)		
≤ 125	102	55
125<c.c<250	62	33
≥ 250	22	12
Riding experiences (years)		
< 2	65	34.9
2-5	48	25.8
6-10	30	16.1
>10	43	23.1
Riding frequencies		
6-7days/week	57	30.6
4-5days/week	24	12.9
2-3days/week	32	17.2
1days/week	17	9.1
≤ 1day/2week	56	30.1
Traffic notices		
≥ 5	4	2.2
3-4	5	2.7
1-2	20	10.8
None	157	84.4
Accidents Experiences		
≥ 5	7	3.8
3-4	18	9.7
1-2	58	31.2
None	103	55.4

3.2. Motorcyclists' perceptions towards road environments

Motorcyclists' perception towards environments can be elaborated into three (3) main categories, which are perception on road condition problems, perception on road geometries and perception on road situation.

3.2.1. Perceptions on road condition problems

With a mean rank of 2.06, poor road surface conditions (potholes, uneven road surface, undulating road) are perceived as the most dangerous by most respondents (see Figure 1). Second in terms of impacting motorcyclist safety, oil slicks and sand on the road surface cause a slippery road, with a mean rank of 2.26. According to the survey, the third recognized road condition problem was objects on the road, such as tires, nails, glass, etc. Respondents ranked insufficient clear zones/road shoulders for motorcycles as the fourth road condition complaint with a mean ranking of 2.46. The least important factor that impacts motorcycle safety is poorly maintained road furniture, such as guardrails or lampposts, which have a mean rating of 2.60. As a result, poor road surface condition has been highlighted as the most distressing road condition problem for motorcyclists. This result is hardly surprising, given that potholes are the most common type of road fault [18]. Weissenfeld et al. [8] and Aetukumana et al. [19] found that the quality of the road surface is identified as a possible threat by motorcyclists, and bad road conditions are among the causes of road accidents involving motorcyclists.

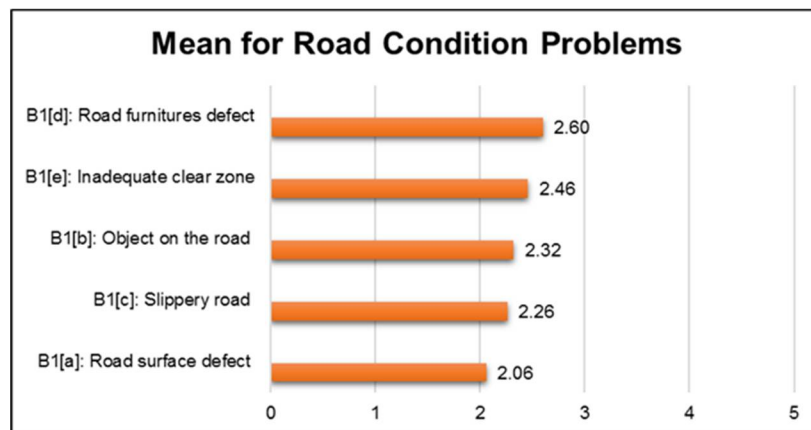


Figure 1. Mean ranking for road condition problems.

3.2.2. Perceptions on road geometries

By using independent t-test or ANOVA analysis at 95% Confidence Level ($\alpha = 0.05$), the perception of respondents towards different road alignment, road access/junction availability and lane width were identified.

3.2.2.1. Perceptions towards road alignment.

Based on table 2 below, it shows that with confident level of 95%, there is no statistically significant difference between straight road alignment and respondents' demographic & riding background (gender, age, license status and riding experience) with an average mean of more than 3.00. This indicate that most of motorcyclist feel that it is safer to ride on straight road alignment. This expected result is consistent with our human common sense.

Meanwhile, data shows that respondents' gender and age have statistically significant with curve road geometry, which P-value is less than 0.05. Female motorcyclist (mean = 2.38) shown to perceive less safe compared to male (mean = 2.82) while riding on curve road alignment. In term of age group, all of them feel that riding on curve road are dangerous, indeed age group 51 to 60 years respondents feel that road curve is very dangerous and affects most to their riding.

Furthermore, it is also found that there is no statistically significant difference between curve road alignment and respondents' license status and riding experience. Most of the group have mean more than 2.5 which reflects that regardless of their license status and riding experience, they are considering that riding on curved road is less safe and dangerous. However, some respondents with an expired or suspended license sense that curved road have no effect (mean = 3.50) to their riding.

According to descriptive statistics with regard to frequencies and percentages of respondents, a majority of motorcycle riders regardless of their demographics and riding experience appear to perceive a straight road as safer and more comfortable than a curved road. The perception arises because some motorcyclists ride at their desired speed limit, but still with caution, easily predicting, responding and overcoming any potentially dangerous circumstances. Additionally, riding on a straight road requires less motorcycling expertise. Similarly, Berg et al. [20] discovered that, as compared to straight roads, the majority of motorcycle crashes happened on bends or curves. As a result, riding on a straight road is undeniably safer than riding on a curve road.

Table 2. Road geometries mean and significant value.

Road Geometry	Parameter	Variables	Mean Value	P - Value		
Road alignment	Straight road	Gender	Male	3.83	0.079**	
			Female	4.11		
		Age (years)	< 20	3.17		
			21 – 30	3.97		
			31 – 40	3.86		0.396**
			41 – 50	3.87		
			51 – 60	4.00		
		License status	None	3.92		
			Probationary	3.60		
	Learner		4.08	0.847**		
	Full	3.92				
	Expired/Suspend	4.00				
	Riding experience (years)	< 2	3.92			
		2-5	4.00	0.846**		
		6-10	3.90			
		> 10	3.81			
	Curve road	Gender	Male		2.82	0.020*
			Female	2.38		
Age (years)		< 20	2.00			
		21 – 30	2.78			
		31 – 40	2.64	0.015*		
		41 – 50	2.61			
		51 – 60	1.00			
License Status		None	2.57			
		Probationary	2.60			
	Learner	2.83	0.530**			
Full	2.72					
Expired/Suspend	3.50					
Riding experience (years)	< 2	2.72				
	2-5	2.73	0.539**			
	6-10	2.47				
	> 10	2.74				

* Difference is statistically significant.

**difference is not statistically significant.

3.2.2.2 Perceptions towards road access

By referring to table 3, it demonstrates that with 95% confidence level, it is statistically no significant different among respondents' demographic and riding background and respective road access or junction. P-value for their significant is more than 0.05. Nevertheless, some analysis is needed to describe on their perceptions. In term of respondents' gender, both male and female feel that the presence of access or junction along the roadway will make their riding less safe compared to road without or less junction. This finding is contradicting with Sadullah [21] where he found that males are more risk taker on road compared to females by comparing the crashes score per 100,000 males' or females' populations. Those findings may identical if more female respondents are taking part in this survey.

For different group of ages of the respondents, it seems that riders with age below 20 years feel impartial (mean = 3.17) on their safe motorcycling on road with an access or junction. Contrary, this

group feel safer (mean = 4.17) while riding on road without the presence of junction. For riders age between 51 to 60 years, they perceive dangerous if there is junction on the roadway compared to road without the existence of junctions. Meanwhile, for riders age between 21 to 50 years, they observe neutral on their safe motorcycling on road without junction but feel unsafe while riding on road with the presence of access or junction.

Table 3. Road geometries mean and significant value.

Road Geometry	Parameter	Variables	Mean Value	P - Value				
Road access	With junction	Gender	Male	2.78	0.982**			
			Female	2.78				
		Age (years)	< 20y	3.17		0.324**		
			21 – 30	2.84				
			31 – 40	2.64				
			41 – 50	2.65				
			51 – 60	2.00				
		License status	None	2.92		0.287**		
			Probationary	2.70				
			Learner	3.00				
	Without junction	Riding experience (years)	Full	2.68	0.062**			
			Expired/Suspend	3.50				
			< 2	2.86				
			2-5	2.98				
			6-10	2.50				
		Gender	> 10	2.63		0.914*		
			Male	3.47				
			Female	3.45				
			Age (years)	< 20			4.17	0.257**
				21 – 30			3.40	
31 – 40	3.42							
41 – 50	3.61							
51 – 60	4.50							
License status	None	3.38	0.682**					
	Probationary	3.50						
	Learner	3.50						
	Full	3.52						
	Expired/Suspend	2.50						
Riding experience (years)	< 2	3.49	0.834**					
	2-5	3.56						
	6-10	3.40						
	> 10	3.37						

* Difference is statistically significant.

** Difference is not statistically significant.

Next, for group of license status of the respondents, it is found that respondents who have none, probationary and full type of license perceive unsafe while riding on road with access or junction. In the meantime, learner and expired or suspended license holder feel impartial on their safety while riding on road with junctions. For road without junction, most respondents feel unbiased on their riding's safety.

Surprisingly, riders who have expired or suspended license feel unsafe while riding on road without the presence of access or junctions.

Further analysis on descriptive statistic, it is found that most of motorcyclists (50% for road with junction and 40% for road without junction) irrespective of their demographic background feel impartial over their safety while riding on road with or without the presence of junction. However, in term of overall safe motorcycling, details screening found that motorcyclists feel safer whilst riding on road without the presence of access of junction. It is because a road without access provides a better environment and comfort for motorcyclists by reducing the chance of a crash owing to less unexpected movement or manoeuvre from other vehicles.

3.2.2.3 Perceptions towards lane width

Table 4 shows that with 95% confidence level, it is statistically no significant different between respondents' demographic and riding background and their perceptions on safe motorcycling with regards to lane's width of road. P-value for their significant is more than 0.05. Still, some analysis is needed to describe on their perceptions. From the table, it seems that male and female respondents feel unsafe (male's mean = 2.46, female's mean = 2.18) whilst riding motorcycle on a narrow lane (less than 2m width). Meanwhile for road that have wider lane width (more than 2m width), they feel that it is safer for them to ride along that way.

In term of age group, most respondents perceive that it is unsafe or dangerous to ride on narrow width of road. However, their perception is quite dissimilar on road with wider road's width although the data shows that the difference is not statistically significant since P-value is more than 0.05. For instance, respondents age group below 51 years feel safer (average mean = 3.90) to ride on wider road's width. Surprisingly, respondents age between 51 to 60 years feel unsafe (mean = 2.50) to ride on more than 2m width of road.

From the table also, it is found that respondents' group who have license status other than expired/suspended license group perceive that it is less safe to ride on narrow lane width. However, expired or suspended license riders feel safer to ride on this road and unexpectedly, this group feel otherwise when it comes to wider road's width. This may be due to their risk-taking behaviour on their riding skills.

Others with the same license status believe that wider roads would make them safer while riding. Similarly, motorcyclists of all riding experience levels identified that a wider lane width made them feel safer than a narrow lane width (average mean = 3.73) regardless of their years of experience). In overall, based on the mean value, most motorcyclists perceived that a road that provides more than 2m of lane width is safer than one with narrow lanes. Motorcyclists may need an adequate lane width to overtake if necessary, or to make an emergency stop due to some failure on a safe and sufficient space area. The results are in accordance with Edquist et al.'s [7] finding that narrow lanes can impact the drivers' perception. An investigation by Salehi et al. [22] also indicated that a narrower lane would decrease the safety of motorcyclists.

3.2.3. Perceptions on road situation

By referring to table 5, it shows that more than 70% of motorcyclist feel safe to travel or ride during daytime with statistic mean of 4.02. Most of riders also feel that riding during night time with the presence of street lighting is safer compared to riding during night time without the presence of street lighting which they perceive very dangerous situation. Riding during dry or good weather condition is very safe according to the motorcyclists. Contrary during rain, wet or poor weather condition, popular perceptions of the respondents agreed that it is dangerous to take a ride during that situation. Besides that, over 65% of riders impress that it is safer to travel if there is shelter or rest area being provided along the roadway. This can be concluded that most of respondents regardless of their background perceive that road situation with clear sight or vision and adequate facilities will make their riding safer and more comfortable.

Table 4. Road geometries mean and significant value.

Road Geometry	Parameter	Variables	Mean Value	P - Value		
Lane width	Narrow lane (< 2m)	Gender	Male	2.46	0.064**	
			Female	2.18		
		Age (years)	< 20	2.33		
			21 – 30	2.39		
			31 – 40	2.31		0.934**
			41 – 50	2.48		
			51 – 60	2.00		
		License status	None	2.38		
			Probationary	2.20		
	Learner		2.75	0.065**		
	Full		2.32			
	Wide lane (> 2m)	Riding experience (years)	Expired/Suspend	4.00	0.232**	
			< 2	2.40		
			2-5	2.56		
		Gender	6-10	2.13		
			> 10	2.30		
			Male	3.74		0.670**
		Female	3.67			
Age (years)		< 20	4.17			
		21 – 30	3.71			
	31 – 40	3.64	0.244*			
	41 – 50	3.91				
	51 – 60	2.50				
License status	None	3.58				
	Probationary	3.40				
	Learner	4.00	0.138**			
	Full	3.81				
Riding experience (years)	Expired/Suspend	2.50	0.838**			
	< 2	3.66				
	2-5	3.71				
	6-10	3.70				
		> 10	3.84			

* Difference is statistically significant.

** Difference is not statistically significant.

3.3. Motorcyclists' perceptions towards other drivers' attitude and behaviour

In analyzing attitudes and behavior, data were initially analyzed using factor analysis (FA). Fa is a data reduction technique that identifies underlying factors or variables that explain better patterns of correlative relationships within a set of measured variables. The variables are the questionnaires listed in the survey form.

Once FA being analysed, it seems that some of the variables or questions were discarded. From total of 41 questions (variables), they were reduced to only 26 questions and divided into four (4) components which are; component 1: Drivers' positive behaviour and attitude, component 2: Drivers' negative behaviour and attitude, component 3: Motorcyclists' positive behaviour and attitude and component 4: Motorcyclists' negative behaviour and attitude. The following analysis was, therefore, carried out on the results of the Mann-Whitney and Kruskal-Wallis H tests regarding behavior and attitude (components 1 to 4) as shown in table 6 and figure 1.

Table 5. Road situation safety scale and mean value.

Road Situation	Safety Scale (%)					Total	Mean
	Very Dangerous	Dangerous	Neutral	Safe	Very Safe		
	1	2	3	4	5		
Day time	1.1	2.7	23.7	38.2	34.4	100	4.02
Night (street lighting)	2.7	11.8	36.6	32.3	16.7	100	3.48
Night (No street lighting)	55.4	24.7	13.4	4.3	2.2	100	1.73
Dry/good weather	0.0	3.2	17.7	34.9	44.1	100	4.20
Rain/wet/poor weather	27.4	40.3	24.7	4.8	2.7	100	2.15
Shelter/rest area prov.	0.5	5.4	26.3	30.6	37.1	100	3.98

By referring to table 6, it shows that there is no statistically significant differences between male and female with regards to both drivers' positive and negative attitude and behaviour. By using descriptive statistics analysis, both groups are impartial (average mean = 3.3) that drivers have positive attitude and behaviour. They also perceive that drivers sometimes have a negative behaviour towards motorcyclists.

In term of riders' age, there are also no significant difference between respondents' age group on their perception towards drivers' positive and negative attitude and behaviour. By using descriptive analysis, most of them neither agree nor disagree that drivers have positive attitude and behaviour towards them. However, by analysing their respective mean value on certain statement in the component, it was found that riders aged between 51 to 60 years old perceive that drivers often have a negative behaviour towards them on the road. For instance, drivers often maneuvered without performing all appropriate checks such as their side and rear view mirror.

For rider current status, it seems that there is no significant difference between each group status towards drivers' positive and negative attitude or behaviour since P-value is more than 0.05. However, by using descriptive analysis and comparing their mean, it was found that 'rider only' group perceive that drivers have lesser positive attitude and behaviour compared to the other two group. 'Rider only' group also feel that drivers are more often to have negative attitude and behaviour compared to the other two groups.

Furthermore, for riders' riding experience category, result show that there is no significant difference on perception between them towards drivers' negative and positive attitude or behaviour. Majority of them feel neutral towards drivers' attitude and behaviour.

To sum up, regardless of motorcyclists' demographic and riding background, there are no statistically significant difference of perceptions between them on drivers' positive and negative attitude and behaviour. Almost all of them perceive unbiased (average mean = 3.35) towards drivers' positive attitude yet perceive that drivers' sometimes (average mean = 3.0) behave negatively while driving on road.

3.4. Motorcyclists' perceptions on their riding attitude or behaviour

Table 7 below shows the significance difference and mean rank of various respondents' demographic and riding background with regards to their perception on their own positive and negative attitude or behaviour. It clearly shows that there is statistically significant difference between motorcyclists' positive and negative behaviour.

Table 6. Driver's attitude and behaviour mean rank and significance.

Components	Variables		Mean Rank	P - Value
Drivers' positive attitude and behaviour	Gender	Male	90.54	0.246**
		Female	100.55	
	Age (years)	< 20	73.92	0.630**
		21 – 30	95.63	
		31 – 40	87.11	
		41 – 50	100.37	
		51 – 60	61.50	
	Rider current status	Rider only	84.06	0.730**
		Rider and driver	93.94	
		Rider and pedest	96.15	
Riding experience (years)	< 2	92.95	0.231**	
	2-5	81.34		
	6-10	102.75		
	> 10	101.45		
Drivers' negative attitude and behaviour	Gender	Male	97.90	0.082**
		Female	83.02	
	Age (years)	< 20	112.50	0.279**
		21 – 30	87.41	
		31 – 40	107.86	
		41 – 50	97.67	
		51 – 60	92.25	
	Rider current status	Rider only	99.09	0.821**
		Rider and driver	93.91	
		Rider and pedest	89.71	
Riding experience (years)	< 2	87.98	0.591**	
	2-5	101.80		
	6-10	94.43		
	> 10	91.92		

* Difference is statistically significant.

** Difference is not statistically significant.

On motorcyclists' positive behaviour components, though the difference between male and female are not really significant, however by comparing their respective mean score and mean rank, it seems that female riders are highly believe that they have a positive behaviour while riding on road. They perceive that they had gave fully attention on traffic and road environment around them, abide all road rules, ridden defensively and with constant vigilance. This difference also statistically significant (P-value = 0.040 < 0.05) on riders' negative behaviour components where female perceive that they are rarely doing negative behaviour while riding such as ridden recklessly, racing with other road user, race away from traffic light and so on. On male riders' side, they also feel that they are hardly to do such negative behaviour whilst riding on road.

For difference age group of riders, there are no significant difference between each category in this group with respect to positive behaviour on road. However, on negative behaviour parts, there is a significant difference within the group with significant value of 0.016 (P < 0.05). Besides, by details examining their respective mean score and mean rank, it is found that riders who aged between 51 to 60 years old perceive that they have never (mean = 1.0) done any negative behaviour while riding on their motorcycle.

Table 7. Motorcyclists' attitude and behaviour mean rank and significance.

Components	Variables	Mean Rank	P - Value	
Motorcyclists' positive attitude / behaviour	Gender	Male	89.65	0.131**
		Female	102.67	
	Age (years)	< 20	73.58	0.332**
		21 – 30	93.06	
		31 – 40	94.56	
		41 – 50	92.91	
		51 – 60	167.00	
	Rider current status	Rider only	88.18	0.656**
		Rider and driver	92.20	
		Rider and pedest	100.17	
	Riding experience (years)	< 2	88.43	0.101**
		2-5	82.72	
		6-10	100.90	
> 10		108.03		
Engine capacity (c.c)	≤ 125 c.c	97.39	0.553**	
	Bet. 125 to 250	88.69		
	≥ 250 c.c	89.00		
Motorcyclists' negative attitude / behaviour	Gender	Male	98.73	0.040*
		Female	81.05	
	Age (years)	< 20	103.08	0.016*
		21 – 30	101.49	
		31 – 40	82.65	
		41 – 50	73.87	
		51 – 60	10.50	
	Rider current status	Rider only	117.06	0.111**
		Rider and driver	89.11	
		Rider and pedest	97.86	
	Riding experience (years)	< 2	102.91	0.009*
		2-5	105.41	
		6-10	83.02	
> 10		73.30		
Engine capacity (c.c)	≤ 125 c.c	97.92	0.062**	
	Bet. 125 to 250	81.13		
	≥ 250 c.c	107.86		

* Difference is statistically significant.

** Difference is not statistically significant.

Result also found that there is no significant difference between riders' current status group with regards to their positive and negative behaviour. Most of them believe that they are highly abide all road's rules and regulations and always riding carefully and wisely. In term of riding experiences, there are significant differences between riders since P-value is 0.009 (<0.05) where riders who have more than 10 years riding experiences feel that they have never done any wrongdoing while riding a motorcycle. This imply that they have a positive behaviour as a rider.

Last but not least, riders who have motorcycle irrespective of engine capacity perceive no significant difference with their riding behaviour. Most of them perceive that they always practice positive behaviour yet rarely done wrongdoing or negative behaviour whilst riding on road.

To put it briefly, most of riders regardless of their background perceive that they have a good behaviour and always abide to rules and law as well as to tolerate with other users on road.

4. Conclusion

Based on the results obtained and analysed data, it can be concluded that the respondents' demographic and riding background data are fairly distributed though some category denominated with certain group. Thus, perception among respondents on safe riding towards road environments and other drivers' attitudes and behaviour could be examined. Motorcycle riders report that poor road surface conditions are among the biggest road condition problems they encounter. Apart from that, most motorcyclists believe riding on a straight road is safer and more comfortable than riding on a curve road, regardless of their demographics or riding backgrounds. Similarly, road users feel safer while riding on roads without access to a junction. They also believe that riding on a road with a lane width of more than 2m is safer than riding on a road with a narrow lane width. Regardless of their background, motorcyclists perceive that road situation with clear sight or vision and adequate facilities will make their riding safer and more comfortable. Regardless of motorcyclists' demographic and riding background, there are no statistically significant difference of perceptions between them on drivers' positive and negative attitude and behaviour. Most of riders perceive that they have a good behaviour and always abide to rules and law as well as to tolerate with other users on road.

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