

Three-Wheeler in Sri Lanka: Aspects and Problems Faced by Passengers

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Abstract: Three-wheeler is the major paratransit mode in Sri Lanka, which can be found in both small and big cities. It provides flexible door to door service to the public. Even with its importance, there are many problems faced by three-wheeler passengers. This study aims to analyse the aspects of three-wheeler and problems faced by passengers. Face to face questionnaire survey was conducted in urban and suburban areas to achieve the purpose. It was found that both urban and suburban passengers have similar concerns in using the service. Factors related to safety and driver have been underlined by passengers. Socio demographic factors of respondents define the difference in the perceptions and evaluations expect for occupation. Government should consider providing necessary regulations to improve safety awareness of both passengers and drivers of three-wheeler. Formal registration of three-wheeler and drivers will also increase passengers confident in using the service.

Keywords: Paratransit; Three-wheeler; Safety; Service; Public transportation

1. INTRODUCTION

Cities need sufficient infrastructure facilities and services in order to serve the public. Transportation infrastructure is the most needed facility for developing countries as well as developed countries. Therefore, government provision on transportation facilities such as constructing highways and railways, rehabilitating the rural roads, increasing the number of buses and trains, and introducing paratransit modes are crucial for the benefit of the public.

Buses and trains are considered as formal transport modes and paratransit are informal transport mode. Most of developing countries have no sufficient, reliable, and comfortable public transportation services. There is a big gap between the supply and demand in most Asian countries. Therefore, government and users try to find for other alternative modes and paratransit offer what are needed by the community. This situation is applied for Sri Lanka, where three-wheeler was introduced in 1978 by the government at that time. The introduction and popularity of three-wheeler was relatively slow at the beginning. But today three-wheelers are the most common visible informal paratransit mode in Sri Lanka. Three-wheelers are becoming more popular due to their availability, provision of door to door service, ease contacting. It does an immense service to the country especially to the rural areas, where there is not enough public transportation services. Nevertheless, many problems faced by customers of this mode.

This research analyses how the aspects of three-wheeler are considered as an issue for passengers in using the service and the occurrence of problems faced by three-wheeler

passengers in Kurunegala district. It is expected that the findings can provide better understanding in improving the services of this paratransit.

2. LITERATURE REVIEW

2.1 Role of Paratransit in Public Transportation

Paratransit are the one of the popular transport modes in developing countries. It is an alternative mode of flexible passenger transportation that does not follow fixed routes or fixed schedules. It plays an important role in the urban passenger transportation. It provides a variety of services including door-to-door movement by flexible for hire services. Paratransit offer some advantages to the public than other transportation modes. High accessibility and mobility, an operating cost is lower for short trips, easy and unimpeded lane movement and low maintenance cost are the main advantages (DLLAJ, 2001). In rural areas, there is no public transport system, especially during night times in emergency situations, there are no modes of transportation if someone do not own his/her own private vehicle. Paratransit comfortably fill these needs. In those areas, the purposes of the trips are widely: getting to the hospital or to school, transporting materials or goods, returning home, visiting relatives and getting the bus stand or railway station are other advantages. (Somasundaraswaran, 2007)

A variety of paratransit modes are in south Asian countries. Most of the paratransit were operated by the private sector. In Sri Lanka three-wheeler is the popular paratransit mode. Bangkok (Tuk-tuk), Indonesia (rickshaw), India (Bajaj) are similar paratransit modes in Asian region. Apart from that, angkutan kota in Indonesia, jeepny in the Philippine, songthaew in Thailand, mammy wagons and matatu in African countries are also some of the popular types of paratransit.

2.2 Service Quality of Paratransit

Paratransit provide numerous services to the public transportation system in most of the developing countries. It does an immense service especially to the rural areas where lack of public transportation system. Considering paratransit there are many good service qualities but have minor qualities as well. Normally, service quality can be measured by evaluating the perception of the people.

Joewono and Kubota (2007) found 70.7% of paratransit users answered that the service quality of paratransit is good enough and 53% respondents says that tariff is suitable with the service quality. They underwent 54 factors, which are directly influenced to service quality in Bandung, Indonesia. Availability, Accessibility, Reliability, Information, Customer service, Comfort, Safety and security, Fare, Environmental impact are main factors they concerned.

2.3 Paratransit in Sri Lanka

Three- wheeler as shown in Fig. 1 is similar to the Tuk-tuk (Thailand), Bajaj (India), rickshaws (Indonesia). In 1970 non-motorized vehicles such as carts were popular in Sri Lanka. In 1977, the government at that time decided to import second hand vehicles to the country. Therefore, most three-wheelers in Sri Lanka, at that time, were imported from Japan. Three-wheelers introduced to the Sri Lankan market in 1978. At that time, there were no many. But in the present, three-wheelers are very common and can find in any time in any

nook and corner in Sri Lanka. Today, three-wheelers are imported from India (Somasundaraswaran, 2008).



Figure 1. Three-Wheeler

Three-wheelers' service is very important in rural areas where there is no or limited public transports. In small towns and rural areas, the services are generally: taking to the schools, hospitals, market, returning home, visit someone are some of common services. Always three-wheelers can be seen near the markets, hospitals, bus stands, rail way station like places where people gathered. This provides easiness for people to commute from one place to another without the necessity of having a private vehicle. Additionally, three-wheeler industries provide jobs to the unemployed youth. As a three-wheeler is very small and easily fits into the parking spaces, all parking lots are filled by three-wheelers. Consequently, there is no place to park other vehicles.

In Sri Lanka, three-wheeler drivers are not permanent. Sometimes they hire a three-wheeler from someone. With this situation, there is no guarantee that the vehicle will be driven by the same driver in the next day, so job satisfaction is very poor. There is no one responsible in this industry to improve the service for the public. Despite all the possible problems, three-wheelers provide valuable service to the public.

3. METHODOLOGY

3.1 Approach

Insufficient public transport services generate people to develop alternative modes to fulfil the demand of transportation from the public. Therefore, many countries, especially developing countries, have their own unique transportation modes that work as paratransit. People use three-wheelers as it is cheaper than other vehicles. Most of the Sri Lankans represent the poor and middle class according to the economical state, so they cannot spend large amounts for the transportation. Using a three-wheeler is a better solution for their transport problems rather than using another comfortable vehicle. People use three-wheelers as they provide better service to passengers. Affordable price, availability, and accessibility are some of the advantages gained by the passengers. But even though it provides good service to the people, many problems have to be faced by the passengers. Poor safety, price irregularities, illegal routes made by the drivers are some of the problems faced by the passengers. Though they have many negative aspects, they use three-wheelers due to poverty.

The methodology is based on a face-to-face questionnaire survey which is conducted in the selected study area. General problems faced by the three-wheeler passengers are

inquired from the respondents by requesting them to fill the questionnaire. The research framework is presented in Figure 2.

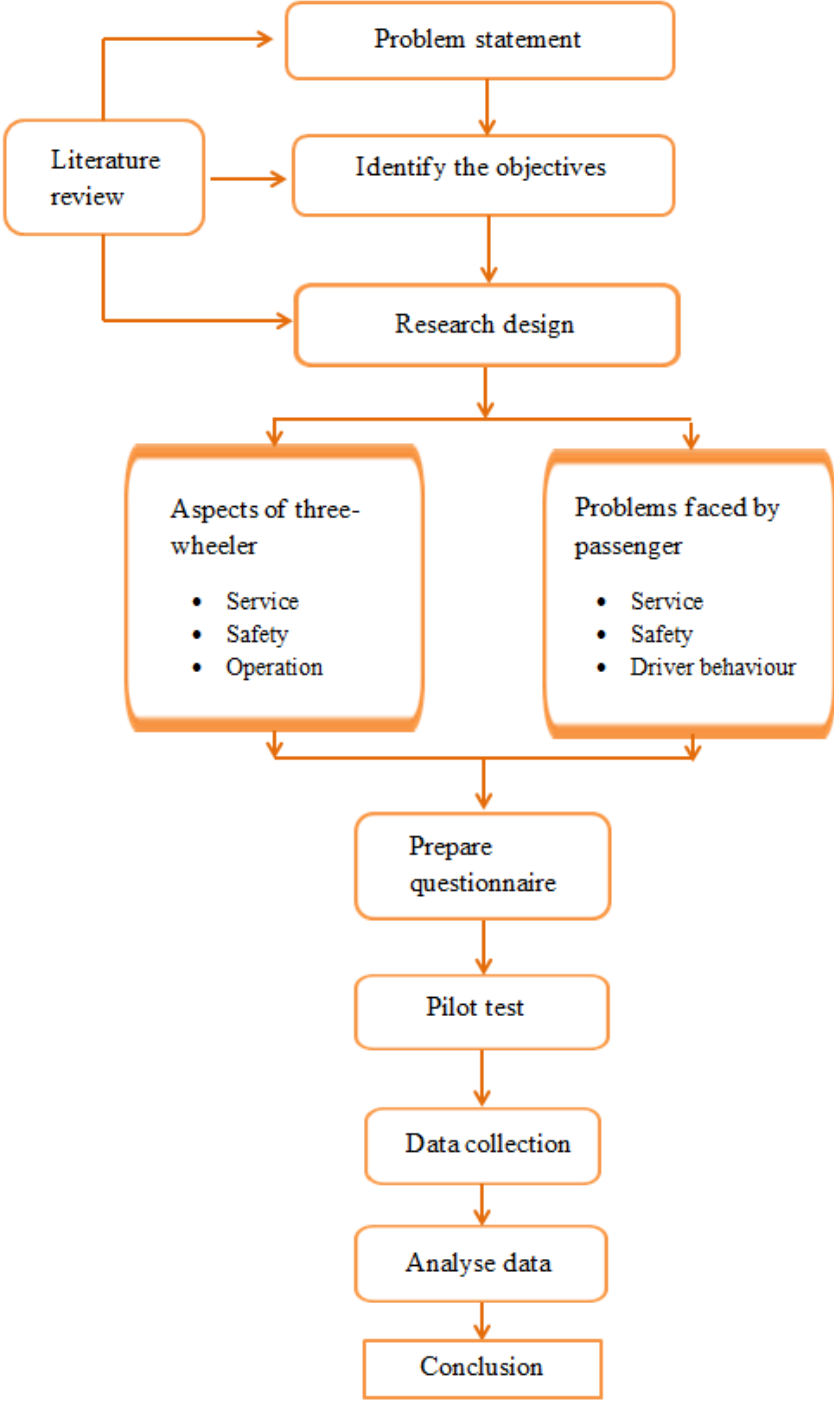


Figure 2. Research framework

3.2 Questionnaire

A three-page questionnaire was designed for this study. At the beginning of the questionnaire a brief introduction about the research and the instructions are included. The questionnaire is

divided with in to two parts, (a) and (b). Part (a) is about respondent profile. Part (b) has two subsections b1 and b2. Part (b1) asks about respondents' agreement whether some aspects of three-wheelers are considered as problem for them in using the service. Under each section there are 3 to 4 attributes. Respondents are asked to rate the aspects using Likert-scale from 1 to 5, ranging from strongly disagree to strongly agree. In part (b2) section some questions asked the frequency of the problems faced by the passengers. In those questions, respondents are asked to rate from 1-5 ranging from never to very often.

3.3 Data Collection

The questionnaire was deemed to be the most suitable way to gather information needed to the research. The questionnaire was distributed over the selected sample of passengers in banks, markets, residents and private tuition classes. For distributing the questionnaires selected the Kurunegala city area as the urban area and Narammala, Polgahawela towns as suburban areas. The questionnaire was distributed to the 100 passengers in Kurunegala city area and 50 passengers from Narammala and 50 passengers from Polgahawela towns. During questionnaire distribution, informal interview to some respondents were also conducted to have better insight on the factors and reasons.

3.4 Analysis of Data

The first analysis part uses mean value to rank the findings based on locations of respondent (urban and suburban) for comparison purposes. After that, detailed analyses are conducted by considering the socio-demographic factors of respondents to understand how the factors may influence the difference perception in the evaluation. T-test is applied when comparing two groups of factors under consideration. Anova is used when the groups for comparison are more than two. Post hoc test is also conducted to identify which groups are significantly different. It is expected that the findings can be used to direct improvement to the proper groups.

4. RESULTS AND DISCUSSIONS

4.1 Profile of Respondents

The profile of respondents collected from 200 samples is presented in Table 1. Within the 200 samples, half of them are collected from urban areas and another half from suburban areas with the percentage of female respondents slightly higher than male respondents. Most of the respondents are at their working age, which represent around 70% of the sample. Therefore, many of them are married (69%) and at the middle-income level category (67%). Only around 30% of respondents used the three-wheeler for their commuting activities, which is reflected from the usage and trip purpose information.

4.2 Aspects of three-wheeler and occurrence of problems

From previous studies and site observation, nine aspects of three-wheelers that may become constraints for passengers in using the service were collected and 16 problems in using paratransit were identified. The agreement whether the nine aspects were considered as

problem for passengers were investigated. Meanwhile, the frequency of occurrence of the 16 identified problems was inquired.

In the agreement whether the aspects of three-wheeler are a problem, the mean values are used to rank the agreement for urban and suburban passengers as shown in Table 2. According to the ranking of agreement, the highest four in the rank where the mean value is larger than 3.5 (indicate more tendency to agree that the aspect is a problem) are occupied by the same aspects for both urban and rural areas. The nature of the three-wheeler vehicle that does not have fully closed body frame contribute to the higher level of injury when face an accident, higher probability of rolling when going high speed, and difficulty to travel in heavy rain. Consideration of paratransit as one of the source of traffic congestion is also taken into account by three-wheeler users. Safety attribute of three-wheeler (seat belt) was not considered as in issue with less consideration for suburban users. Comfort, capacity and environmental aspects were not the issued considered by users in using the service.

Table 1. Profile of Passenger Respondents

Variables	Classification of variables	Frequency	%
Gender	Male	86	43
	Female	114	57
Age	<25 years	33	16.5
	26-60 years	144	72
	>60 years	23	11.5
Marital status	Not married	62	31
	Married	138	69
Occupation	Student, retired & no work	61	30.5
	Workforce	139	69.5
Education	Junior high school or less	43	21.5
	Senior high school	98	49
	Higher than senior high school	59	29.5
Monthly income or allowance	Low (< Rs. 15,000)	42	21
	Middle (Rs. 15,000 - 50,000)	113	66.5
	High (> Rs. 50,000)	45	22.5
Usage	Often (every day and every working day)	30	15
	Sometimes (2-4 days a week)	30	15
	Seldom (less than 2 days)	140	70
Trip purpose	Study& work	67	33.5
	Other	133	66.5
Living place	Urban	100	50
	Suburban	100	50

The frequency of problems faced by passengers of three-wheelers are also presenting in order of the occurrence by considering the mean values as displayed in Table 3. The results show that driver's factors dominant the first five occurrences of problems consistently for urban and suburban passengers. The problems are mostly related with the driving behaviours of drivers (i.e. poor driving skills, waving through traffic, speeding, and overtaking carelessly) with one factor related to safety for using the service with unknown driver at night time. The results

also indicate that the occurrence of problems is less for suburban passengers than urban passengers. It is also interesting to note that difficulty to find three-wheeler is faced equally for both urban and suburban passengers and ranked sixth.

Table 2. Agreement on the aspects of three-wheeler as a problem

Rank	Urban		Suburban	
	Aspect of Three-Wheeler	Mean	Aspect of Three-Wheeler	Mean
1	Higher level of injury when face an accident	4.05	Higher probability of rolling when going high speed	4.08
2	Contribute to traffic congestion	3.94	Contribute to traffic congestion	4.02
3	Higher probability of rolling when going high speed	3.83	Higher level of injury when face an accident	3.94
4	Difficult to travel in heavy rain	3.80	Difficult to travel in heavy rain	3.58
5	No seat belts	3.02	Contribute to air pollution	3.07
6	Contribute to noise pollution	2.98	Contribute to noise pollution	2.99
7	Limited seating capacity	2.97	No seat belts	2.92
8	Contribute to air pollution	2.93	No comfortable seats	2.78
9	No comfortable seats	2.83	Limited seating capacity	2.60

Note: 1: strongly disagree, 2: disagree, 3: neither agree nor disagree, 4: agree, and 5: strongly agree.

Table 3. Frequency of problems faced by three-wheeler passengers

Rank	Urban		Suburban	
	Problems	Mean	Problems	Mean
1	Poor driving skills	4.09	Weaving through traffic carelessly	3.76
2	Waving through traffic carelessly	3.99	Overtaking carelessly	3.69
3	Feeling unsafe to travel with an unknown driver at night	3.51	Speeding	3.56
4	Overtaking carelessly	3.5	Feeling unsafe to travel with an unknown driver at night	3.53
5	Speeding	3.32	Poor driving skills	3.46
6	Difficult to find TW at night	3.26	Difficult to find TW at night	3.36
7	Ignore traffic signs	2.85	Ignore traffic signs	2.92
8	Loud music played by the driver	2.84	Loud music played by the driver	2.82
9	Illegal works	2.67	Increase fare at night	2.62
10	Increase fare at night	2.65	Feeling unsafe to travel with an unknown driver at day time	2.53
11	Feeling unsafe to travel with an unknown driver at day time	2.58	Get u-turn on pedestrian crossing	2.48
12	Get u-turn on pedestrian crossing	2.48	Illegal works	2.28
13	Drinking habits	2.15	Low speed	1.98
14	Low speed	2.11	Drinking habits	1.95
15	Drop passengers away from the destination	1.93	Drop passengers away from the destination	1.72

4.3 Socio-demographic consideration on the evaluation of occurrence of problem

In this analysis, the socio-demographic factors of respondents are considered in understanding if a difference exists in perception of the three wheeler's aspects and in evaluating the occurrence of problems so improvements can be directed to the proper groups if necessary.

Gender

Table 4. Comparison of male and female on the opinion and occurrence

No	Aspects / Problems	Gender					
		Male		Female		t-value	*Sig/n.s
<u>Opinion on the aspects</u>		Mean	Stdev	Mean	Stdev		
1	Service						
1.1	Difficult to travel in heavy rain	3.63	0.908	3.74	0.776	-0.913	n.s
1.2	No comfortable seats	2.85	0.775	2.77	0.787	0.689	n.s
1.3	Limited seating capacity	2.71	0.795	2.84	0.965	-1.038	n.s
2	Safety						
2.1	Higher level of injury when face an accident	4.02	1.04	3.97	0.945	0.352	n.s
2.2	Higher probability of rolling when going high speed	4.07	0.837	3.87	0.836	1.685	n.s
2.3	No seat belts	2.92	0.857	3.01	1.093	-0.654	n.s
3	Operation						
3.1	Traffic congestion	4.14	0.87	3.86	0.871	2.251	Sig
3.2	Air pollution	2.87	0.794	3.1	0.902	-1.833	n.s
3.3	Noise pollution	2.94	0.741	3.02	0.776	-0.699	n.s
	<u>Frequency of the problems faced</u>						
4	Service						
4.1	Difficult to find TW at night	3.3	0.798	3.32	0.834	-0.115	n.s
4.2	Increase fare at night	2.57	0.902	2.68	0.998	-0.836	n.s
4.3	Drop passengers away from the destination	1.76	0.685	1.88	0.72	-1.268	n.s
4.4	Drive slowly	2.12	0.726	1.99	0.645	1.286	n.s
5	Safety						
5.1	Speeding	3.63	0.704	3.3	0.977	2.773	Sig
5.2	Waving through traffic carelessly	3.01	0.777	3.85	0.943	0.461	n.s
5.3	Overtaking carelessly	3.64	0.944	3.56	1.073	0.536	n.s
5.4	Get u-turn on pedestrian crossing	2.44	0.696	2.51	0.962	-0.571	n.s
6	Driver behaviour						
6.1	Feeling unsafe to travel with an unknown driver at night	3.43	0.805	3.59	0.91	-1.272	n.s

6.2	Feeling unsafe to travel with an unknown driver at day time	2.57	0.805	2.54	0.904	0.21	n.s
6.3	Smoking habits	1.66	0.625	1.77	0.704	-1.138	n.s
6.4	Drinking habits	1.95	0.701	2.12	0.693	-1.702	n.s
6.5	Illegal works	2.47	0.698	2.48	0.924	-0.151	n.s
6.6	Ignore traffic signs	2.92	0.636	2.86	0.901	-1.602	n.s
6.7	Loud music played by the driver	2.72	0.746	2.91	0.898	0.542	n.s
6.8	Poor driving skills	3.74	0.857	3.8	0.843	-0.446	n.s

* Sig: statically significant at the 95% confidence level, and n.s.: not significant.

High speeding is a problem for men than women. Most of the females always try to find a known three-wheeler driver for their trip. They have contact numbers of the drivers and if they want to go to some where they call to the driver. Women normally use the same three-wheeler driver. Regular driver is cheaper and safer because passengers know the driver personally, so they rarely face problems.

Normally women use three wheelers to go to shopping, such to the market, in the morning or evening. At that time, there is no traffic congestion. But men use three-wheelers typically to go to work in peak hours. Therefore, they face traffic congestion more than women.

Trip purpose

Table 5. Comparison of trip purpose on the opinion and occurrence

No	Aspects / Problems	Trip purpose					
		Study and work		Other		t-value	*Sig/n.s
-	<u>Opinion on the aspects</u>	Mean	Stdev	Mean	Stdev		
1	Service						
1.1	Difficult to travel in heavy rain	3.65	0.956	3.72	0.741	-0.561	Sig
1.2	No comfortable seats	2.9	0.878	2.74	0.7	1.509	n.s
1.3	Limited seating capacity	2.78	0.87	2.79	0.918	-0.025	n.s
2	Safety						
2.1	Higher level of injury when face an accident	4.08	0.94	3.93	1.015	1.081	n.s
2.2	Higher probability of rolling when going high speed	4.06	0.755	3.88	0.892	1.496	n.s
2.3	No seat belts	2.94	0.86	2.99	1.087	-0.36	n.s
3	Operation						
3.1	Traffic congestion	4.1	0.806	3.9	0.923	1.619	Sig
3.2	Air pollution	2.99	0.789	3.01	0.914	-0.166	n.s
3.3	Noise pollution	2.93	0.695	3.03	0.804	-0.897	n.s
-	<u>Frequency of the problems faced</u>						
4	Service						
4.1	Difficult to find TW at night	3.52	0.687	3.16	0.871	3.099	Sig
4.2	Increase fare at night	2.9	0.958	2.44	0.914	3.432	Sig
4.3	Drop passengers away from the	1.83	0.625	1.83	0.625	0.016	n.s

	destination						
4.4	Drive slowly	2.18	0.608	1.95	0.717	2.398	n.s
5	Safety						
5.1	Speeding	3.64	0.758	3.3	0.94	2.72	Sig
5.2	Waving through traffic carelessly	4.01	0.862	3.78	0.872	1.88	n.s
5.3	Overtaking carelessly	3.76	1.089	3.48	0.952	1.993	n.s
5.4	Get u-turn on pedestrian crossing	2.42	0.751	2.52	0.925	-0.81	n.s
6	Driver behaviour						
6.1	Feeling unsafe to travel with an unknown driver at night	3.61	0.794	3.45	0.914	1.299	n.s
6.2	Feeling unsafe to travel with an unknown driver at day time	2.72	0.901	2.44	0.814	2.35	Sig
6.3	Smoking habits	1.82	0.683	1.66	0.659	1.679	n.s
6.4	Drinking habits	2.04	0.689	2.06	0.711	-0.235	n.s
6.5	Illegal works	2.46	0.915	2.49	0.733	-0.245	Sig
6.6	Ignore traffic signs	2.84	0.724	2.91	0.847	-0.621	n.s
6.7	Loud music played by the driver	2.72	0.686	2.91	0.928	-1.525	n.s
6.8	Poor driving skills	3.8	0.808	3.76	0.877	0.283	n.s

* Sig: statically significant at the 95% confidence level, and n.s.: not significant.

Most of the problems faced by the people those who going to study and work. They are the people regularly used three wheelers. Difficult to find the TW at night, increase fare at night, high speeding, unsafe to travel with the unknown driver, and illegal works are some of the problems faced by them. Because there are many private tuition classes held until night. So the students have to travel at night. The working people also have to travel at night. So people use TW for study and work are the one who face those problems than people using three wheelers for other purposes.

Occupation

There is no statistically significant difference can be identified between working people and those who are student, retired and no work. Therefore, the table is not presented. The two groups have the same opinion on the aspects of three-wheeler and frequency of occurrence.

Marital status

Table 6. Comparison of marital status on the opinion and occurrence

No	Aspects / Problems	Marital status					
		Not married		Married		t-value	*Sig/n.s
-	<u>Opinion on the aspects</u>	Mean	Stdev	Mean	Stdev		
1	Service						
1.1	Difficult to travel in heavy rain	3.56	0.917	3.76	0.78	-1.549	n.s
1.2	No comfortable seats	2.77	0.798	2.85	0.779	-0.583	n.s
1.3	Limited seating capacity	2.71	0.948	2.83	0.875	-0.853	n.s
2	Safety						

2.1	Higher level of injury when face an accident	4.15	0.743	3.91	1.116	1.495	n.s
2.2	Higher probability of rolling when going high speed	4.03	0.724	3.94	0.899	0.678	n.s
2.3	No seat belts	3	0.992	2.98	1	0.105	n.s
3	Operation						
3.1	Traffic congestion	4.02	0.896	3.98	0.9	0.289	n.s
3.2	Air pollution	2.98	0.735	3.04	0.909	-0.426	n.s
3.3	Noise pollution	2.98	0.757	2.95	0.745	0.28	n.s
-	<u>Frequency of the problems faced</u>						
4	Service						
4.1	Difficult to find TW at night	3.31	0.781	3.28	0.854	0.169	n.s
4.2	Increase fare at night	2.56	0.842	2.66	1.015	-0.628	n.s
4.3	Drop passengers away from the destination	1.74	0.599	1.83	0.746	-0.849	n.s
4.4	Drive slowly	2.05	0.556	2.07	0.765	-0.169	n.s
5	Safety						
5.1	Speeding	3.71	0.837	3.32	0.881	2.909	Sig
5.2	Waving through traffic carelessly	4.03	0.677	3.81	0.935	1.821	Sig
5.3	Overtaking carelessly	3.94	0.765	3.4	1.084	3.895	Sig
5.4	Get u-turn on pedestrian crossing	2.65	0.96	2.41	0.828	1.753	n.s
6	Driver behaviour						
6.1	Feeling unsafe to travel with an unknown driver at night	3.44	0.842	3.51	0.89	-0.563	n.s
6.2	Feeling unsafe to travel with an unknown driver at day time	2.47	0.844	2.59	0.886	-0.926	n.s
6.3	Smoking habits	1.66	0.626	1.76	0.714	-0.964	n.s
6.4	Drinking habits	2.13	0.665	1.98	0.701	1.353	n.s
6.5	Illegal works	2.68	0.864	2.35	0.799	2.562	Sig
6.6	Ignore traffic signs	3.11	0.791	2.76	0.79	2.832	Sig
6.7	Loud music played by the driver	3.05	0.838	2.73	0.811	2.48	Sig
6.8	Poor driving skills	3.69	0.841	3.81	0.862	-0.897	n.s

* Sig: statically significant at the 95% confidence level, and n.s.: not significant.

Significant differences between not married and married respondents are observed for frequency of occurrence related to some attributes of safety and driver behaviour with unmarried respondent significantly faced the problem more often than married respondents.

Living place

Table 7. Comparison of living place on the opinion and occurrence

No	Aspects / Problems	Living place					
		Urban		Suburban		t-value	*Sig/n.s
-	<u>Opinion on the aspects</u>	Mean	Stdev	Mean	Stdev		
1	Service						
1.1	Difficult to travel in heavy rain	3.8	0.667	3.58	0.966	1.875	Sig
1.2	No comfortable seats	2.83	0.682	2.78	0.871	0.452	Sig
1.3	Limited seating capacity	2.97	0.858	2.6	0.899	2.997	n.s
2	Safety						
2.1	Higher level of injury when face an accident	4.05	0.947	3.94	1.023	0.789	n.s
2.2	Higher probability of rolling when going high speed	3.83	0.922	4.08	0.734	-2.122	n.s
2.3	No seat belts	3.02	0.995	2.92	1.002	0.708	n.s
3	Operation						
3.1	Traffic congestion	3.94	0.919	4.02	0.841	-0.642	n.s
3.2	Air pollution	2.93	0.769	3.07	0.946	-1.149	Sig
3.3	Noise pollution	2.98	0.635	2.99	0.87	-0.093	Sig
-	<u>Frequency of the problems faced</u>						
4	Service						
4.1	Difficult to find TW at night	3.26	0.928	3.36	0.689	-0.865	Sig
4.2	Increase fare at night	2.65	0.936	2.62	0.982	0.221	n.s
4.3	Drop passengers away from the destination	1.93	0.742	1.72	0.655	2.065	n.s
4.4	Drive slowly	2.11	0.68	1.98	0.681	1.35	n.s
5	Safety						
5.1	Speeding	3.32	0.764	3.56	0.978	-1.934	n.s
5.2	Waving through traffic carelessly	3.99	0.759	3.76	0.965	1.873	Sig
5.3	Overtaking carelessly	3.5	1.03	3.69	1.002	-1.322	n.s
5.4	Get u-turn on pedestrian crossing	2.48	0.87	2.48	0.847	0	n.s
6	Driver behaviour						
6.1	Feeling unsafe to travel with an unknown driver at night	3.51	0.847	3.53	0.893	-0.163	n.s
6.2	Feeling unsafe to travel with an unknown driver at day time	2.58	0.843	2.53	0.881	0.41	n.s
6.3	Smoking habits	1.81	0.662	1.64	0.674	1.799	n.s
6.4	Drinking habits	2.15	0.687	1.95	0.702	2.036	Sig
6.5	Illegal works	2.67	0.711	2.28	0.9	3.4	Sig
6.6	Ignore traffic signs	2.85	0.702	2.92	0.884	-0.62	n.s
6.7	Loud music played by the driver	2.84	0.788	2.82	0.892	0.168	n.s
6.8	Poor driving skills	4.09	0.854	3.46	0.717	5.651	n.s

* Sig: statically significant at the 95% confidence level, and n.s.: not significant.

Drinking habits, illegal works, poor driving skills like driver behaviour problems are faced by the urban people than suburban people. In urban areas, there are many types of drivers and they are unknown by the passengers. In suburban areas, most of the passengers know the drivers and drivers know the passengers. They are familiar to each other so it is reasonable to expect that driver behaviour problems are less in suburban areas.

Urban people say that drivers do not drop the passengers at the right destination. It may happen due to the heavy traffic congestion, so the TW cannot reach to the exact place. Suburban people agree to the problem that the three wheelers can easily roll when going high speed. The traffic situation in suburban cities where there are less vehicles, which may encourage drivers to drive in high speed may contribute on this. On the other hand, urban cities are faced with many vehicles on the road and heavy traffic congestion so the drivers cannot drive fast and the chance to rolling is reduced.

Age

Table 8. Comparison of age on the opinion and occurrence

No	Aspects / Problems	Age						F-value	*Sig/n.s
		<25 yrs		25-60 yrs		>60 yrs			
-	<u>Opinion on the aspects</u>	Mean	Stdev	Mean	Stdev	Mean	Stdev		
1	Service								
1.1	Difficult to travel in heavy rain	3.48	1.176	3.71	0.737	3.87	0.815	1.571	n.s
1.2	No comfortable seats	2.67	0.89	2.81	0.76	3	0.739	1.237	n.s
1.3	Limited seating capacity	2.55	0.905	2.85	0.918	2.74	0.689	1.566	n.s
2	Safety								
2.1	Higher level of injury when face an accident	4.09	0.843	3.97	1.054	4.04	0.706	0.248	n.s
2.2	Higher probability of rolling when going high speed	4	0.75	3.94	0.891	3.96	0.638	0.058	n.s
2.3	No seat belts	2.91	0.843	3.01	1.061	2.83	0.778	0.398	n.s
3	Operation								
3.1	Traffic congestion	4.21	0.781	3.9	0.914	4.17	0.717	2.401	n.s
3.2	Air pollution	3.06	0.899	3	0.901	2.91	0.515	0.197	n.s
3.3	Noise pollution	2.94	0.788	3	0.766	2.96	0.706	0.103	n.s
-	<u>Frequency of the problems faced</u>								
4	Service								
4.1	Difficult to find tw at night	3.24	0.902	3.31	0.787	3.43	0.896	0.381	n.s
4.2	Increase fare at night	2.61	0.899	2.61	0.969	2.83	0.984	0.516	n.s
4.3	Drop passengers away from the destination	1.73	0.452	1.79	0.752	2.22	0.6	4.186	Sig
4.4	Drive slowly	2.03	0.467	2.02	0.714	2.22	0.736	0.831	n.s
5	Safety								
5.1	Speeding	3.7	0.951	3.36	0.874	3.57	0.788	2.229	n.s

5.2	Waving through traffic carelessly	4.12	0.6	3.83	0.931	3.78	0.795	1.613	n.s
5.3	Overtaking carelessly	4	0.75	3.49	1.071	3.7	0.876	3.643	Sig
5.4	Get u-turn on pedestrian crossing	2.76	0.902	2.43	0.882	2.39	0.499	2.121	n.s
6	Driver behaviour								
6.1	Feeling unsafe to travel with an unknown driver at night	3.48	0.939	3.52	0.869	3.57	0.788	0.058	n.s
6.2	Feeling unsafe to travel with an unknown driver at day time	2.73	0.876	2.51	0.811	2.57	1.121	0.826	n.s
6.3	Smoking habits	1.79	0.65	1.73	0.702	1.61	0.499	0.489	n.s
6.4	Drinking habits	2.12	0.6	2.02	0.724	2.13	0.694	0.445	n.s
6.5	Illegal works	2.82	0.882	2.35	0.789	2.74	0.864	5.741	Sig
6.6	Ignore traffic signs	3.21	0.82	2.81	0.793	2.87	0.694	3.465	Sig
6.7	Loud music played by the driver	3.03	0.81	2.82	0.858	2.61	0.722	1.764	n.s
6.8	Poor driving skills	3.67	0.816	3.81	0.853	3.7	0.876	0.509	n.s

* Sig: statically significant at the 95% confidence level, and n.s.: not significant.

Table 9. Posthoc test for comparison of age on the opinion and occurrence

Dependent Variable			Sig.	Dependent Variable			Sig.
Drop passengers away from the destination	<25	26-60	.648	Illegal works	<25	26-60	.003
		60<	.010			60<	.721
	26-60	<25	.648		26-60	<25	.003
		60<	.007		60<	60<	.036
	60<	<25	.010		60<	<25	.721
		26-60	.007		26-60	26-60	.036
Overtaking carelessly	<25	26-60	.009	Ignore traffic signs	<25	26-60	.009
		60<	.266			60<	.111
	26-60	<25	.009		26-60	<25	.009
		60<	.354		60<	60<	.747
	60<	<25	.266		60<	<25	.111
		26-60	.354		26-60	26-60	.747

Young people are quite considerable about the driver behaviour and safety factors such as overtaking carelessly, illegal works, ignore traffic signs. These problems are considered and faced by the young people more than old people. Elderly people experienced that dropping them away from their destination is a quite often problem more than their younger passengers. Most likely due to their age that not convenient to walk far.

Education

Table 10. Comparison of education on the opinion and occurrence

No	Aspects / Problems	Educational Level						F-value	Sig. at 5%
		Junior high school or less		Senior high school		Higher than senior high school			
	<u>Opinion on the aspects</u>	Mean	Stdev	Mean	Stdev	Mean	Stdev		
1	Service								
1.1	Difficult to travel in heavy rain	3.28	1.098	3.81	0.698	3.8	0.738	7.037	Sig
1.2	No comfortable seats	2.72	0.882	2.82	0.778	2.85	0.715	0.344	n.s
1.3	Limited seating capacity	2.7	0.939	2.8	0.952	2.83	0.769	0.286	n.s
2	Safety								
2.1	Higher level of injury when face an accident	3.72	1.161	3.96	1.004	4.25	0.733	3.884	Sig
2.2	Higher probability of rolling when going high speed	3.88	0.793	3.85	0.912	4.19	0.706	3.274	Sig
2.3	No seat belts	2.95	1.09	2.92	0.991	3.07	0.944	0.419	n.s
3	Operation								
3.1	Traffic congestion	3.81	0.958	3.95	0.924	4.15	0.715	1.982	n.s
3.2	Air pollution	2.67	0.919	3.13	0.915	3.02	0.656	4.379	Sig
3.3	Noise pollution	2.67	0.778	3.04	0.717	3.12	0.768	4.956	Sig
	<u>Frequency of the problems faced</u>								
4	Service								
4.1	Difficult to find tw at night	3.33	0.778	3.34	0.824	3.25	0.843	0.196	n.s
4.2	Incerse fare at night	2.49	0.736	2.77	1.101	2.53	0.817	1.814	n.s
4.3	Drop passengers away from the destination	1.81	0.664	1.86	0.749	1.78	0.671	0.274	n.s
4.4	Low speeding	2.33	0.68	1.91	0.644	2.07	0.691	5.922	Sig
5	Safety								
5.1	Speeding	3.28	0.854	3.33	0.982	3.75	0.632	5.274	Sig
5.2	Waving through traffic carelessly	3.7	0.887	3.84	0.905	4.07	0.785	2.452	n.s
5.3	Overtakng carelessly	3.16	1.153	3.65	0.985	3.81	0.88	5.648	Sig
5.4	Get u-turn on pedestrian crossing	2.16	0.785	2.63	0.913	2.46	0.75	4.696	Sig
6	Driver behaviour								
6.1	Feeling unsafeto travel with anunknown driver at night	3.26	0.79	3.62	0.914	3.54	0.816	2.741	n.s
6.2	Feeling unsafe to travel with an unknown driver at day time	2.37	0.618	2.62	0.936	2.58	0.875	1.294	n.s
6.3	Smoking habits	1.67	0.644	1.69	0.695	1.81	0.656	0.737	n.s
6.4	Drinking habits	2.02	0.672	2.05	0.709	2.07	0.716	0.05	n.s
6.5	Illegal works	2.42	0.879	2.6	0.822	2.31	0.793	2.507	n.s
6.6	Ignore traffic signs	2.74	0.848	2.93	0.763	2.92	0.816	0.859	n.s
6.7	Loud music played by the driver	2.53	0.855	2.95	0.878	2.85	0.715	3.756	Sig
6.8	Poor driving skills	3.74	0.759	3.78	0.88	3.8	0.867	0.047	n.s

* statically significant at the 95% confidence level

Table 11. Posthoc test for comparison of education on the opinion and occurrence

No	Dependent Variable			Sig.	No	Dependent variable			Sig
1	Difficult in heavy rain	Junior highschool or less	senior highschool	.000	6	Low speeding	Junior highschool or less	senior highschool	.001
			higher than senior school	.002				higher than senior school	.055
		senior highschool	Junior highschool or less	.000			senior highschool	Junior highschool or less	.001
			higher than senior school	.943				higher than senior school	.147
		higher than senior school	Junior highschool or less	.002			higher than senior school	Junior highschool or less	.055
			senior highschool	.943				senior highschool	.147
2	Higher level of injury	Junior highschool or less	senior highschool	.181	7	Overtaking carelessly	Junior highschool or less	senior highschool	.008
			higher than senior school	.007				higher than senior school	.001
		senior highschool	Junior highschool or less	.181			senior highschool	Junior highschool or less	.008
			higher than senior school	.067				higher than senior school	.329
		higher than senior school	Junior highschool or less	.007			higher than senior school	Junior highschool or less	.001
			senior highschool	.067				senior highschool	.329
3	Roll the tw	Junior highschool or less	senior highschool	.809	8	High speeding	Junior highschool or less	senior highschool	.765
			higher than senior school	.071				higher than senior school	.008
		senior highschool	Junior highschool or less	.809			senior highschool	Junior highschool or less	.765
			higher than senior school	.014				higher than senior school	.004
		higher than senior school	Junior highschool or less	.071			higher than senior school	Junior highschool or less	.008
			senior highschool	.014				senior highschool	.004
4	Air pollution	Junior highschool or less	senior highschool	.004	9	U turn on pedestrian crossing	Junior highschool or less	senior highschool	.003
			higher than senior school	.045				higher than senior school	.082
		senior highschool	Junior highschool or less	.004			senior highschool	Junior highschool or less	.003
			higher than senior school	.409				higher than senior school	.208
		higher than senior school	Junior highschool or less	.045			higher than senior school	Junior highschool or less	.082
			senior highschool	.409				senior highschool	.208
5	Noise pollution	Junior highschool or less	senior highschool	.008	10	Loud music	Junior highschool or less	senior highschool	.007
			higher than senior school	.003				higher than senior school	.061
		senior highschool	Junior highschool or less	.008			senior highschool	Junior highschool or less	.007
			higher than senior school	.527				higher than senior school	.458
		higher than senior school	Junior highschool or less	.003			higher than senior school	Junior highschool or less	.061
			senior highschool	.527				senior highschool	.458

Respondents who have higher education, considered more on the factors of all categories (service, safety, driver behaviour and operation) that are significantly different. Tables 9 and 10 show tendencies that the higher the education level that they have, the more they concerned about the aspects and the more they considered the occurrence of the problems. It is interesting to point out the low education group considered that they faced with low speed driving of three-wheeler more often than other educational groups.

Monthly income

Table 12. Comparison of monthly income or allowance on the opinion and occurrence

No	Aspects / Problems	Monthly income or allowance							
		Low		Middle		High		F-value	Sig. at 5%
	<u>Opinion on the aspects</u>	Mean	Stdev	Mean	Stdev	Mean	Stdev		
1 Service									
1.1	Difficult to travel in heavy rain	3.67	1.052	3.63	0.793	3.87	0.694	1.336	n.s
1.2	No comfortable seats	2.69	0.811	2.84	0.808	2.82	0.684	0.578	n.s
1.3	Limited seating capacity	2.64	0.906	2.81	0.905	2.87	0.869	0.743	n.s
2 Safety									
2.1	Higher level of injury when face an accident	3.95	0.936	3.88	1.084	4.31	0.668	3.129	Sig
2.2	Higher probability of rolling when going high speed	3.95	0.731	3.83	0.925	4.27	0.618	4.456	Sig
2.3	No seat belts	2.83	0.908	2.96	1.06	3.11	0.91	0.846	n.s
3 Operation									
3.1	Traffic congestion	4.05	0.764	3.88	0.933	4.16	0.824	1.692	n.s
3.2	Air pollution	2.98	0.924	2.95	0.905	3.16	0.673	0.962	n.s
3.3	Noise pollution	2.86	0.814	2.96	0.749	3.18	0.716	2.15	n.s
<u>Frequency of the problems faced</u>									
4 Service									
4.1	Difficult to find TW at night	3.31	0.897	3.3	0.865	3.33	0.603	0.025	n.s
4.2	Increase fare at night	2.69	1.07	2.58	0.952	2.71	0.869	0.37	n.s
4.3	Drop passengers away from the destination	1.78	0.571	1.89	0.787	1.71	0.589	1.185	n.s
4.4	Low speeding	2.02	0.563	2.11	0.76	1.91	0.557	1.346	n.s
5 Safety									
5.1	Speeding	3.52	0.862	3.33	0.92	3.64	0.773	2.343	n.s
5.2	Waving through traffic carelessly	3.9	0.906	3.75	0.882	4.16	0.767	3.55	Sig
5.3	Overtaking carelessly	3.76	0.983	3.36	1.053	4.02	0.783	7.992	Sig
5.4	Get u-turn on pedestrian crossing	2.64	0.906	2.38	0.805	2.58	0.917	1.83	n.s
6 Driver behaviour									
6.1	Feeling unsafe to travel with an unknown driver at night	3.64	0.879	3.43	0.905	3.62	0.747	1.296	n.s
6.2	Feeling unsafe to travel with an unknown driver at day time	2.57	0.831	2.51	0.846	2.64	0.933	0.381	n.s
6.3	Smoking habits	1.74	0.701	1.73	0.698	1.71	0.589	0.017	n.s
6.4	Drinking habits	2.21	0.565	1.92	0.746	2.22	0.636	4.619	Sig
6.5	Illegal works	2.67	0.754	2.44	0.886	2.38	0.747	1.514	n.s
6.6	Ignore traffic signs	3.17	0.824	2.75	0.819	2.96	0.638	4.524	Sig
6.7	Loud music played by the driver	2.9	0.906	2.76	0.899	2.93	0.58	0.888	n.s
6.8	Poor driving skills	3.74	0.828	3.71	0.913	3.98	0.657	1.694	n.s

Table 13. Posthoc test for comparison of monthly income or allowance on the opinion and occurrence

Dependent Variable			Sig.	Dependent Variable			Sig.
Higher level of injury	low	middle	.702	Waving through traffic carelessly	low	middle	.329
		high	.088			high	.177
	middle	low	.702		middle	low	.329
		high	.014			high	.009
	high	low	.088		high	low	.177
		middle	.014			middle	.009
Roll the tw	low	middle	.421	Drinking habits	low	middle	.019
		high	.078			high	.957
	middle	low	.421		middle	low	.019
		high	.003			high	.014
	high	low	.078		high	low	.957
		middle	.003			middle	.014
Overtakig carelessly	low	middle	.026	Ignore traffic signs	low	middle	.004
		high	.219			high	.210
	middle	low	.026		middle	low	.004
		high	.000			high	.142
	high	low	.219		high	low	.210
		middle	.000			middle	.142

High income earners considered that safety and driver behaviour aspects of three-wheeler such as rolling of the TW, overtaking carelessly, waving through the traffic, drinking habits, ignore traffic signs are issues in using the service more than middle and low income earners. In the same perspective of the previous category, most of the high income earners are the people who have higher education. Due to their knowledge, it is reasonable to expect that they have more consideration on the aspects and problems of three-wheeler service more than other groups. It is interesting to observe that low income respondents faced problems of drivers ignoring the traffic sign significantly more than middle income respondents.

5. CONCLUSIONS

This research was carried out to find the agreement whether the aspects of three-wheeler are considered as an issue for passengers and to analyse the problems faced by the passengers in terms of the occurrence. A questionnaire survey was conducted in Kurunegala city area and Narammala & Polgahawela towns, which represent urban and suburban areas, respectively, for the benefit of this research. There is no difference of regulations for three wheelers in those cities. In general, the study can conclude that safety aspects of three-wheeler are considered as issues for passengers. In the same line, problems related to safety have been highlighted by respondents in using the three-wheeler services. Additionally, factors related to three-wheeler drivers are well taken into consideration by passengers in using the services. It is also observed that suburban passengers are less concerned on the aspects and problems of three-wheeler than their urban counterpart. The study also found that socio-demographic factors define the perceptions and evaluations of three-wheeler except for occupancy where no single variable is found significantly different. Educating users and drivers on safety should be considered to improve safety attributes of three-wheeler services. Registering three-wheeler drivers can also be expected to improve driver's attitude and behaviour.

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