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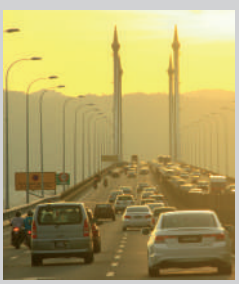
Research Report

Compilation of OPS Bersepadu Studies Conducted During Hari Raya Aidilfitri 2017



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MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH
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Abstract

Every year, the respective authorities will perform an integrated operation called OPS Bersepadu as an approach to curb the fatality rate incurred during festive seasons. Time, manpower, money and efforts were invested in order to create awareness and enhance traffic regulations among the road users. Thus, MIROS has conducted several studies to assess the effectiveness of OPS Bersepadu conducted for this Hari Raya Aidilfitri (HRA). The evaluation study was conducted through several research projects i.e. seatbelt wearing compliance, helmet wearing compliance, vehicle speed and CRS usage. The findings of each measured variable were presented in separate chapters. The comparative trend of road users' perception and behavioural changes between during OPS and the non-OPS period was observed.

As expected, traffic volume during the OPS period increased on the Expressways and Federal Roads. The volume of the vehicles during OPS Hari Raya Aidilfitri was 28% higher compared to normal days. Heavy vehicle banning strategies were found to be effective due to the existence of enforcement during OPS. The percentage of heavy vehicles decreased to 37% for both the expressway and Federal Road during OPS Hari Raya Aidilfitri 2017.

Meanwhile, the speed study found that the mean speed during OPS was 77.6 kph while the mean speed after OPS was 77.0 kph. It was observed that the s OPS speed limit violation rate of 80 kph and 90 kph was lower during OPS as compared to after OPS. Even after the speed limit was increased back to 90 kph, there were no significant changes in the mean speed.

As for helmet wearing, proper helmet wearing shows a significant increment among motorcyclists during OPS. While the results are non-indicative for its influence towards helmet wearing, the overall helmet wearing rate, nevertheless, is already positive.

The seatbelt wearing rate was also higher during OPS for driver and front passenger but declined slightly for rear passengers. When comparing the seatbelt wearing rate by types of vehicle, car drivers and front passenger showed a significant increase during OPS. Drivers and front passengers who travelled on expressway also showed a significant increase during OPS. On the other hand, seatbelt wearing among drivers of 4WD and rear passengers of MPV/SUV decreased from before OPS to during OPS.

Despite the launch of OPS Bersepadu, the CRS use observed is still low (below 50%). The decreasing number of CRS used during OPS may be affected by the festive season whereby most family members travel together in one (1) vehicle, hence the limited seats for the occupants. While CRS use can reduce infant fatalities up to 70% and 54%-80% for small children, clearly the importance of the use of CRS is still not a priority among drivers as part of road safety.

The level of POBC for this HRA 2017 was surprisingly high before OPS started. Later, an increment of 2.2% was recorded during OPS. However, the increment was not significant. Meanwhile, the percentage of enforcement visibility throughout the implementation of OPS shifted from medium to high. The results from the inferential statistical analysis clearly show a significant difference in the existence of enforcement activities. This indicates that the road users saw a significant increase in enforcement activities during the implementation of OPS HRA 2017 as compared to before the implementation of OPS HRA 2017.

This study shows that road safety messages play an important role in enhancing awareness. The messages must be focused and not general (such as be safe on the road) to tailor to the road users in complying with specific traffic regulations. Social media platform shows the most received road safety messages among road users. Therefore, the selection of medium plays an important role in conveying messages towards these target group.

1. Introduction

Festive seasons keeps gave us the chills in the spine since it frequently relates to the road fatality. Road fatality is a worldwide concern as it was one of the highest cause of death. Therefore, integrated enforcement and road safety campaigns by Royal Malaysian Police (PDRM), Road Transport Department (JPJ), Land Public Transport Commissioner (SPAD), Road Safety Department (JKJR), Highway Planning Unit (HPU) and several agencies are conducted. For this HRA, OPS Bersepadu was held for 15 days from 18 June until 2 July 2017.

In evaluating the effectiveness of the interventions conducted during the OPS period, Malaysian Institute of Road Safety Research (MIROS) has had several studies conducted. This study aims to assess the effectiveness of OPS Bersepadu implemented throughout the Hari Raya Aidilfitri for 2017. This was done through the following studies:

i. road users' exposure towards road safety information and road safety information (through media) dosage;
ii. compliance towards helmet wearing;
iii. compliance towards seatbelt wearing among drivers and occupants,
iv. speed change study;
v. use of child restraint system in travelling vehicles;
vi. road users' perception towards traffic enforcement; and
vii. traffic volume study.

Results and discussion for each evaluation study are presented separately in the following chapters. This study recommends that the implementation of OPS Bersepadu are still relevant in controlling road user's compliance to traffic regulations.

2. Helmet Wearing Before and During OPS Hari Raya 2017

2.1 Introduction

Balik Kampung is synonymous with Hari Raya. The tradition roots deep in the society as people, by hook or by crook, willing to spend hours (even up to 20 hours) on the road to reach their hometowns. Given that most city dwellers do not originate from there, they normally take an extra holiday for travelling back to ensure by the morning of 1st Syawal (the tenth month of Islamic lunar calendar), they are with their family. Consequently, the number of vehicles on the road exponentially escalates, hence increasing the risk of accidents accordingly.

To address the additional risks, enforcement agencies escalated their activities thru more operations on the road beside the increment of compound amount. Media also played their role in creating hype and improve public awareness towards road safety in general, and also specifically towards the enforcement activities. With such intense publicity it received, how would the OPS influence road users?

This study aimed to address this question, specifically focusing on the influence of OPS on helmet wearing behaviours.

2.2 Research Objectives

The study aimed to examine the impact of enforcement activities (i.e. OPS), specifically on helmet-wearing compliance. It was conducted concurrently with the OPS by the enforcement agencies during 2017 Hari Raya festive season.

Specifically, the study aimed:

i. to compare motorcycle riders and pillions helmet wearing before and during enforcement OPS of Hari Raya 2017, and;
ii. to compare motorcycle riders and pillions proper helmet use before and during enforcement OPS of Hari Raya 2017 (refer methodology for the definition of proper wearing).

2.3 Research Limitation

The study considered observation locations that were along two (2) federal routes only.

2.4 Literature Review

Motorcyclists are vulnerable road users. Unlike users of other motorised modes of transport, motorcyclists are exposed to a higher risk of serious injury or fatality when involved in a crash because the nature of motorcycles itself is that it lacks structure to protect riders from their surroundings. In a crashworthiness study, Pang and colleagues (2000) reported that 62.9% of vital organ injuries among motorcyclists are associated with head injuries. Further, in 2014, Polis DiRaja Malaysia (PDRM) recorded a total of 6,674 road fatalities, of which 62.6% involved motorcyclists (PDRM, 2015). This trend was also visible in 2010 when PDRM reported that in the preceding six (6) years, more than 2,000 riders were killed annually due to a head injury. Thus, for motorcyclists, helmet is the critical element for safe riding.

In Malaysia, helmet wearing law was introduced in stages: The law was effective for Kuala Lumpur/Selangor, Perak and Penang in 1975, and expanded to Melaka, Johor, Negeri Sembilan in 1976 before continuing to Kelantan, Terengganu, Pahang, Kedah, and Perlis in 1977. Helmet wearing law covered the whole of Malaysian peninsular by 1st June 1980. Despite the long implementation of the law, which showed 30% effectiveness when comparing deaths in 1973 to 1979 (Supramaniam, van Belle, & Sung, 1984), helmet-wearing rate is low, in particular at the rural vicinities (Kulantayan, Radin Umar,

Ahamd Hariza, Nasir, & Harwant, 2001). While more recent studies also supported that helmet wearing rate is lower in a rural area (Rabihah, Azli, Abdullah, & Nurulhana, 2013; Abdullah, Mohd Khairul, in press), the overall results are relatively high with more than 90% helmet wearing. Abdul Manan and Várhelyi (2015) reported helmet wearing at relatively high rate, about 80%, when observing at six (6) stretches of dual-lane single carriage roads in Malaysia. Noor Faradila and her team (2013), however, reported a lower value of 66.8% wearing rate in the school area.

Nonetheless, in his review, Zulhaidi and colleagues (2015) highlighted that despite the high wearing rate of helmet, the more worrisome problem is the low rate of proper helmet use. This is because many studies have suggested that proper helmet use can reduce the severity of head injuries (Sosin, Sacks, & Holmgreen, 1992; Kraus, McArthur & Williams, 1994; Auman, Kufera, Ballesteros, Smialek, & Dischinger, 2002; Servadei, Begliomini, Gardini, Giustini, & Kraus, 2003; Radin, Norghani, Hussain, Shakor & Hamdan, 2005). In addition, relative to the types of helmet, proper strapping of it is more effective in protecting motorcyclists from head injury (Ramli & Oxley, 2016).

In 1996, when the country did not have any integrated intervention strategies, just within the 15 days of the festive season, the statistics recorded a total of 321 deaths, (i.e. constituting 20 deaths per day; Radin, 1998). In due course, enforcement agencies have executed OPS to increase enforcement activities as well as their presence on the roads during this festive season. With such an effort, the Government of Malaysia aims to reduce the actual road crashes despite the inflated crash risk. Ahmad Azad and Mohd Khairul (in press), in their report of the similar study, found a significant difference of proper helmet use during OPS Hari Raya 2015, relative to before OPS. The similar finding is also evident during OPS Hari Raya 2016 (Ahmad Azad & Mohd Khairul, in press). These findings further strengthen the need for enforcement OPS during the festive season.

2.5 Methodology

2.5.1 Study Design & Sampling

This is a descriptive, cross-sectional study. It involved observations before and during OPS Hari Raya 2015 which took place at two (2) locations: Beranang and Bangi. Both locations represent the sub-urban area because previous studies highlighted these locations to have more influence towards the OPS.

2.5.2 Instrument

The study utilised in-house developed pen-and-paper observation form. It entails information about whether riders and pillions were wearing the helmet, and if they did, whether it was properly strapped (definition: strapping is fastened, properly under the chin, not loose).

2.5.3 Procedure

Firstly, the study involved identification of observation spot. Using maps that are available online, potential spots were identified before the actual visit took place. During the visit, researchers determined the suitability of the spot for observation, which entails operating speed and volume, inter alia. Observation spot identification commenced before the actual data collection day. In this study, two (2) observation spots identified located along a stretch of federal route F1 and F31.

Data collection involved two (2) researchers seating by the roadside at the identified spot from 1300 hours to 1800 hours. They took 30 minutes to break after 1530 hours. Their observations involved traffic from both directions. At each spot, two (2) sets of observations were made: before launching of OPS, and during the period of OPS.

2.5.4 Data Analysis

Analysis of the observed data involved SPSS version 21 to execute odds-ratio procedure comparing the helmet use, and proper strapping between before and during OPS.

2.6 Results and Discussion

2.6.1 Results

Table 1 summarises the results of this study at specific observation locations, as well as the overall results. Accordingly, the results were segregated based on before (N = 2102) and during (N = 2254) OPS. Helmet wearing rate before the OPS was relatively high with the lowest was 82.3% at Beranang, followed by Bangi Lama at 92.2%. The overall wearing rate was 88.1%. Unlike at Beranang, which was 81.6%, the wearing rate showed a positive trend during the OPS to 93.2% at Bangi Lama. The overall wearing rate during the OPS was at 88.8%.

Difference of helmet use (regardless of proper or not) was marginal during OPS relative to before OPS at both observed places. At Bangi Lama the increment was only 1.0% whereas at Beranang the trend was reversed, reduction of 0.7%. Odd ratio analysis, however, revealed these difference as not significant: ORBangi = 1.16, CI [.86, 1.56], $X2(1) = .98$, $p = .32$; ORBeranang = 0.95, CI [.74, 1.22], $X2(1) = .14$, $p = .71$. Overall, the trend of helmet wearing was an increase of 0.7% during OPS relative to before. Also, it was not a significant odds ratio, OROverall = 1.08, CI [.89, 1.30], $X2(1) = .62$, $p = .43$.

Despite the minimal increment of helmet use, among those who wore it, the percentage of proper wearing drastically increase during OPS relative to before OPS. Overall, 77.5% helmet wearers properly fasten the straps before the OPS commenced, and the figure jumped to 85.9% during OPS. This is a significant positive results: OROverall = 1.77, CI [1.50, 2.09], $X2(1) = 45.57$, $p < .001$. Similarly, at individual observation spots, the positive results also manifested with 9.1% and 6.8% increase of proper helmet wearing during OPS at Bangi Lama and Beranang, respectively. Odd ratio analysis further

supports the observable difference: ORBangi = 1.92, CI [1.54, 2.37], X2(1) = 35.76, p < .001; and ORBeranang = 1.53, CI [1.18, 2.00], X2(1) = 10.16, p = .002.

Table 1 Results of the study

Location	Before, *N* (%)					During, *N* (%)				
	Wearing				Not wearing	Wearing				Not wearing
	Unfasten	Fasten	Loose	Total[1]		Unfasten	Fasten	Loose	Total[1]	
Bangi Lama	50 (4.4)	882 (78.1)	197 (17.4)	1129 (92.2)	96 (7.8)	60 (4.6)	1142 (87.2)	107 (8.2)	1309 (93.2)	96 (6.8)
Beranang	51 (7.1)	552 (76.5)	119 (16.5)	722 (82.3)	155 (17.7)	47 (6.8)	577 (83.3)	69 (10)	693 (81.6)	156 (18.4)
Total	101 (5.5)	1434 (77.5)	316 (17.1)	1851 (88.1)	251 (11.9)	107 (5.3)	1719 (85.9)	176 (8.8)	2002 (88.8)	252 (11.2)

Note: [1] This column refers to the total number of riders who were wearing helmet, regardless of fastening

2.6.2 Discussion

2.6.2.1 The Influence of OPS on Helmet Wearing (Objective 1a)

Results of the current study are consistent with findings of Abdul Manan and Várhelyi (2015) that reported helmet wearing at about 80%. The wearing rate in Bangi Lama, however, was higher to reaching further than 90% in both observation periods, to replicate previous study results during OPS Hari Raya 2016 (Ahmad Azad & Mohd Khairul, in press). Relative to previous studies (e.g. Ahmad Azad & Mohd Khairul, in press, Ahmad Azad & Mohd Khairul, in press, Abdullah & Mohd Khairul, in press) Beranang was a new observation spot. Given its more rural locality, the lower wearing rate was something not uncommon, as per literature (Kulantayan et al., 2001; Rabihah et al., 2013; Abdullah & Mohd Khairul, in press).

Further, the non-significant results from statistical analysis indicate the absence of evidence to support the impact of enforcement activity towards wearing rate. While this may be arguably in contradictory to a common understanding (e.g. higher enforcement leads to higher compliance to the law), there is logical a potential explanation of this which clutches on the baseline observation (i.e. before OPS). Because the wearing rate even before the launching of the OPS was already high, i.e. around 88%, the room for improvement is lesser – the ceiling effect. Thus, the influence of OPS may not be sensitive enough to evince higher results. Furthermore, neither Bangi Lama nor Beranang received any specific enforcement activities directly targeting helmet wearing. Therefore, the marginal difference during OPS, relative to before its launch, was not something unexplainable.

2.6.2.2 The Influence of OPS on Proper Helmet Wearing (Objective 1b)

As per literature (e.g. Ramli & Oxley, 2016; Zulhaidi et al., 2015), helmet wearing without proper strapping is useless. Unlike the marginal positive results of helmet wearing, the results of proper wearing revealed a significant jump of about 9% during OPS, in comparison with before its commencement. Further, helmet wearers were twice more likely to properly strap during the OPS period. This indicates a positive influence of OPS with regards to proper strapping among riders who were using helmet. Similar positive results were reported in previous studies as well (e.g. Ahmad Azad & Mohd Khairul, in press; Mohd Khairul & Ahmad Azad, in press).

With regards to helmet wearing issue, there are three groups of motorcyclists: 1) motorcyclists who do not wear helmet at all; 2) motorcyclists who wear helmet but without proper strapping; and 3) motorcyclists who properly wear helmet. While the first group is always the main concern from the government, the second group, in our opinion, is more critical. This is because, while the first group may seem not to care about their safety, there are chances that their economic status is very low to even afford a helmet. Of course, some unruly motorcyclists simply break the law. These assumptions, however, does not apply at all to the second group of motorcyclists – the very helmet is already on their head! To not fasten the strapping strongly indicates the

lack of safety conscious within them. We believe this is the more problematic group. Imagine that if this problematic group can be addressed, from this simple study, chances of fatalities due to head injury may be roughly reduced to about 14% to 22% from the status quo.

2.7 Conclusions and Recommendations

To conclude, enforcement activities during OPS supported proper helmet use among motorcyclists. While the results are non-indicative for its influence towards helmet wearing, the high wearing rate, nevertheless, is already positive. Even though both observed locations were lacked any direct enforcement activity during the OPS, the hype and ambience of OPS, possibly from the media, may contribute to the overall positive results. In short, enforcement activities should be continued during the future festive seasons to cope with the higher risk attached.

3. Compliance of Rear Seatbelt Wearing During OPS Raya 2017

3.1 Introduction

Studies have demonstrated that seat belts can reduce the injury severity during road crashes (Elvik & Vaa, 2004; Evans, 1986; IRTAD, 1995; Petridou et al., 1998). Similarly, seatbelts usage reduces the probability of being killed by 40-50% for drivers and front occupants in Elvik and Vaa study (2004). They added that for occupants sitting in back seats reduces by about 25%. Meanwhile, Shimamura et al. (2005) study showed a decrease of 45% in the killed or severely injured (KSI) category when use seatbelts.

The use of seatbelts is the cheapest and the most effective way to reduce road crash fatalities for car drivers and occupants. Many countries have put into place legislation that requires vehicle occupants to use safety belt including Malaysia. It was started with Road Transport Ordinance 1958 whereby front occupants of a motor vehicle are compulsory to use safety belt on 1st April 1979. Afterwards, the mandatory use for rear seatbelts took effect on 1 January 2009 (Road Traffic Act, 1987).

In 1993, as reported by Hauswald (1997) that the wearing rate among drivers in Kuala Lumpur was only 40%. After years of front seatbelt law has been introduced in 1979, the rate was merely increased to 76.6% in 2003. However, they revealed that none of rear occupant wore seat belt (Kulanthayan et al., 2004). Furthermore, MIROS study (Norlen et al., 2010) shows that there is uniformity on compliance rate for drivers and front occupants from December 2008 until June 2010 as presented in Figure 1 below. However, for rear occupant, the compliance rate continuously decreasing starting from Mac 2009 until June 2010. As of June 2010, the compliance rate was 86.3% for drivers, 74.7% for front occupants, and 9.7% for rear occupant. From 2010 to 2015, the trends of seatbelt compliance were gradually declined for the following months until it reached 9.8% in 2015.

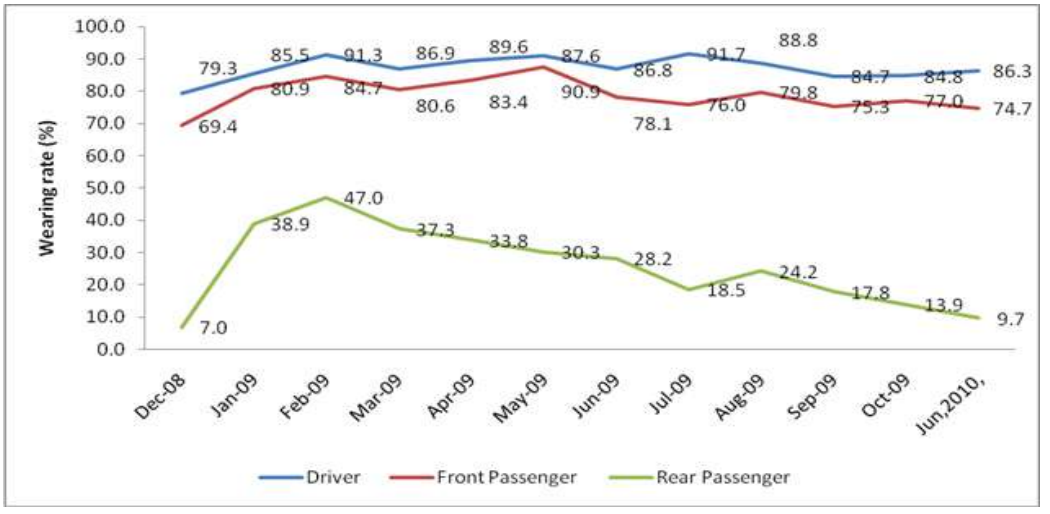


Figure 1 Nationwide seatbelt wearing rate (Overall) Dec 08 – June 2010

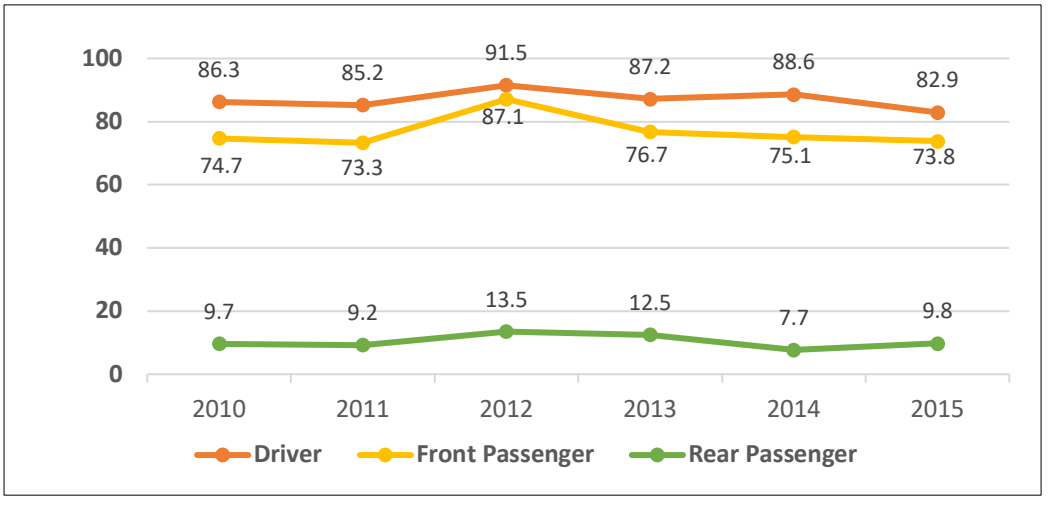


Figure 2 Yearly seatbelt wearing 2010 – 2015

3.2 Research Objectives

This research would like to compare the compliance of rear seatbelt wearing before and during OPS Raya 2017 as well as between previous OPS and current OPS. This study also

determines the trend of rear seatbelt use rate by demographic profile. Public awareness for seatbelt wearing remains low even though a lot of research shown the advantage of seatbelt usage. This is shown through a percentage reduction of rear seatbelt wearing. Thus, monitoring of seatbelt's compliance is vital as a feedback mechanism for the government to improved seatbelt use among vehicle occupants in Malaysia.

3.3 Research Limitation

Limitation of this research is observation hours (during daytime). Therefore, the results do not represent the pattern of seatbelt wearing by time of day. The high rate of seatbelt use might be due to the concentration of enforcement activities on road.

3.4 Methodology

This study was conducted through cross-sectional study design. In order to evaluate the effectiveness of the OPS, roadside observations were done before (15th June until 8th June 2017) and two (2) weeks during (19th June until 2nd July 2017). The study was conducted in five (5) randomly selected locations namely Seremban and Shah Alam at which representing seatbelt wearing on short distance, and three (3) main expressways were selected in order to observe vehicle occupants travelling long journey; Plaza Tol Sg. Besi, Plaza Tol Gombak and Plaza Tol Jalan Duta. Criteria for site inclusion were slowing of traffic and a safe position for viewing traffic at the closest distance. The selection of observation site was based on criteria below:

i. a safe position;
ii. slow traffic area; and
iii. adjacent to junction, traffic light or roundabouts.

3.4.1 Sample Size Calculation

The sample size was determined using a single proportion formula. Taking 13.9% as estimated rear occupant seatbelt wearing rate (referring to rear occupant seatbelt

wearing rate in 2010) with consideration of a 5% tolerable error at 95% confidence interval. Thus, the minimum required sample size was 200 samples for each location. The minimum sample number for each location as presented in Table 2.

Table 2 Minimum number of rear occupants by phases of OPS and respective selected location

Selected location		Minimum number of rear occupants by phases of OPS	
		Before	***During***
Non-expressway	Seremban	200	200
	Shah Alam	200	200
Expressway	Plaza Tol Sg. Besi	200	200
	Plaza Tol Gombak	200	200
	Plaza Tol Jalan Duta	200	200
Total minimum number of rear occupants		2000	

3.4.2 Sample Selection

All occupants of light-duty vehicles (cars, vans etc), Multipurpose Vehicles (MPV), Sports Utility Vehicles (SUV) and light trucks which travelled along the observation point were observed. The vehicle should carry at least one (1) rear occupant and vehicles with heavily tinted windscreen or windows were excluded.

3.4.3 Roadside Observations

This study used roadside observation approach. The point of observation was as explained above. Two trained researchers were placed at each observation point. All researchers were trained on how to fill the form based on observed vehicle. Safety at the observation point was emphasized on the day of observation. The observations took place at 8.00 am until 5.00 pm from Monday to Friday.

3.4.4 Research Tool: Seatbelt App

This study used seatbelt smartphone apps that were developed by Malaysia Digital Economy Corporation (MDEC). All the data key in will automatically save in a database that will be operated by a research officer. Figure 3 shows an overview of the seatbelt app.

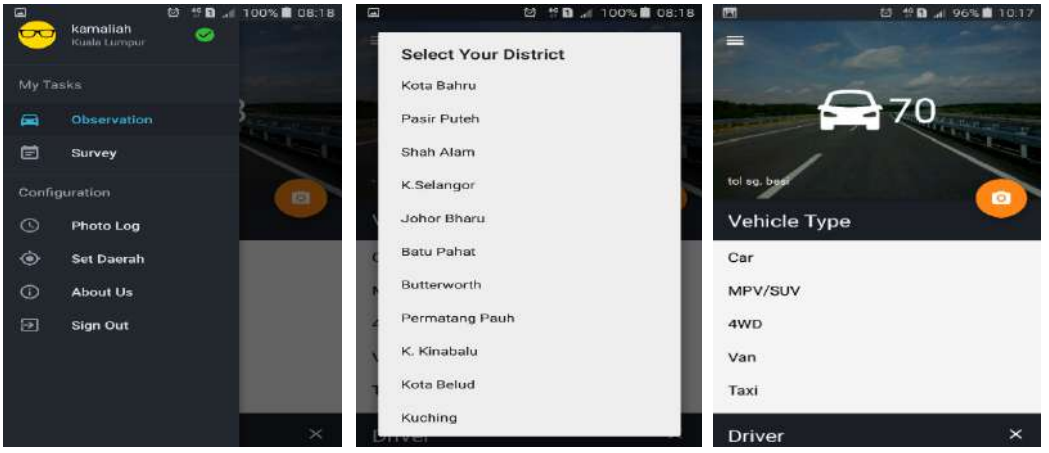


Figure 3 Overview of seatbelt app

3.4.5 Data Analysis

Prior to data analysis, data cleaning was done by a researcher using the same statistical software for the data analysis. Data were analysed using software such as SPSS version 21. Frequency distribution and proportion was tabulated using descriptive analysis. To determine the effectiveness of the OPS, data of before and during the OPS were analysed using cross-tabulation matrix analyses. The relative risk and 95% confidence interval were computed and taken as the final results for assessing the effectiveness of the OPS.

3.5 Results

This section discusses three (3) subsections; i) the compliance of rear seatbelt usage before and during OPS Raya; ii) pattern of rear seatbelt use rate by gender, location and type of occupants; and iii) the compliance of rear seatbelt usage between previous OPS and current OPS.

3.5.1 Compliance of Rear Seatbelt Usage Before and During OPS Raya 2017

A total of 2,192 drivers, 2,321 front occupants and 3,758 of rear occupants were observed for their seatbelt usage status throughout the study period. Table 3 shows the distribution of the sample size during the study.

Table 3 Sample size according to phase of the OPS and type of occupant

Type of occupants	Phases of observation		
	Before OPS	During OPS	Total
Driver	1,805	1,107	**2,912**
Front occupant	1,452	869	**2,321**
Rear occupant	2,347	1,411	**3,758**
TOTAL	5,604	3,387	**8,991**

Figure 4 shows the seatbelt usage among vehicle occupants before and during the OPS. In this figure, the seatbelt wearing rate for drivers and front occupant show increase pattern before OPS and during OPS (Drivers: 91.4% to 92.8%, front occupants: 81.5% to 85.2%). In the other hand, seatbelt wearing rate for rear occupant show a slight decrease from 7.7% to 6.7% for the period before OPS and during OPS. However, Table 4 shows that only front occupants had a statistically significant odds ratio. Front occupants were 1.184 (1.016, 1.379) times more likely to wear seatbelt during OPS compared to before OPS.

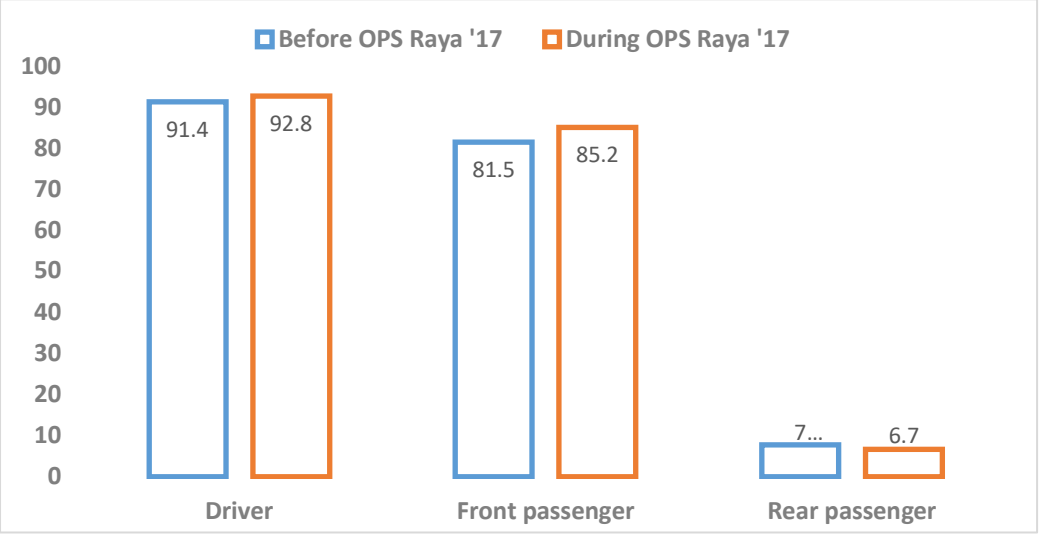


Figure 4 Overall seatbelt usage rate among vehicle occupants

Table 4 Likelihood of vehicle occupant's seatbelt wearing during as compared to before the OPS

Seatbelt use	Usage status	Before OPS		During OPS		OR[a] (95% CI)
		N	%	N	%	
Driver	*Belted*	1649	91.4	1027	92.8	**1.132** (0.941, 1.362)
	Unbelted	156	8.6	80	7.2	
Front	*Belted*	1184	81.5	740	85.2	**1.184[b]** (1.016, 1.379)
	Unbelted	268	18.5	129	14.8	
Rear	*Belted*	180	7.7	95	6.7	**0.914** (0.773, 1.082)
	Unbelted	2167	92.3	1316	93.3	

[a]Odd ratio of 2 by 2 table analyses (likelihood of wearing seatbelt during OPS compared to before OPS)
[b]Significant

3.5.2 To Determine the Trend of Rear Seatbelt Use Rate by Gender, Type of Vehicle and Location

Table 5 shows the result of seatbelt usage rate by OPS period and gender. In a comparison of gender and seatbelt usage rate among different types of occupants by

the period of OPS, none of the occupants had a significant odds ratio. Still, it is vital to note the likelihood of seatbelt use for both male and female rear occupants. Male rear occupants were 0.931 (0.709, 1.221) times less likely to wear seatbelt during OPS than before OPS. On the contrary, female rear occupants were estimated to wear seatbelt 0.903 (0.729, 1.118) times less likely during OPS than before OPS.

Table 5 Likelihood of seatbelt usage rate by the period of the OPS and gender

Occupant	Gender	Usage status	Before OPS		During OPS		OR[a] (95% CI)
			N	%	N	%	
Driver	Male	*Belted*	1336	91.1	811	92.8	**1.157**
		Unbelted	130	8.9	63	7.2	(0.938, 1.427)
	Female	*Belted*	313	92.3	216	92.7	**1.033**
		Unbelted	26	7.7	17	7.3	(0.704, 1.516)
Front	Male	*Belted*	489	80.6	331	84.9	**1.211**
		Unbelted	118	19.4	59	15.1	(0.968, 1.516)
	Female	*Belted*	695	82.2	409	85.4	**1.164**
		Unbelted	150	17.8	70	14.6	(0.946, 1.434)
Rear	Male	*Belted*	64	8.5	36	7.6	**0.931**
		Unbelted	691	91.5	436	92.4	(0.709, 1.221)
	Female	*Belted*	116	7.3	59	6.3	**0.903**
		Unbelted	1476	92.7	880	93.7	(0.729, 1.118)

[a]Odd ratio of 2 by 2 table analyses (likelihood of seatbelt usage during OPS compared to before OPS)

Table 6 shows the likelihood of seatbelt usage rate by OPS period and type of vehicle. Statistically, the likelihood of seatbelt usage during OPS than before OPS for both car's drivers and front occupants are significant with 1.327 (1.036, 1.700) and 1.269 (1.050, 1.533) odds ratios respectively. On the contrary, the 4WD's drivers (OR = 0.374) and MPV/SUV's rear occupants (OR = 0.742) were found to be less likely wearing seatbelt during OPS than before OPS.

Table 6 Likelihood of seatbelt wearing rate by the period of the OPS and type of vehicle

Occupant	Type of vehicle	Usage status	Before OPS		During OPS		OR[a] (95% CI)
			N	%	N	%	
Driver	Car	*Belted*	1182	91.1	740	94.0	**1.327[b]**
		Unbelted	115	8.9	47	6.0	(1.036, 1.700)
	MPV/SUV	*Belted*	391	92.2	255	91.1	**0.916**
		Unbelted	33	7.8	25	8.9	(0.671, 1.250)
	4WD	*Belted*	64	98.5	29	85.3	**0.374[b]**
		Unbelted	1	1.5	5	14.7	(0.234, 0.598)
	Van	*Belted*	12	63.2	3	50.0	**0.667**
		Unbelted	7	36.8	3	50.0	(0.167, 2.666)
Front	Car	*Belted*	839	81.3	532	86.2	**1.269[b]**
		Unbelted	193	18.7	85	13.8	(1.050, 1.533)
	MPV/SUV	*Belted*	296	84.3	177	83.1	**0.946**
		Unbelted	55	15.7	36	16.9	(0.715, 1.251)
	4WD	*Belted*	40	76.9	28	82.4	**1.235**
		Unbelted	12	23.1	6	17.6	(0.606, 2.519)
	Van	*Belted*	9	52.9	3	60.0	**1.250**
		Unbelted	8	47.1	2	40.0	(0.257, 6.070)
Rear	Car	*Belted*	92	5.6	58	5.9	**1.028**
		Unbelted	1540	94.4	928	94.1	(0.835, 1.266)
	MPV/SUV	*Belted*	86	14.1	35	9.5	**0.742[b]**
		Unbelted	523	85.9	334	90.5	(0.554, 0.993)
	4WD	*Belted*	2	2.5	2	4.1	**1.330**
		Unbelted	78	97.5	47	95.9	(0.486, 3.635)
	Van	*Belted*	0	-	0	-	-
		Unbelted	26	100.0	7	100.0	

[a]Odd ratio of 2 by 2 table analyses (likelihood of seatbelt usage during OPS compared to before OPS)
[b]Significant

The likelihood of seatbelt usage according to location is also calculated as in Table 7. Based on the table, it can be seen clearly that drivers and front occupants who travelled on expressway were more prone to wear seatbelt during OPS than before OPS. Drivers

were 1.518 (1.149, 2.005) times more prone to wear seatbelt during OPS compared to before OPS. Similarly, front occupants were 1.333 (1.064, 1.671) times more prone to wear seatbelt during OPS compared to before OPS.

Table 7 Likelihood of seatbelt wearing rate by the period of the OPS and location

Occupant	Site of observation	Usage status	Before OPS		During OPS		OR[a] (95% CI)
			N	%	N	%	
Driver	**Expressway**	*Belted*	867	89.4	600	94.0	**1.518[b]**
		Unbelted	103	10.6	38	6.0	(1.149, 2.005)
	Non expressway	*Belted*	782	93.7	427	91.0	**0.799**
		Unbelted	53	6.3	42	9.0	(0.629, 1.014)
Front	**Expressway**	*Belted*	665	82.8	442	88.2	**1.333[b]**
		Unbelted	442	17.2	59	11.8	(1.064, 1.671)
	Non expressway	*Belted*	519	80.0	298	81.0	**1.042**
		Unbelted	130	20.0	70	19.0	(0.845, 1.285)
Rear	**Expressway**	*Belted*	131	9.8	70	8.4	**0.893**
		Unbelted	1199	90.2	767	91.6	(0.733, 1.087)
	Non expressway	*Belted*	49	4.8	25	4.4	**0.934**
		Unbelted	968	95.2	549	95.6	(0.674, 1.293)

[a]Odd ratio of 2 by 2 table analyses (likelihood of usage seatbelt during OPS compared to before OPS)
[b]Significant

3.5.3 To Compare the Compliance of Rear Seatbelt Between Previous OPS and Current OPS

According to Figure 5, drivers and front occupant usage rate were higher in OPS Raya 2017 (92.8% and 85.2%) compared to OPS Raya 2016 (88.9% and 74.6%). In contrast, the percentage for rear occupant was 6.7% in OPS Raya 2017 but higher in OPS Raya 2016 that was 6.8%. The driver and front occupant show a significant increase with OR for drivers 1.5988 (1.1756, 2.1743) and OR for front occupant 1.9508 (1.5255, 2.4945) while reducing the rate for rear occupant was not significant.

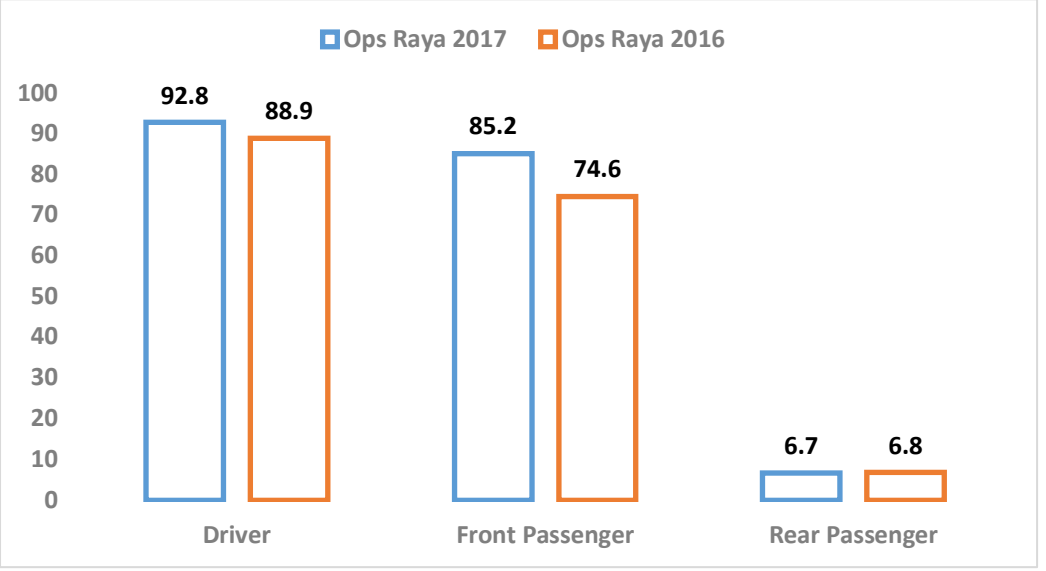


Figure 5 Comparison of seatbelt usage rate between OPS Raya 2017 and OPS Raya 2016

3.6 Discussion and Conclusion

This study aims to determine the seatbelt usage rate before and during OPS Raya 2017, the pattern of rear seatbelt use rate by gender, type of vehicle, location and also compare the seatbelt usage rate between OPS Raya 2017 and OPS Raya 2016. Based on the findings, the usage rate was higher during OPS for driver and front occupant but slight decrease for rear occupant. As for the gender, it shows that male and female rear occupant were less likely to wear seatbelt during the OPS as compared to before OPS.

When comparing the seatbelt wearing rate by types of vehicle, car's drivers and front occupant show significant increase during OPS. On the other hand, 4WD's drivers and MPV/SUV rear occupants' seatbelt wearing were found to be decreasing from before OPS to during OPS. Based on location, drivers and front occupants travelling on expressway shows significant increase during OPS compare to before OPS.

When comparing between OPS Raya 2017 and OPS Raya 2016, it shows that seatbelt wearing rate increase for driver and front occupant while slightly decrease for rear occupant even though the approaches from the related enforcement agencies were the same. The approaches were static canopy on certain routes for enforcement purposes and higher visibility of enforcement officer.

The increase seatbelt wearing rate was also expected since findings from Norlen et al. in 2010 support that if the enforcement activities increase, the compliance rate for seatbelt wearing would also increase and started to decline when the enforcement activities decrease over time. Despite the fact that there was slight increase seatbelt wearing rate during OPS, the approach from enforcement agencies need to be strategised back because of the decrease pattern for rear occupant as compared to previous OPS Raya 2016. It could be more specific enforcement towards car occupants and importantly to publicise more on the enforcement activities. Besides, enforcement relating to seatbelt wearing should be increased and more visible to the public.

4. Perception of Being Caught Study

4.1 Introduction

In Malaysia, road safety and reducing road casualties are the main priorities as the festive seasons' approach. Royal Malaysian Police (RMP), the Road Transport Department (RTD) as well as the Land Public Transport Commission (LpTC) will suit up and execute integrated enforcement which is OP Selamat or OPS Bersepadu. It aims to disseminate the road safety information to road users and reducing the crash rate and fatalities on the roads during the festive season. This is one of the preventive measures implemented since 2001 (with the introduction of LpTC in 2010) which uses the number of fatalities and crashes as the indicator of success or failure.

During OP Selamat 11, it was reported that the number of fatalities decreased after 15 days of operation conducted nationwide. Meanwhile, the number of crashes increased as compared to the last OPS. However, the Inspector-General of police has stated that on the whole, fatal crashes occurring throughout OP Selamat 11 has decreased by 12% compared to OP Selamat 9 which took place during the previous Hari Raya Aidilfitri (New Straits Times (NST), 2017). In addition to that, the fatalities caused by road crashes throughout OP Selamat 11 also decreased by 14% compared to the preceding year (NST, 2017).

The operations of these enforcement agencies were conducted starting from OP Selamat 11 which began from 18th June 2017 until 02nd July 2017. For these OPS, their focus would be on comprehensive enforcement towards traffic offenders to educate road users and simultaneously reducing the accident rate and fatalities on the roads during the festive season. Among the enforcement strategies employed for this year's Hari Raya Aidilfitri (HRA) are issuing immediate summonses to traffic offenders at all exits points along the North-South Expressway (NSE) during this OPS Selamat,

implementing national Intelligent Compound Online Payment System (iCOPS) to detect traffic offenders who have outstanding summons, apart from detecting cloned cars and vehicles with fake road tax. Furthermore, seven major traffic offences were emphasized and Road Transport Department (JPJ) officers went under cover, disguising themselves as occupants to monitor express buses. The seven major traffic violations are running red light, overtake at double lines, using mobile phones while driving, illegal use of emergency lanes, queue-jumping, did not wear seatbelts and illegal use of emergency lane continuously for commercial vehicles (Bernama, 2017).

The study focussed on the road traffic enforcement aspect. This study aims to measure the effectiveness of traffic enforcement activities conducted through the duration of OPS. However, the road users' Perception of Being Caught (POBC) between two (2) periods, which is before and during the implementation of OPS HRA were assessed.

4.2 Objectives of the Study

The general objective of this study is to determine the change of road users' perception of being caught when committing traffic offences throughout the implementation of OPS Bersepadu HRA 2017.

The specific objectives are to:

i. determine the level of perception of being caught before and during OPS HRA 2017 implementation; and
ii. determine the level of traffic enforcement visibility throughout the implementation of OPS Bersepadu HRA 2017.

4.3 Limitations of the Study

This survey was restricted to the length of OPS implementation period. Therefore, the number of days for data collection, especially during OPS period was limited.

4.4 Methodology

4.4.1 Sample and Site Selection

This survey research was led in a group administered questionnaire setting. The sampling technique was based on road users with a valid driving license using purposive sampling. Purposive sampling is a sampling technique in which the sample was selected based upon some fitting characteristic of the sample members by an d individual (Zikmund, 2003).

A series of field surveys over a period of four (4) weeks will be carried out, before and during the launch of the OPS Bersepadu HRA 2017 (18 June – 02 July 2017). The target population of this study are fully-licensed motorists and motorcyclists in Klang Valley. A total of 401 respondents were collected during the four (4) weeks surrounding the festival period of HRA in Klang Valley. The sites chosen were agencies in Klang Valley.

Table 8 Sample distribution

Location	Before OPS (05 – 08 June 2017)	During OPS (19 – 22 June 2017)
Klang Valley	200 Motorists/Motorcyclists	200 Motorists/Motorcyclists
Total respondents	**400**	

4.4.2 Instrument

Data will be collected via a survey using questionnaire in three (3) locations. The respondents were asked to rate the possibility of being caught if committed traffic offences according to the enforcement conducted based on their perception. These responses were on a scale of 0 to 10, where 0 is “not likely to be caught” and 10 is “highly likely to be caught” (WHO, 2015). The variables that will be measured are (i) changes in

perception levels of the risk of being caught, (ii) the visibility of enforcement activities, and (iii) demographic profiles of the respondents.

4.4.3 Data Analysis

Data entry and analysis was done using SPSS to answer the objectives and results was discussed further section.

4.5 Results and Discussions

4.5.1 Analysis of the Perception of Being Caught (POBC) for OPS Hari Raya Aidilfitri 2017

Table 9 demonstrates the overall percentage of road users' POBC for OPS HRA 2017. The data were clustered into two (2) main periods, before OPS and during OPS in order to seek for the pattern.

The percentages of the overall POBC for road users were calculated. Before OPS, the percentage of the road users' overall POBC was surprisingly high (64.1%). The percentage then increased to 66.3% during OPS with a small difference of 2.2%. This clearly specifies that road users are aware of the actual increased enforcement activities.

Table 9 Perception of being caught among road users before and during OPS HRA 2017

Period	OPS HRA 2017
	Overall
Before OPS	64.1%
During OPS	66.3%

*The percentage collected was from 0% to 100% whereby 0% indicates perception of not being caught at all while 100% indicates a sure perception of being caught.

Table 10 shows an evaluation of POBC through the OPS HRA 2017 for motorists and motorcyclists. In order to compare the mean scores of overall POBC recorded in OPS HRA 2017 period, an independent-samples t-test was performed. However, the result exposes that there was an insignificant difference in mean scores for before OPS (*M* = 6.41, *SD* = 2.516) and during OPS (*M* = 6.63, *SD* = 2.396; *t* (399) = 0.193, *p* = .661).

Table 10 Comparison of perception of being caught during the OPS HRA 2017 for road users

HRA 2017	Mean	SD	Independent sample t-test
Road users			
Before OPS	6.41	2.516	*t (399) = 0.193, p = .661*
During OPS	6.63	2.396	

4.5.2 Traffic Enforcement Visibility from Road Users' Perspective During OPS Implementation

Before the OPS implementation, it was revealed that the majority of respondents perceived that the level of traffic enforcement visibility was medium (61.2%) at all locations. Meanwhile, other respondents perceived low visibility (30.3%) and 8.5% perceived high visibility.

In the meantime, there was a shift in high visibility during OPS as the percentage increase to 23% (from 8.5%). Both categories of medium and low visibility decreased slightly with 50% and 27% respectively. In general, medium visibility of traffic enforcement was reported for both periods of OPS.

By running Mann-Whitney test, the change in the enforcement visibility scores between two OPS period was tested. The result shown that the scores at all locations (Mean rank = 215.06, n = 200) were significantly higher during the OPS implementation as compared to before the OPS implementation (Mean rank = 187.01, n = 201), *U* = 17287.5, z = -2.449, *p* = .014.

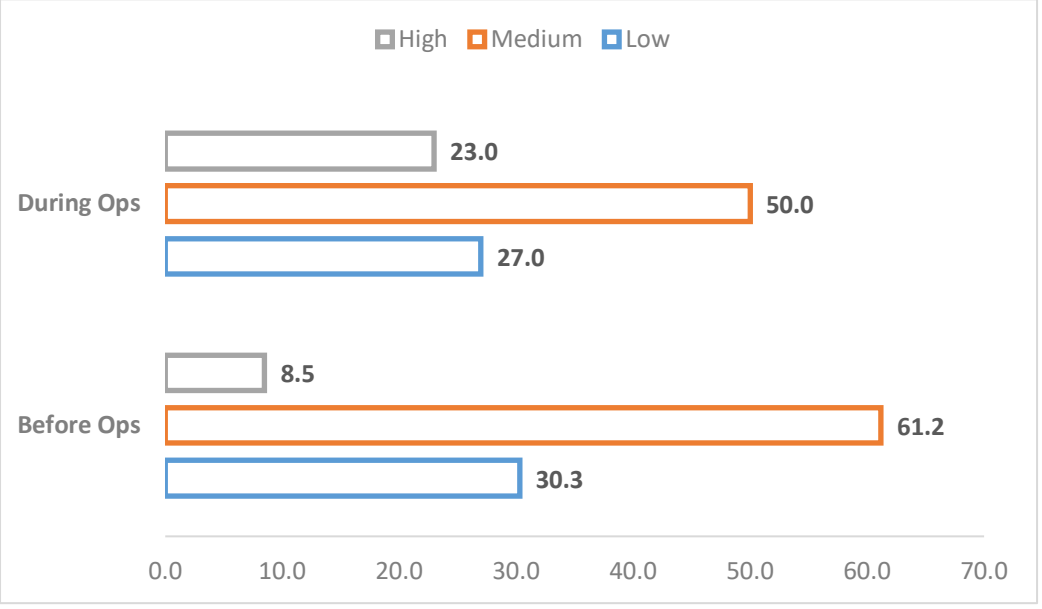


Figure 6 Percentage of traffic enforcement visibility before and during the OPS implementation

Table 11 Comparison of enforcement visibility scores at all locations before and during OPS HRA 2017

	OPS period	Mean rank	p-value
Enforcement visibility score at all locations	Before OPS	187.01	.014
	During OPS	215.06	

4.6 Conclusion and Recommendation

Although OPS HRA showed a positive impact on the year 2017, the magnitude has shown inversely. The results show that there was an increase of 2.2% in POBC level during the implementation of OPS HRA 2017. However, the increment was not significant. This might be due to the effect of OPS CNY conducted early in 2017 which is still lingering among the public as the POBC level was already high before the OPSHRA 2017 started.

Meanwhile, the visibility percentage for enforcement activities was shifted from medium to high during the OPS implementation. The inferential analysis shows a significant difference in the existence of enforcement activities. This indicates that the road users notice the significant increase in enforcement activities during the implementation of the OPS HRA 2017 as compared to before the implementation of OPS HRA 2017.

From the findings, it is recommended as follow:

i. The respective enforcers should plan new approach of OPS implementation every festive season that can be seen and feel significantly by the road users.
ii. The cause and effect of committing traffic offences should always be publicised every day throughout the media.
iii. The respective enforcers should have focused on overt operation to increase visibility rather than covert approach.

5. Traffic Volume Profile and Banning Strategies

5.1 Introduction

OPS Hari Raya Aidilfitri 2017 is one (1) of effort from the Ministry of Transport to reduce the possible increase in road accidents and causalities. The exposure control strategy was implemented during OPS Hari Raya Aidilfitri 2017. The exposure control was involved in reducing the degree of density of traffic and banning heavy vehicle.

Traffic volumes were expected to increase during the festive season and consequently, the number of an accident increased with the number of deaths per day exceed. Understanding the congestion characteristics caused by the holiday is beneficial because appropriate countermeasures for safety improvement can be taken (Jun, 2010). Therefore, it is important to observe traffic volume during the festive season to reduce the number of future crashes.

Controlling heavy vehicles volume during the festive season is among the strategies under the OPS to reduce traffic accident and avoid delay created by heavy vehicles. An involvement of heavy vehicles in an accident would increase the risk of accident severity, especially for the vulnerable road users such as motorcyclists and pedestrians. Through banning strategy, heavy vehicles are prohibited from being on the road. However, this ban did not cover vehicles undertaking critical services such as sewerage services, tankers for transporting fuel and emergency services. The banning would normally be for a period of two (2) days before and after the festive season. Table 12 shows the type of banned heavy vehicle. The heavy vehicle banning was affected on 23 to 24 June and 1 to 2 July 2017.

Table 12 Type of banned heavy vehicle

Type of heavy vehicle	Type of heavy vehicle
	
Low loader	Concrete mixer truck
	
Tipper	Car carrier BDM 5000 kg
	
Bulldozer	Steamroller

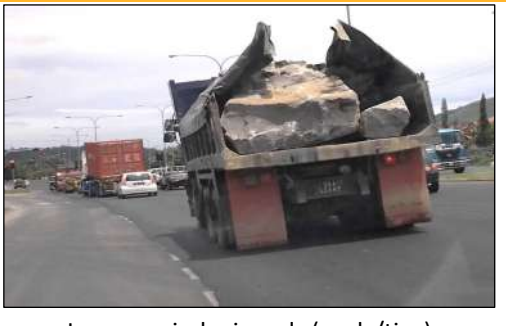
Timber lorry

Tow truck (except for emergency)

Crane

Lorry carried construction material

Lorry carried construction material



Lorry carried minerals (coals/tins)

5.2 Objective of the Study

The main objective of the study is to establish the traffic volume profile during OPS Bersepadu Hari Raya Aidilfitri 2017. The study also examines the effectiveness of the heavy vehicle banning strategy.

5.3 Scope of the Study

Traffic volume studies are conducted to determine the number, movements, and classifications of vehicles at a five (5) selected location. Five (5) points of location were selected on Federal Road cover north, south and east region in Peninsular Malaysia only. Table 13 shows the detail location and date of data collection on the Federal road.

Table 13 Location and date of data collection

District	Road number	Coordinates	Date (During OPS - Banning 23, 24 June & 1, 2 July 2017)	Date (After OPS)
Batu Pahat	F5 (Jalan Batu Pahat – Muar) Single carriageway/ 2 lane	N 1.8508060 E 102.8999140	22 & 23 June	11 & 12 July
Yong Peng	F1 (Jalan Johor Baharu – Segamat) Single carriageway/ 2 lane	N 2.03627 E 103.05461	30 June & 1 July	11 & 12 July
Tanjung Malim	F1 (Jalan Kuala Lumpur – Tanjung Malim) Dual carriageway/ 4 lane	N 3.7024320 E 101.5073390	22 & 23 June	4 & 5 July
Bentong	F8 (Jalan Kuala Lumpur Sempadan Kota Baharu) Single carriageway/ 2 lane	N 3.5813 E 101.8935	22 & 23 June	4 & 5 July
Sekinchan	F5 (Jalan Klang – Teluk Intan) Dual carriageway/ 4 lane	N 3.4626480 E 101.1388290	30 June & 1 July	4 & 5 July

5.4 Methodology

The method of study is designed based on the objective of the study. To establish the traffic volume profile during OPS Bersepadu Hari Raya Aidilfitri 2017; the secondary data obtained for expressway was provided by Malaysia Highway Authority (MHA) and for the federal road was provided by Highway Planning Unit (HPU). Below shows the list of the expressways was performed on a during OPS Bersepadu Hari Raya Aidilfitri 2017 based on the number of vehicles entering toll plaza:

i. Ampang – Kuala Lumpur Elevated Highway (AKLEH)
ii. Lingkaran Luar Butterworth (BORR)
iii. Duta – Ulu Kelang Expressway (DUKE)
iv. Lebuhraya Koridor Guthrie (GCE)
v. Cheras Kajang (GRANDSAGA)
vi. Lebuhraya Shah Alam (KESAS)
vii. Lebuhraya Kajang Seremban (LEKAS)
viii. Lebuhraya Kemuning – Shah Alam (LKSA)
ix. Lebuhraya Pantai Timur (LPT)
x. Lebuhraya Pantai Timur Fasa 2 (LPT2)
xi. Maju Expressway (MEX)
xii. Kuala Lumpur – Kepong (KLK)
xiii. Lebuhraya Pintas Selat Klang Utara (NNKSB)
xiv. Lebuhraya Baru Pantai (NPE)
xv. Projek Lebuhraya Utara Selatan (PLUS)
xvi. South Klang Valley Expressway (SKVE)
xvii. Sistem Penyuraian Trafik KL Barat (SPRINT)

The data for the federal road is provided from the telemetric data. Telemetric data provides the number of vehicle passing through HPU's counting station at various locations in Peninsular Malaysia. For this study, the data was provided from counting stations at Labis, Batu Pahat, Ayer Hitam, Pontian Kecil, Kukup, Segamat, Kota Tinggi, Merlimau, Seremban, Tampin, Tapah, Tanjung Malim, Ipoh, Kuala Kubu Baharu dan Kuala Selangor.

Counting was performed on a daily basis and the profile of the traffic volume was observed during the OPS Bersepadu Hari Raya Aidilfitri 2017. This study reveals peak traffic flow and compared the percentage difference categories of vehicle to the overall volume.

Besides, to examines the effectiveness of the heavy vehicle banning strategy the traffic volume study was obtained by manual counting on the federal road. There are five (5) locations on the federal road were selected in this traffic volume study (see Table 2). Traffic volume count was conducted for the two-time period; during OPS and after OPS (normal day). Observers were stationed at the selected federal road to count vehicle manually; the number of vehicles by vehicle types. Traffic volume studies are conducted to determine the number, movements, and classifications of vehicles at a given location. This data is useful in identifying the trends of traffic volume, critical flow periods, and also the influence of large vehicles on vehicular traffic flow.

5.5 Results

This section discusses the results obtained from the MHA, HPU and traffic volume study. A traffic study consists of traffic volume at study areas and compliance of heavy vehicle on banning strategy.

5.5.1 Road Traffic Capacity along Expressways

Figure 7 shows the traffic volume profile on expressways for the period 18 June until 30 June 2017 (during OPS), obtained from MHA. A total average of 17 expressways within Peninsular Malaysia was considered in this study. The traffic count was classified into the following five (5) vehicles class:

i. Vehicles with 2 axles and 3 or 4 wheels excluding taxis (Passenger car).
ii. Lorries with 2 axles and 5 or 6 wheels.
iii. Lorries with 3 or more axles.
iv. Taxis.

v. Buses.

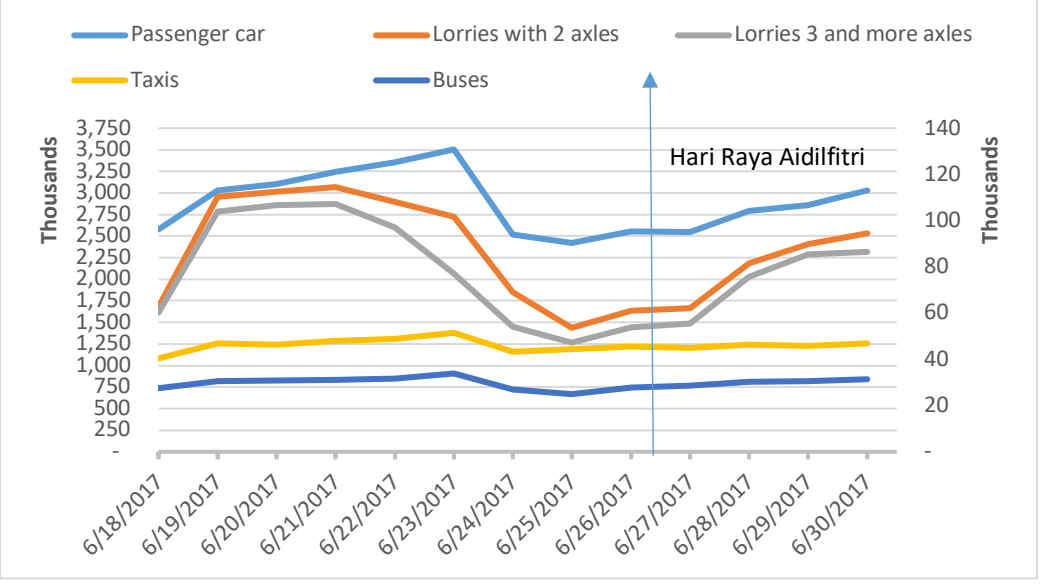


Figure 7 Traffic volume profile on Expressways from 18 June – 30 June 2017

The graph shows, during OPS period especially from 19 June to 23 June 2017, the volume of the passenger car was increased 16% and the volume of the heavy vehicle (lorries) was decreased 17%. Both taxis and buses increased by 10%. The highest point recorded was at 3,768,160 which was on 23 June 2017, the two (2) days before of Hari Raya Aidilfitri. On the 25 June 2017 (Eid day), volume for all type of vehicle low on the toll highway but start on 26 June, all type of vehicle volume increase day by day. It is shown that the movement of vehicle out from Klang Valley before Hari Raya Aidilfitri and gradually back to normal after the festive.

5.5.2 Road Traffic Capacity along Federal Road

Figure 8 shows the profile of traffic volume on federal road over two (2) weeks before and during the OPS Hari Raya Aidilfitri (1 June until 30 June 2017), obtained from HPU. The traffic count was classified into the following four (4) vehicles class:

i. Vehicles with 2 axles including taxis (Passenger car)
ii. Lorries with 2 axles
iii. Lorries with 3 or more axles and busses
iv. Motorcycle

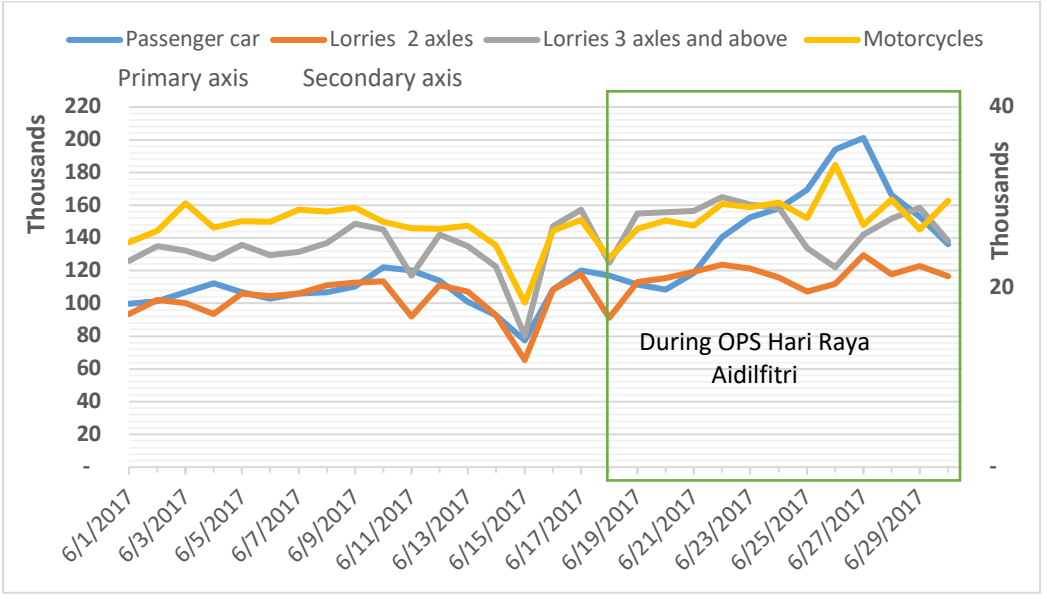


Figure 8 Traffic volume profile on the federal road from 1 June – 30 June 2017

Figure 8 shown traffic volume trend is mostly influenced by the number of passenger car on the federal road. The average volume before OPS was around 176,000 per day with the figure climbing up to 224,00 per day during the OPS period. The highest point recorded was at 277,316 which was on the third day of Hari Raya Aidilfitri.

5.5.3 Traffic Volume Count and Heavy Vehicle Banning on Federal Road

Traffic volume count by vehicle classification was collected at five (5) locations. The locations were Batu Pahat, Yong Peng, Tanjung Malim, Sekinchan and Bentong. The traffic count was conducted manually at every 15-minute interval and classified into the following six (6) vehicle categories:

i. Motorcycles
ii. Passenger car (Car, MPV, van, taxi)
iii. Lorries with 2 axles
iv. Lorries with 3 axles
v. Buses
vi. Banned vehicles

Figure 9 shows the average one-hour traffic volume by vehicle classification collected on site during OPS Hari Raya Aidilfitri period and after OPS Hari Raya Aidilfitri (normal day). As shown, the traffic was highly influenced by passenger car and in overall the growth of traffic volume during OPS period as compared to normal days. In addition, Table 3 showed the difference percentage of traffic volume during OPS as compared to normal days.

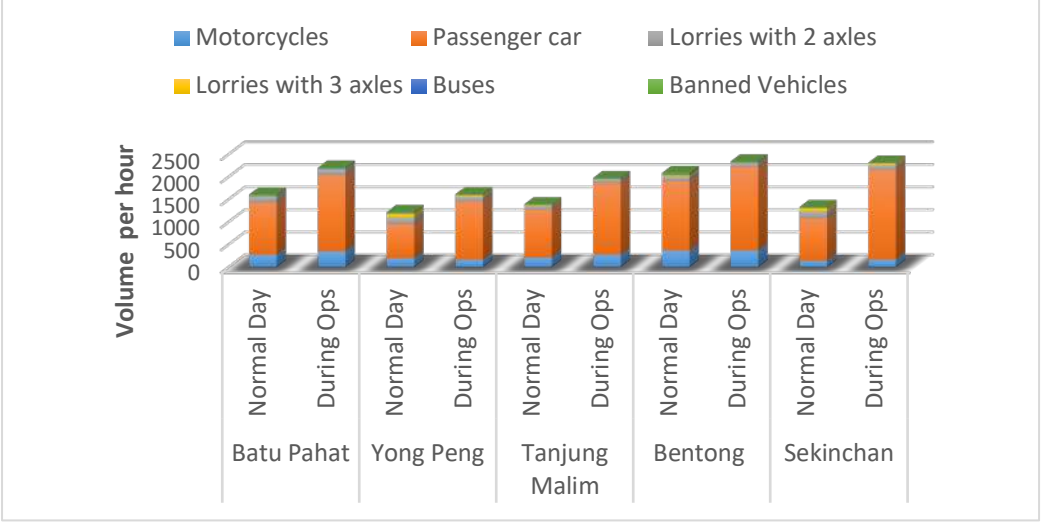


Figure 9 Average one-hour traffic volume for five (5) locations

Table 14 Different in traffic volume during OPS and normal day

		Motorcycles	Occupant car	Lorries with 2 axles	Lorries with 3 axles	Buses	Banned heavy vehicle	Total
Batu Pahat	Normal day	275	1159	133	9	12	21	1,608
	During OPS	352	1689	126	7	16	14	2205
	Diff. in vol. (%)	28	46	-6	-23	41	-31	37
Yong Peng	Normal day	194	763	142	82	11	29	1221
	During OPS	165	1296	100	34	10	14	1619
	Diff. in vol. (%)	-15	70	-30	-58	-4	-54	33
Tanjung Malim	Normal day	212	1063	81	17	6	14	1393
	During OPS	275	1591	81	6	9	12	1975
	Diff. in vol. (%)	30	50	0	-64	61	-13	42
Bentong	Normal day	368	1540	96	31	18	33	2085
	During OPS	371	1854	75	16	19	10	2345
	Diff. in vol. (%)	1	20	-23	-49	7	-69	12
Sekinchan	Normal day	140	948	147	73	5	20	1332
	During OPS	167	1988	110	42	4	4	2314
	Diff. in vol. (%)	19	110	-25	-43	-23	-79	74

* symbol negative (-) mean percentage reduction

Based on Table 14, at Batu Pahat, the volume of vehicle travel during the OPS Hari Raya Aidilfitri was increase 37% as compared normal day. For Yong Peng, the difference in traffic volume was 33% compare a normal day. The increment in traffic volume during a normal day and during OPS period for Tanjung Malim was 42%. Meanwhile, at Bentong, only 12% traffic volume increased during OPS period. The highest traffic volume increased was at Sekinchan which recorded 73%.

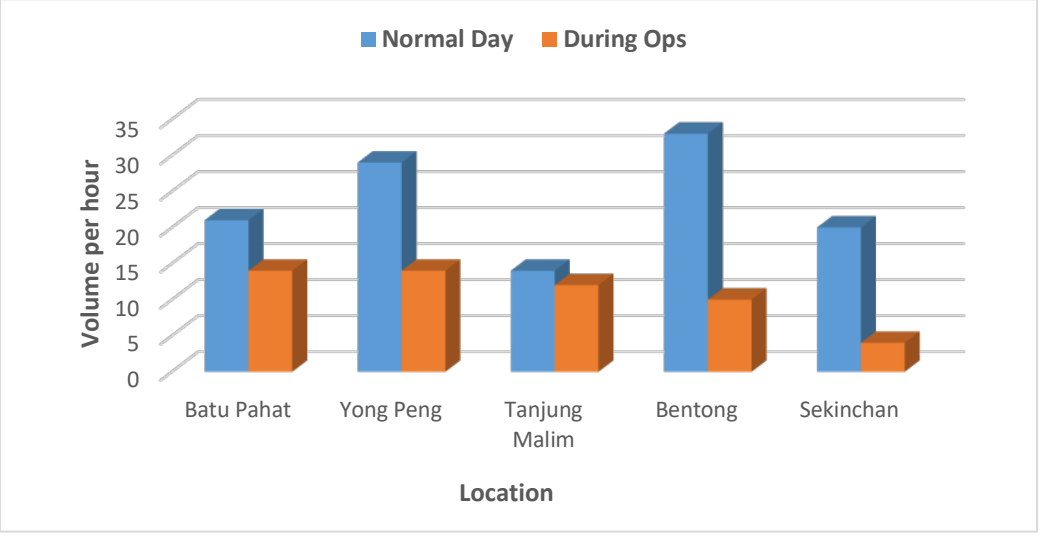


Figure 10 Traffic volume of the heavy vehicle banning during OPS and normal day

Through banning strategy, heavy vehicles were prohibited from being on the road during festive season dated from 23, 24 June and 1, 2 July 2017. This is to avoid delay and accident created by these vehicles on the road. Figure 10 shows the volume of banned vehicles on normal days and during the OPS period. All locations recorded a reduction in the volume of banned vehicles during the OPS period as compared to normal day. As shown in Table 14, the highest percentage reduction of heavy vehicle banned at Sekinchan was 79% and followed by Bentong 69%. Meanwhile, at Tanjung Malim, the reduction was only 13% which is the lowest percentage reduction of heavy vehicle banned. Although some location has the low reduction, it still indicates that the strategy of heavy vehicle banning was obeyed by most lorry companies that use the federal road to travel because all the location has the reduction of the traffic volume of heavy vehicle.

5.6 Conclusion

Overall traffic volume during the OPS period was increased on the Expressways and federal roads. The volume of the vehicle during OPS Hari Raya Aidilfitri was 28% higher compared to normal day. Heavy vehicle banning strategies found effective due to the existence of enforcement during OPS. The percentage of heavy vehicle decrease to 37% both for the expressway and federal road during the OPS Hari Raya Aidilfitri 2017.

6. Observation of CRS Used in Selected Area of Klang Valley, Before and During OPS Bersepadu Raya Aidilfitri 2017

6.1 Introduction

OPS Selamat was carried out each year by Royal Military Police and Road Transport Department to prevent more fatal road crashes during the festive season, especially during Hari Raya Aidilfitri and Chinese New Year. Due to the high volume of traffics during this period, accidents were highly recorded for the past five (5) years in Hari Raya Aidilfitri.

An overview by Norlen, Wong, Hizal Hanis and Ilhamah (2011) found that the leading group of casualties in private vehicles are children aged 1 to 4. It was also found that traffic crashes involving children aged 1 to 4, mostly occur in the residential area. In Malaysia, a 2004 study on child safety seat usage found that 27.4% drivers were found to be using at least one child safety seat (S. Kulanthayan, Ahmad Razak, & Ellen Schenk, 2010). Another observation study done in the United Arab Emirates found that only 4% of children seated in front of vehicles sampled were properly restrained (Barss, Al-Obthani, Al-Hammadi, Al-Shamsi, El-Sadig, & Grivna, 2008). In their observational study, Muammar, Nurulhana, M. Khairul Alhapiz, and Firdaus (2014), found that only 9.5% of children aged 6 and below were restrained. The study also found that only 3.1% of children aged 12 and below were restrained while travelling in vehicles.

Currently, there is no legislation in Malaysia to require the use of proper child restraint together with seat belt. A child physical structure, however, is different from an adult, hence the necessity of a suitable child restraint system (Anund, Falkmer, Forsman, Gustafsson, Matstoms, Sorensen, Turbell, & Wenall, 2003). While the safety features of

new passenger vehicles are constantly improved, the intended reduction of injury may not happen at all if children are not properly restrained Safety improvement in vehicles would be pointless if the users do not bother or do not know how to use the safety devices correctly. A study in Selangor by Low Suet Fin, Nurulhana Borhan and Sharina Sharif (2015) revealed that 49% respondents agree that no CRS legislation contributes to non-used of CRS by Malaysians.

6.1.1 Group Type of CRS

Adult's anatomy is different from children's anatomy, hence adult's seatbelt in a vehicle are not suitable for children. Children have to be seated in CRS until they are grown enough to fit with adult's seatbelt. To fit with children weight and height, CRS is designed differently according to the variation. Children have outgrown the CRS when they have reached the suggested range of height and weight of the CRS. The children must change to the other suitable CRS for their current growth. Usually, infants will be carry using CRS type 0 with rearward facing. Children estimate from seven (7) months above that meet certain criteria can be transferred into CRS type 1. Most CRS are advisable to be secured on rear passenger seat because of the presence of passenger airbag (PAB) at the front passenger seat. Table 1 describes the CRS type that complies with the United Nations standard, ECE Regulation 44.

Table 15 Group type of child restraint system (*Source:* RosPA, http://www.childcarseats.org.uk/types-of-seat/)

Type of child restraint		Weight range	Approximate age range
Group 0 rearward-facing baby seats		0 – 10 kg (22lbs)	Birth to 6 – 9 months

Group 1 forward-facing seats		9 – 18 kg (- 4020 lbs)	9 months – 4 years
Group 2 High-backed booster seat		15 – 25 kg (33-55 lbs)	4 – 6 years
Group 3 booster cushion		22 – 36 kg (48-79 lbs)	6 – 11 years

6.2 Objectives of the Study

The objectives of this study are to determine the use of CRS among children when travelling in vehicles in the selected area of Klang Valley before and during OPS Bersepadu Raya Aidilfitri 2017.

i. To determine CRS use in vehicle travelling along the road before and during OPS Bersepadu Raya Aidilfitri 2017.
ii. To determine CRS use among driver's gender.
iii. To determine CRS use with the compliance of seatbelt wearing among drivers.

6.3 Methodology

6.3.1 Research Design and Sampling

In this study, direct observation was used as the method to get the CRS wearing data. A group of trained research assistants were assigned to observe vehicles with children from a distance of approximately 1 – 3 metres radius from the subjects.

6.3.1.1 Observation Criteria:

i. Observation was done at toll entry/exit area where vehicles are stopped or driven slow enough for occupants to be observed
ii. Only M1 vehicles with children occupants will be counted
iii. Observation was done at both traffic directions.
iv. Vehicles with heavy/dark tinted window won't be observed
v. Public transports are excluded.

6.3.1.2 Observation Location

The observation took place at three (3) points that cover almost incoming traffic from south, north and east of Klang Valley. The locations are highway toll at Sungai Besi Toll Plaza, where travellers were coming from southern, Gombak Toll Plaza, where travellers were coming from the east and Jalan Duta Toll Plaza, where travellers were coming from north of Klang Valley. The observers were located at the Touch N Go and also Smart Tag lanes. Both of the lanes do not require vehicles to stop and pay for the ticket fee, but the vehicles would slow down at the gate, hence it will give more volume of incoming vehicles. Table 16 shows the observation duration and also locations.

Table 16 Locations and observation duration

Location	Before OPS	During OPS	Time
Sg. Besi Toll Plaza	14 June 2017	20 June 2017	12.00 pm – 2.00 pm (2 hours)
Jalan Duta Toll Plaza	13 June 2017	19 June 2017	
Gombak Toll Plaza	8 June 2017	21 June 2017	

6.3.1.3 Sample

The observations were done to vehicles that only carried at least 1 child or installed with CRS. The total number of children observed in vehicles were 650 and 751 before and during OPS respectively as shown in Figure 11. The observed children in vehicles were estimated from age 0 to 12 years old. The children were observed whether they seated in the CRS with proper or improper way. A total number of 608 and 572 vehicles were observed before and during OPS respectively as shown in Table 17. The distribution of vehicle type is described in Table 18. Other than that, CRS type and CRS positioning in the vehicle were being observed too.

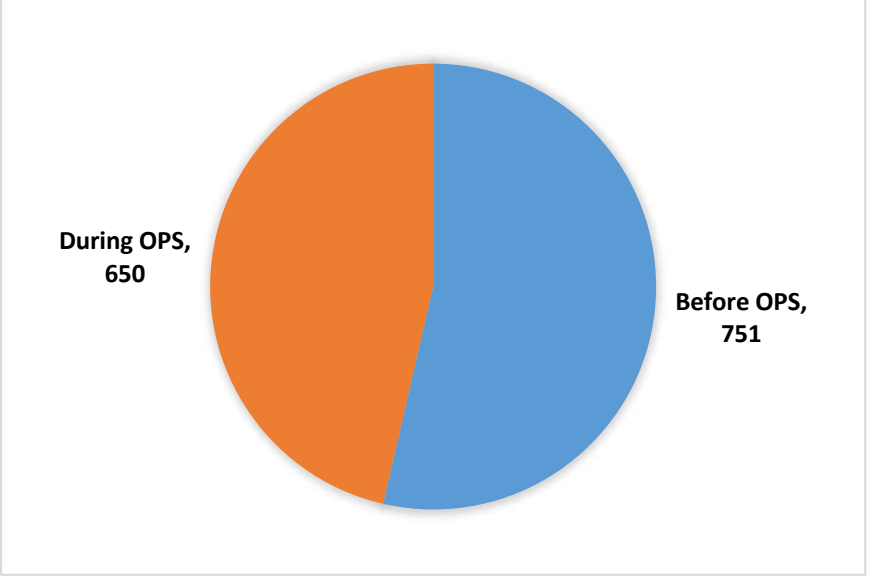


Figure 11 Number of children being observed according to OPS

Table 17 Number of vehicle observed according to location

Location	Vehicle (N) before OPS	Vehicle (N) during OPS
Plaza Tol Sg. Besi	154	178
Plaza Tol Jalan Duta	189	166
Plaza Tol Gombak	265	228
Total	608	572

Table 18 Vehicle type according to OPS implementation

Type of vehicle	Before OPS (N)	During OPS (N)
Car	478	426
MPV	95	97
SUV	23	36
Truck (pick-up)	8	12
Others	4	1

6.3.1.4 Observation Variables

Observation variables in this study were as follows:

i. CRS characteristic: type, orientation position, location on occupant seating.
ii. CRS restrained status.
iii. Driver gender.
iv. Seatbelt wearing by driver and other occupants.
v. Vehicle type.
vi. Child seating on driver's lap or occupant's lap.

6.3.2 Data Analysis

Descriptive analysis of CRS usage in Klang Valley travellers by CRS type, CRS position in vehicle and also restraint compliance by drivers. The data were analysed using SPSS version 21.

6.4 Results

6.4.1 CRS Use

From the observation, we found out only 24.66% from 1180 vehicles were equipped with CRS for both durations before and during OPS. As shown in Figure 12, 23.85% vehicle was equipped with CRS before OPS and 25.52% were observed during OPS.

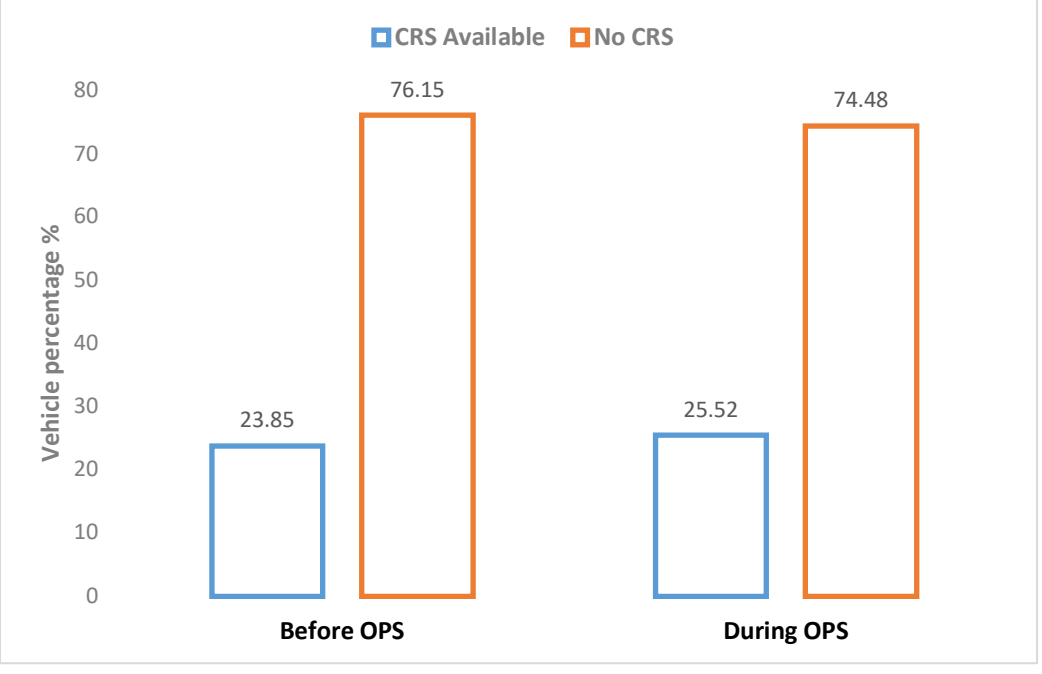


Figure 12 Vehicle equipped with CRS before and during OPS

Of 291 vehicles observed equipped with CRS, 5.15% of them were installed with 2 CRS, makes the total number of CRS observed were 306. The percentage of CRS spotted before OPS was 24.96% while during OPS was 26.30%. Figure 13 is showing the total number of CRS spotted during and before OPS.

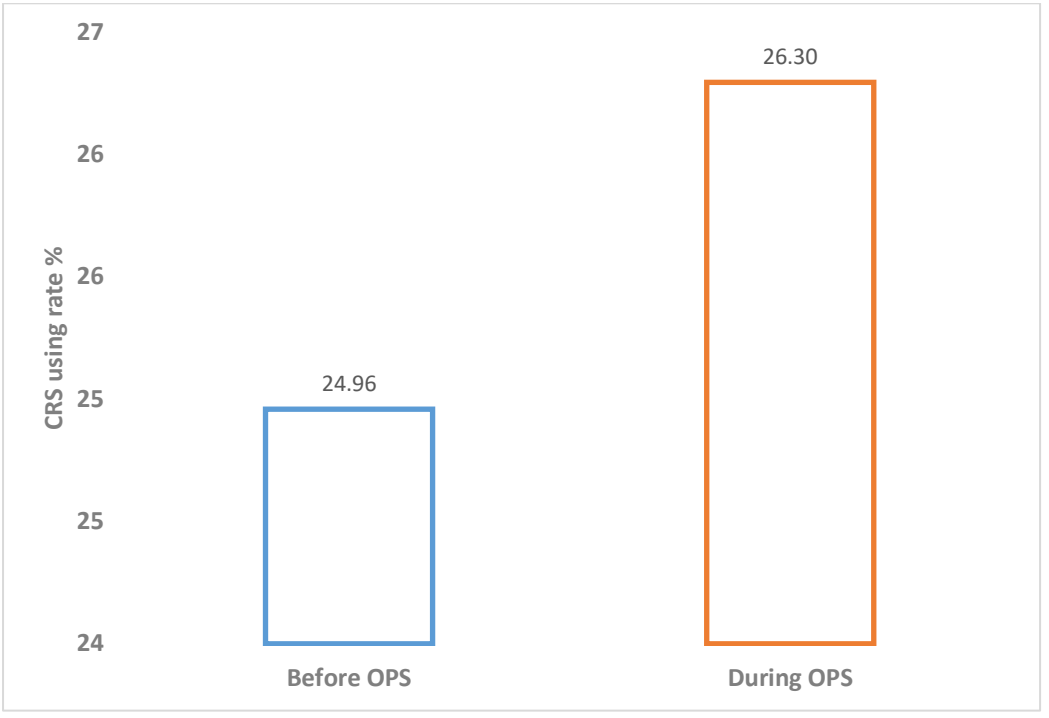


Figure 13 Number of CRS observed before and during OPS

Apart from the use of CRS was observed, we also observed the CRS categories which are also known as CRS group type. These CRS type can be referred to Table 19 for their descriptions. 149 CRS from Group 1 were observed in both OPS period, followed by 112 CRS from Group 2 and 45 CRS from Group 0. The details number of CRS group type is showed in Table 5. Figure 14 shows the CRS group type percentage where CRS from Group 1 was the most CRS used in those both period of OPS.

Table 19 CRS used according to group type, before and during OPS

CRS type	OPS		Total
	Before	*During*	
Group 0	25	20	45
Group 1	73	76	149
Group 2	56	56	112
Total	154	152	306

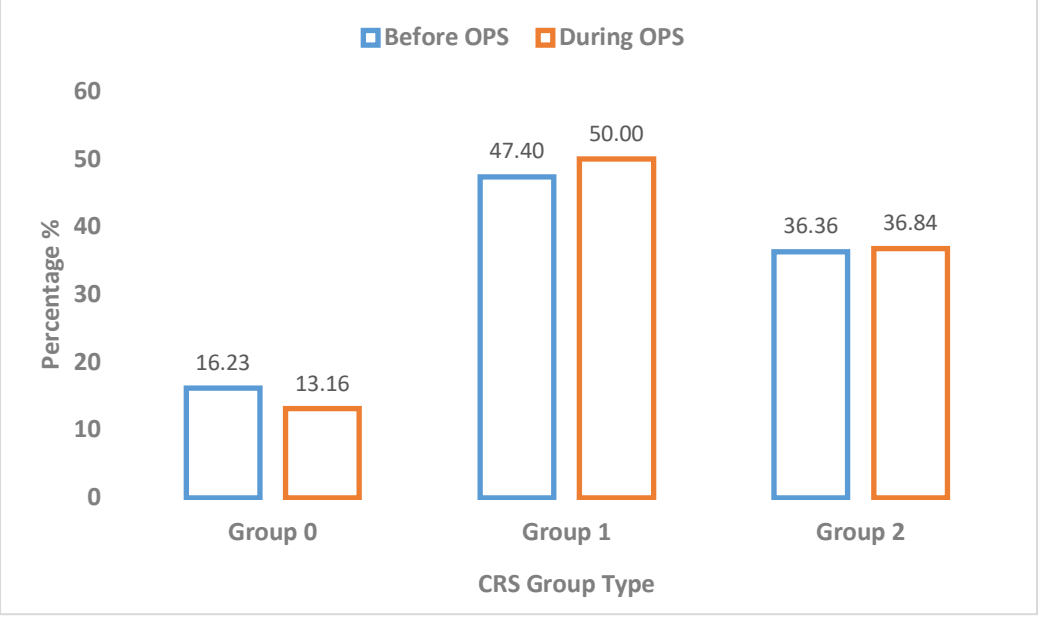


Figure 14 CRS use according to CRS type

6.4.2 CRS Proper Use

From 306 CRS spotted in the vehicles, we observed 291 children were seated in the CRS while the rest of CRS were empty. Some of the CRS were empty with no presence of children in the vehicle and vice versa. Meanwhile, in Figure 15, among 291 children that were seated in CRS, there were 31 (18.56%) of them were not being restrained properly with the safety belt provided in CRS. The result shows before OPS, the child restrained

in the CRS was 25.51% and the number was decreased to 8.70% during OPS as shown in Figure 16 below.

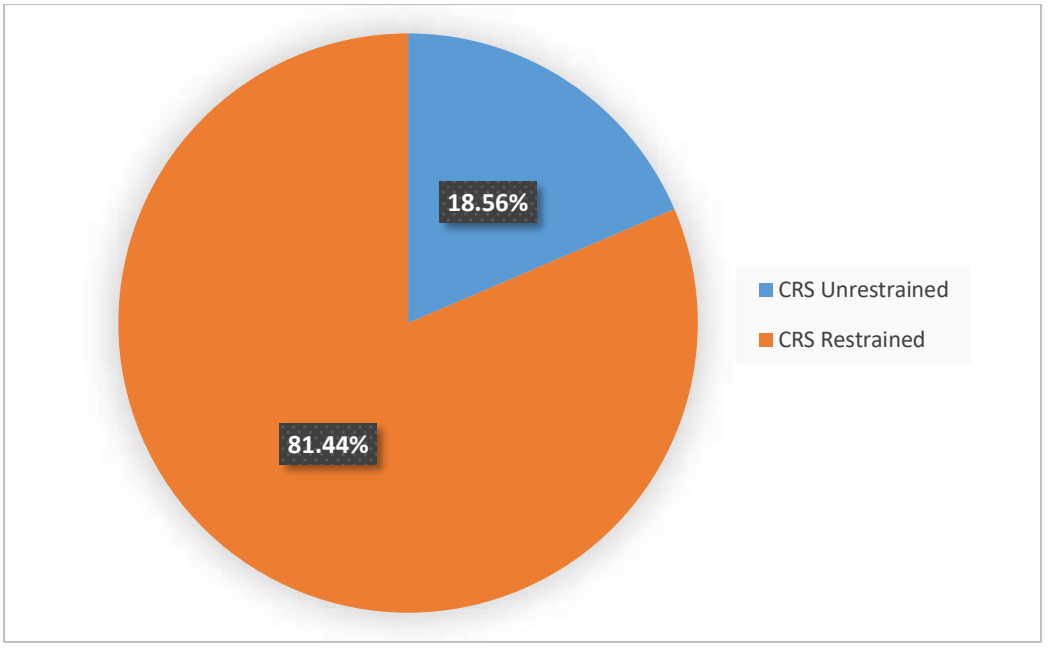


Figure 15 Percentage of overall CRS restrained status

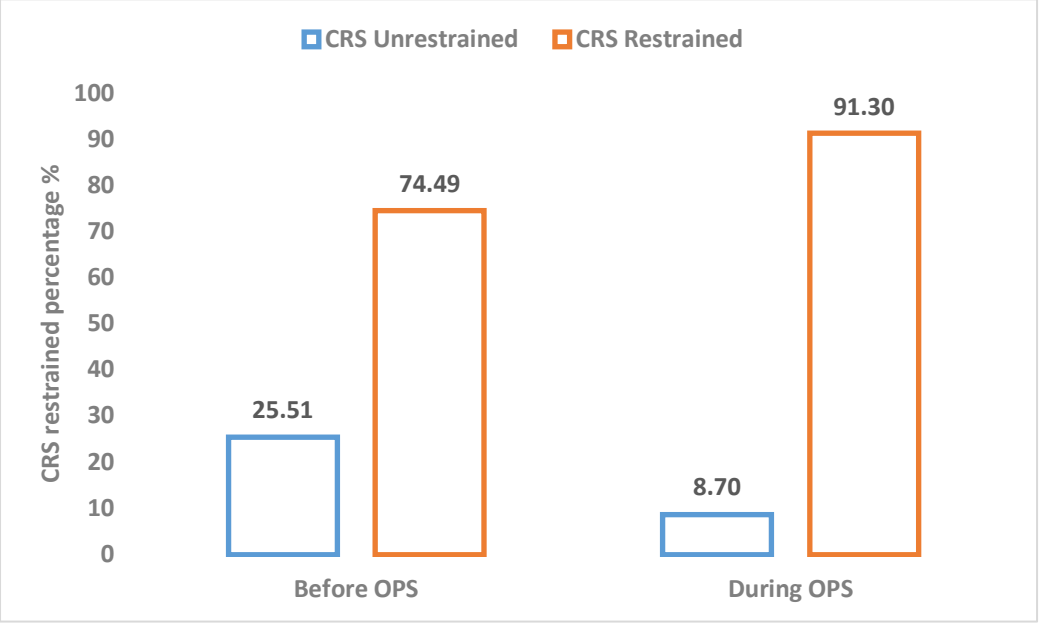


Figure 16 CRS restrained status by OPS period

6.4.3 CRS Position in Vehicle

In Figure 17, the graph is showing 29.22% CRS were placed at the front passenger seat before OPS and 70.78% during OPS. In rear passenger seat, 34.87% CRS were placed before OPS and 65.13% during OPS. Refer to Figure 8, before OPS began, CRS placed at rear passenger seat were 13.64 % from Group 0, 31.17% from Group 1 and 10.39% were from Group 2. Meanwhile, at the front passenger seat, 2.60% were from Group 0, 16.23% from Group 1 and 10.39% from Group 2. During OPS was implemented, 5.26% CRS were placed at the front passenger seat, followed by 19.08% CRS type 1 and 10.53% CRS Group 2. While at the rear passenger seat,7.89% CRS from Group 0, 30.92% CRS Group 1 and 26.32% CRS Group 2. The number of CRS placed at the front passenger seat was higher during OPS was implemented compare to before OPS. CRS is recommended to be installed at the rear passenger seat as the passenger airbag at front seater might cause injury to children when its deployed in crashes.

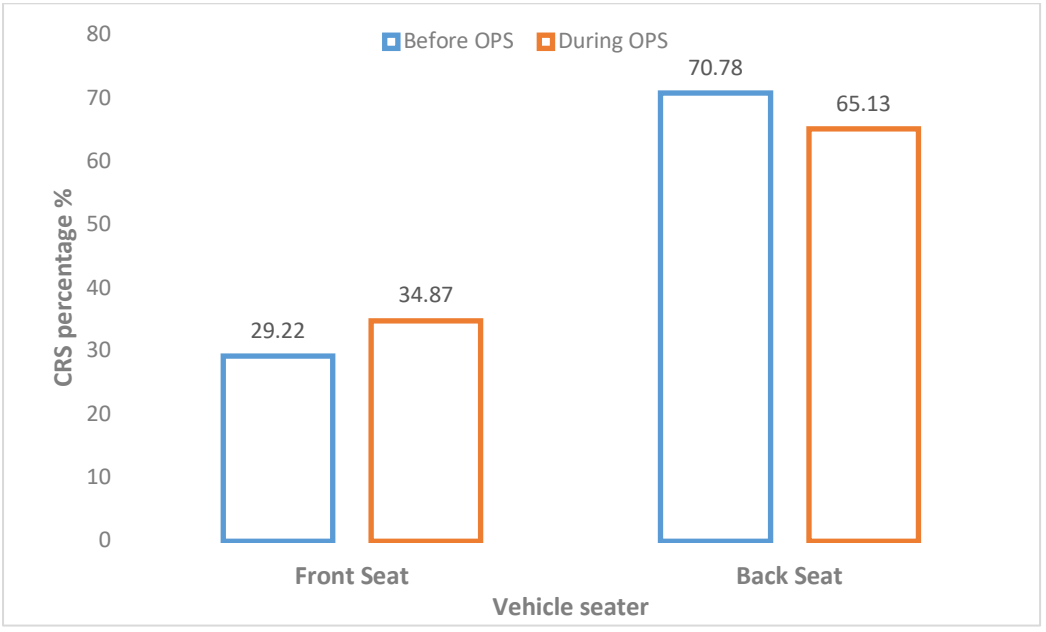


Figure 17 CRS position in vehicle according to CRS type

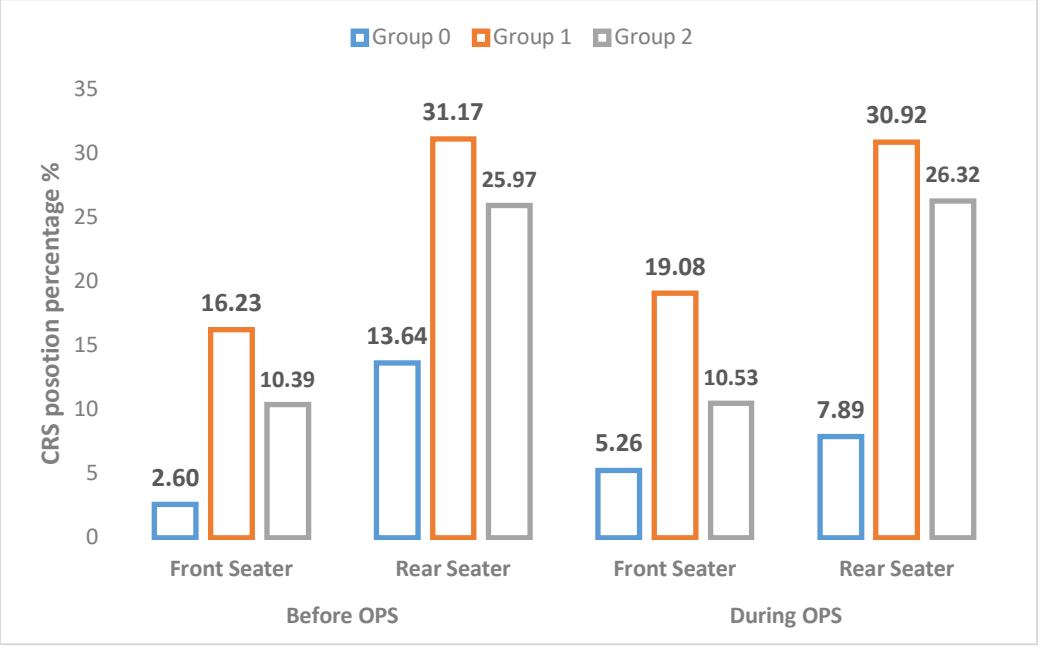


Figure 18 Distribution of CRS position in vehicle according to CRS group type

6.4.4 Gender of Drivers Towards CRS Use

Total of 1180 drivers was observed with 912 male drivers and 268 female drivers. Table 20 is showing the distribution of drivers according to gender and type of vehicle. In general, female drivers were observed less than male drivers 32.41% and 34.25% for both before and during the OPS period as described in Figure 19. Chi-square test revealed that there was no significant relation between gender and OPS enforcement on the use of CRS, $\chi 2$ (1, N = 268) = 0.432, p = 0.511 for female group and $\chi 2$ (1, N = 912) = 0.126, p = 0.746 for male group. However, for both before and during OPS, female drivers are 1.7 times more likely to use CRS while travelling with children compared to male drivers, $\chi 2$ (1, N = 1180) = 28.82, p <0.001, odds ratio = 1.701.

Table 20 Distribution of drivers' gender

Vehicle type	Male drivers (N)	Female drivers (N)	Total
Car	689	215	904
MPV	153	39	192
SUV	46	13	59
Truck (pick-up)	19	1	20
Others	5	0	5

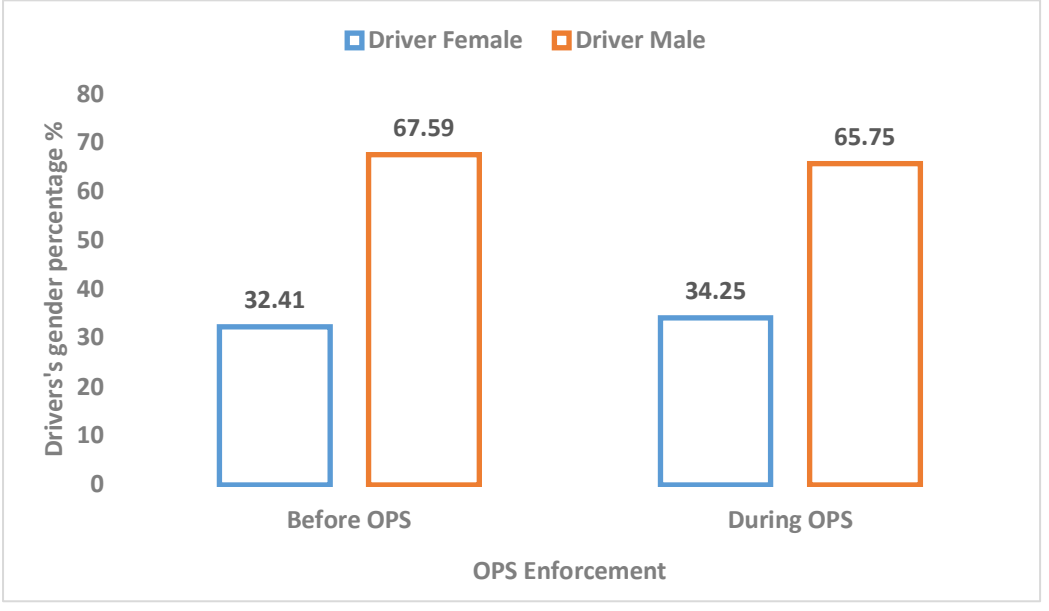


Figure 19 CRS used towards drivers' gender according to OPS period

6.4.5 Seatbelt Wearing Compliance of Driver towards CRS Use

The observation result found out that seatbelt wearing rate among drivers was high during the observation in both OPS period, 95.17% (before OPS) and 94.52% (during OPS) as shown in Figure 20. Chi-square test revealed that there was no significant relation between drivers' seatbelt wearing and OPS enforcement on the use of CRS, $\chi 2$ (1, N = 1034) = 0.683, p = 0.439 for belted group and $\chi 2$ (1, N = 146) = 0.002, p = 1.000 for unbelted group. However, for both before and during OPS, belted drivers are 1.1

times more likely to use CRS while travelling with children compared to unbelted drivers, $\chi 2$ (1, N = 1180) = 18.56, p <0.001, odds ratio = 1.112.

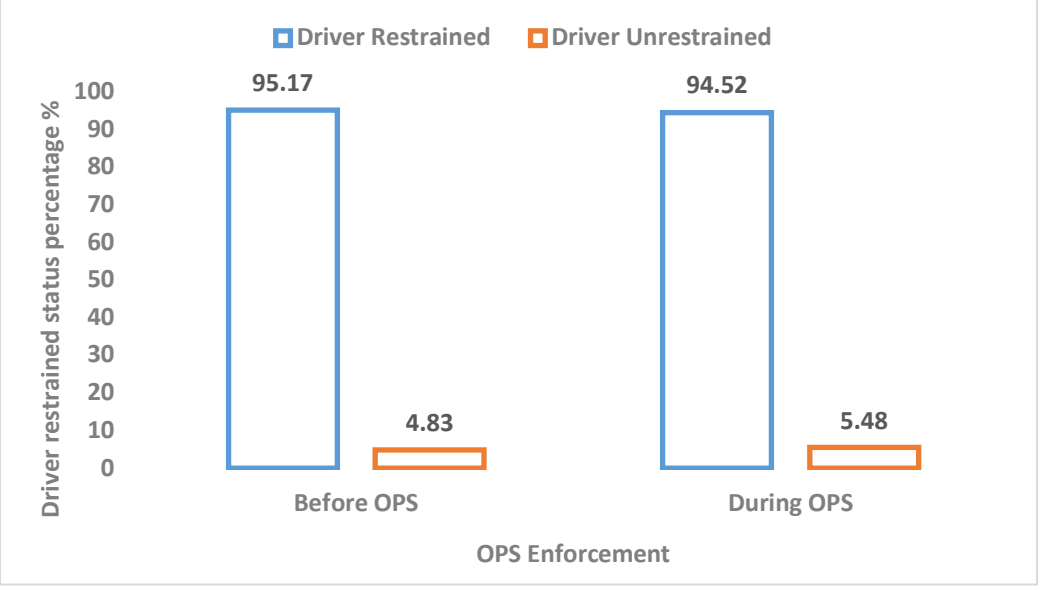


Figure 20 CRS used according to driver restrained

6.5 Discussions

6.5.1 CRS Use

From the observation, we found that CRS using rate was slightly increased during OPS period. However, the increase was not significant as revealed by chi-square test of independence, $\chi 2$ (1, N = 1180) = 0.445, p <0.504, odds ratio = 0.914. The use of CRS has no effects on the implementation of OPS. CRS Group 1 is designed for children age estimated nine (9) months or earlier (based on the weight and height of children) up to 4 years. The wide range of age that CRS Group 1 can be used may be the factor that this type of CRS was highly used during the observation. The percentage of CRS positioned on the passenger seat was also improved as there were more CRS were placed on rear

passenger seat than front passenger seat. However, there were still drivers who do not restrain their child properly in the CRS even though the children were seated in the seat.

6.5.2 Gender

Driver's gender seems has no effects on the CRS use whether before or during OPS. While female drivers were observed low in numbers, they were likely to use CRS more compare to male drivers regardless of the presence of OPS. The trend is similar to the previous finding for observation during Chinese New Year OPS. This finding is also significant with the previous studies done by the other researchers in the country where wearing CRS is legislation (de Oliveira, S. Carvalho, M. Santana, R. Camargo, G. Luders, & L. Franzin, 2009).

6.5.3 Seatbelt

Seatbelt wearing complies also have no effects on the CRS use whether before or during OPS. From the observation, the numbers of driver wearing seatbelt were high compared to the unrestrained driver. However, the result was not significant with the CRS use among the drivers travel with CRS during the OPS period. Overall result shows belted drivers are more likely to use CRS compare to the unrestrained drivers regardless of the presence of OPS. This result is similar to the 1.3.3 where OPS was not related to the CRS use among the drivers.

6.6 Conclusion and Recommendations

Despite the use of CRS campaign that had been launched recently, the CRS use in vehicles among drivers are still low. The decreasing number of CSR used during OPS might be affected by the festive season where most of the family members were travelled together in a vehicle, hence the limited seats for the occupants. Meanwhile, installing CRS in a vehicle will take seating space, this might be the reason why CRS was not being installed when more family members occupied in a vehicle. A report

(Lawrence, Kathy, Lococo, Warren, Ashburn, & Janelle Rose, NHTSA, 2009) states, crowding in the car is one of the factors that affect decision. A study by Simpson, Wren, Chalmers and Stephenson (2003) found that no space or limited room to fit CRS is one of the reasons why parents prefer to not using CRS. Furthermore, a car with many passengers makes parents choose unrestraint their kids. For those who have many children, parents expressed their disappointment in determining who should be given priority because parents do not have the space to restrain all of the CRS. While CRS use can reduce infant fatalities up to 70% and 54% – 80% for small children (Zaza, S., Sleet, D. A., Thompson, R. S., Sosin, D. M., & Bolen, J. C., 2001), it is clearly the use of CRS still do not catch the attention of the drivers as part of road safety feature that can prevent from severe injury when collision occurs.

Just like the previous study in OPS period, CRS wearing for this study was once again not reached 50% of the user rate. The OPS enforcement did not give effects of the CRS wearing. It is recommended that more safety advertisement and campaign about CRS broadcasted among the public. In this way, they will be more likely alert and have some information about the importance of the CRS for their children.

7. A Study on Road Safety Information Through Media Before and During OPS Hari Raya Aidilfitri 2017

7.1 Introduction

As time goes by, registered vehicles in Malaysia are increasing. Thus, the number of fatalities is also expected to increase parallel to the number of vehicles. In Malaysia, there are many enforcement and education programme conducted to control the number of fatalities from time to time so that the number did not increase and lastly decrease. In Road Safety Plan of Malaysia 2014 – 2020, under Strategic Pillar 4 which is Safer Road Users, road safety programme that is meant to support the pillar is public education and awareness programmes via media. This programme is an ongoing programme from Road Safety Plan of Malaysia 2006 – 2010. To inculcate a good driving culture among road users in the country, media campaigns will be further enhanced to educate road users about the dangers of speeding, tailgating, queue jumping, beating red lights, abusing the emergency lanes, helmet wearing and seat belt usage.

However, one common scenario that is happening in Malaysia every year is the increased number of fatalities and injuries during major festive seasons in Malaysia such as Hari Raya, Chinese New Year, Deepavali and Christmas. The numbers are high if to be compared to number of fatalities during the non-festive season in Malaysia. It has been a culture for Malaysian to go back to their hometown during these long holidays and to travel a long distance. It is reported that during the festive season, each year, there is an increase in numbers of vehicles travelling on expressways, federal and state roads.

During the festive season, an advocacy programme is even stepped up to remind and create awareness among Malaysian citizen about road safety. The numbers of fatalities will immensely increase if enforcement and advocacy programmes through education

or awareness campaign on road users are not intensify during this season. However, the exposure received by Malaysians and how effective these advocacy programmes and campaigns remain uncertain.

Since 2007, several studies have been conducted by MIROS to evaluate the effectiveness of interventions conducted by several relevant agencies during the festive period. A study on media dosage conducted by Jamilah et al. (2011) shows a 40.4% of increment in terms of exposure on road safety information from before to during OPS Hari Raya Aidilfitri. During Hari Raya Aidilfitri 2016, similarly, an increment was seen. In which, an average number of 7.27 news on road safety appeared daily in the media before OPS while during OPS, an increment of 119.12% is seen with an average of 15.93 news per day on road safety appeared in the media.

With the increase of road safety messages appeared in the media, the level of attentiveness lies high on affective level (84.3%) whereby the respondents agreed that they feel the need to be safe on the road. A total of 82.1% of respondents reported that their behaviour changed during the implementation of the OPS period. Another similar study conducted during the Chinese New Year Period in 2012 by Jamilah et al shows that there is a positive trend of behaviour change during the pre-, during and post-festive season. This was attributed to the increased numbers of road safety information disseminated throughout the period. Meanwhile, during Hari Raya Aidilfitri 2016 period, from the survey, most of the respondents reported that they comply more to traffic regulation during OPS compared to before OPS. Thus, from the studies conducted, it can be concluded that conveying awareness through a continuous road safety campaign at the national level by government agencies and private organizations is crucial to aid the reduction of number of road crashes during festive seasons.

Therefore, this study is conducted to evaluate publics' exposure to road safety messages during the Hari Raya Aidilfitri 2017 period. This is to determine whether the road safety messages that are being broadcasted or published are well received by road users. It will also measure how far road safety information that they received is effective in influencing their driving behaviour in abiding by traffic regulations.

7.2 Objectives

General objective: To determine the effects of road safety information received among public during the Hari Raya Aidilfitri period.

Specific objectives:

i. To quantify the dosage of road safety messages through media before and during OPS;
ii. To determine the type of road safety messages that most road users are most exposed to; and
iii. To evaluate the implication of road safety messages on behaviour change among road users

7.3 Methodology

The methodology of this study that includes instrument, locations, study design, sample and site selection, duration of study and data collection procedures are further explained in this section.

The objectives of this study are met by adopting two (2) methods. Firstly, the road safety messages are calculated by daily monitoring of road safety messages and information appeared in the newspaper. The daily monitoring of road safety messages and information is conducted via a database of an external party that is hired by MIROS called the iSentia. The role of iSentia is to monitor daily news coverage related to road safety based on the keywords given to them. 50 printed newspapers were monitored closely on a daily basis.

The second method used is to measure the exposure of road safety information among road users. To measure the exposure and the penetration of road safety messages received by the road users, a self-administered questionnaire was distributed among the public. The survey will cover publics' exposure to road safety messages through media and how far it influences their behaviour on the road during this Hari Raya Aidilfitri

period. The survey was conducted in a few selected government agencies and private companies in Klang Valley. As for this study, the data will be collected before the OPS and also during OPS.

7.3.1 Instrument

The original instrument was developed in 2011 and the development was done based on literature and previous OPS studies conducted. The same instrument was amended and used for similar studies since 2014. It is a self-reported questionnaire in which the respondents respond to the questionnaire items based on their own experience. Literature reviews from past studies that are related to campaign evaluation also became the reference to developed each variable in the questionnaire. In order to gauge public exposure towards road safety campaign, the variables that need to be measured are the medium or channel of the information, the message itself and the reaction towards the message received. This questionnaire covers publics' exposure towards road safety messages through media, their behaviour on the road and demographic profile. Some of the variables asked the respondents to rate the likelihood of a statement in which 0 is the lowest score while 10 is the highest score. Other than that, for some variables, the respondents need to choose between a set of answers. The data collection was conducted before and also during OPS.

7.3.2 Sample and Site Selection

The site selection is based on previous OPS study that has been conducted to measure its' effectiveness specifically for Hari Raya Aidilfitri period. A total of 400 respondents are selected for this study, 200 respondents for before OPS and another 200 for during OPS. During the proposal tabling, the research team planned to get four (4) government agencies and four (4) private companies to take part in the study. However, the research team found difficulties to get permission to enter to private companies as most of them have policies to not allow any study to take place as it will take up their staff's time and productivity. SPSS was used to analyse the data.

Table 21 Respondent demographics as per location

Location	No. of respondents	Total no. of respondents
Before OPS		
Government agency 1	25	200
Government agency 2	25	
Government agency 3	25	
Government agency 4	25	
Government agency 5	25	
Government agency 6	25	
Government agency 7	25	
Government agency 8	25	
During OPS		
Government agency 1	25	200
Government agency 2	25	
Government agency 3	25	
Government agency 4	25	
Government agency 5	25	
Government agency 6	25	
Government agency 7	25	
Government agency 8	25	
Total		**400**

7.4 Results and Discussions

Through iSentia, news and road safety information that is being issued in the newspaper is monitored daily. Figure 21 below shows the frequency of road safety messages disseminated through the newspaper. An average frequency of 35.2 news on road safety appeared daily in one of the medium which is the newspaper during the period of before OPS. While an average frequency of 32 news per day during OPS on road safety information recorded as appeared in the same medium. The findings showed 352 road safety information was disseminated before OPS while 320 road safety information was disseminated during OPS. This shows a decrease between the period of before OPS and

during OPS, in which there was more 32 information during OPS. The reduction of road safety information could due to less news on car crash or accidents as it is also reported that OPS Bersepadu Hari Raya Aidilfitri 2017 recorded only 257 deaths (Malaysia Gazette, 2017).

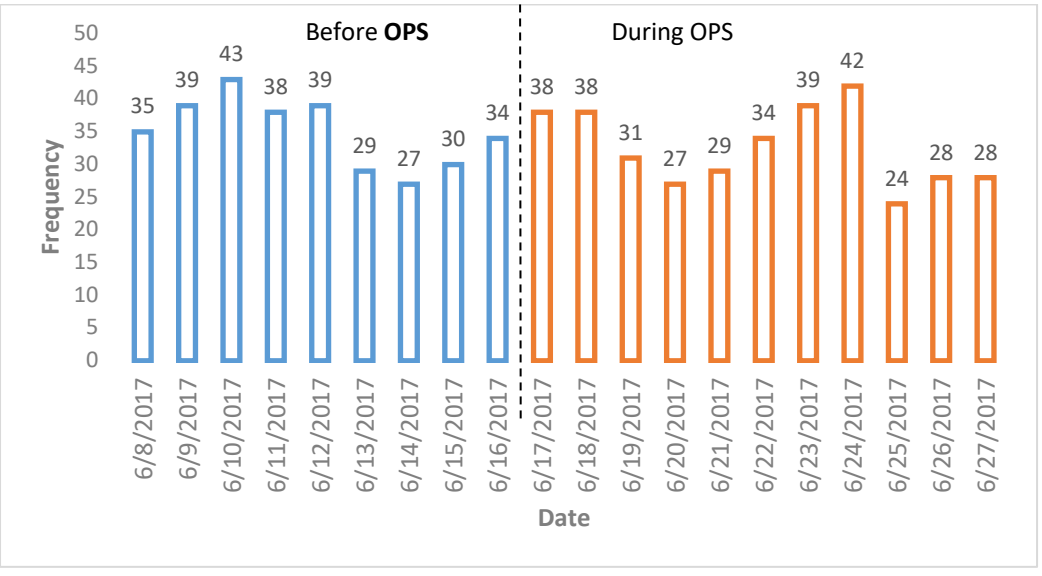


Figure 21 Frequency of road safety information

Respondents were then asked on their exposure towards road safety news. The survey shows an increase of 12.0% respondents that were exposed to road safety news from before to during OPS as can be seen in Figure 22 below. This is because from 84.0% it increased to 96.0%. However, even though according to media dosage quantification, it shows more road safety information was disseminated before OPS, but the quantification is only for the newspaper as the hired company can only survey through the newspaper's news and it does not work for televisions airings, radio, or other social media platforms such as Facebook or Twitter. On the contrary, when asked to the respondents, the respondents reported higher exposure during OPS and not before OPS. This could be attributed to other media mentioned above such as television and another popular social media platform.

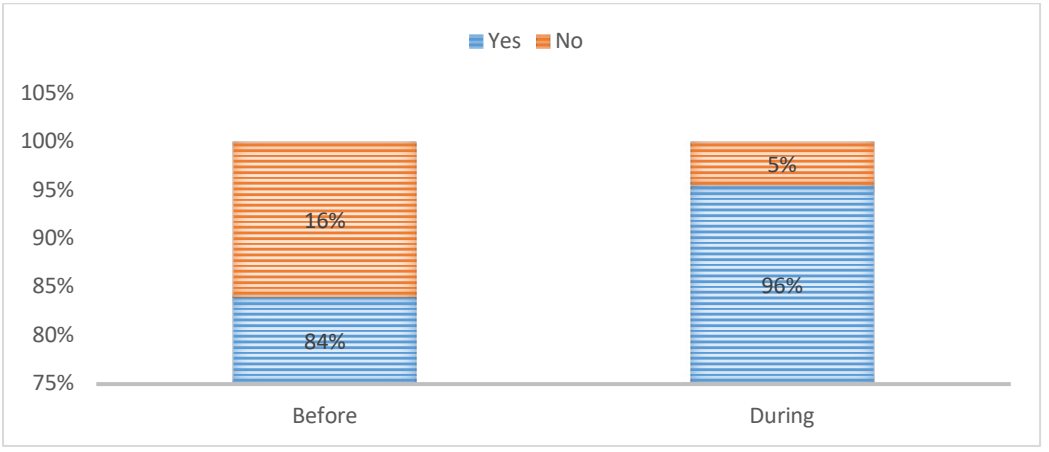


Figure 22 Percentage of respondents' exposure towards road safety news

The respondents were also needed to identify which medium they usually received the road safety news. From Figure 23, it is seen that most of the respondents received road safety news highly through social media before and during OPS. The findings for before OPS showed a mean of 7.54 while during OPS, the mean is 9.74. The mean is indicating how frequent the respondents are exposed to road safety news in which bigger mean means higher exposure. Besides social media, the respondents also reported television as the second popular medium as it shows a mean of 7.05 before OPS and 9.03 during OPS. This indicates that television is still a relevant medium of dissemination of messages and news as it stands second after social media.

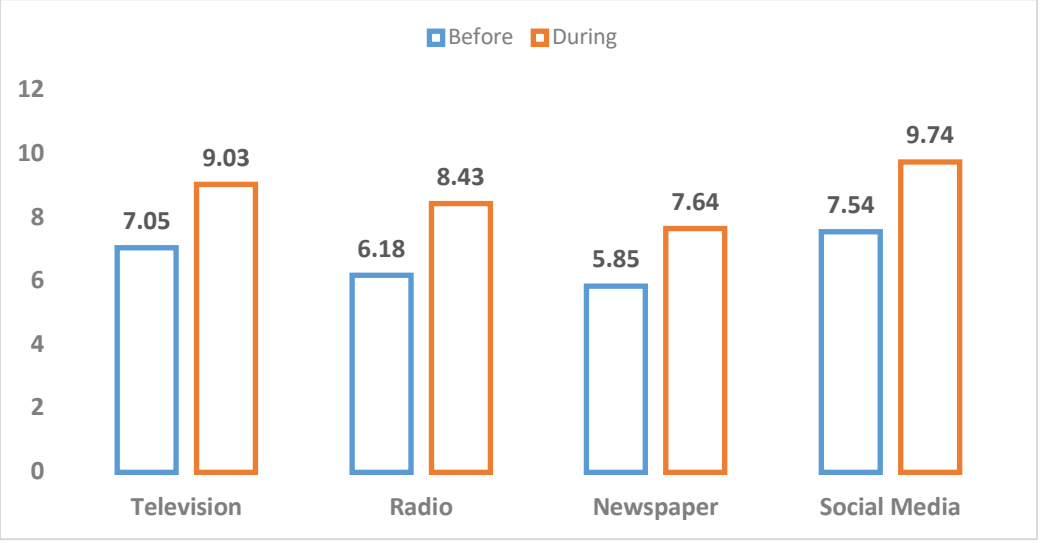


Figure 23 Mean scores of medium of road safety news received

According to Figure 24 below, the respondents then reported that mostly, they received road safety news regarding crash incidents, before and during OPS. The mean of the scores is 7.88 for before OPS and 9.89 for during OPS. Similarly, the second highest types of news are related road safety messages as the respondents reported 5.96 and 8.41 as average for before OPS and during OPS. Lastly, for road safety facts, respondents reported 5.79 and 8.12 as the mean of the likelihood they encountered those types of message.

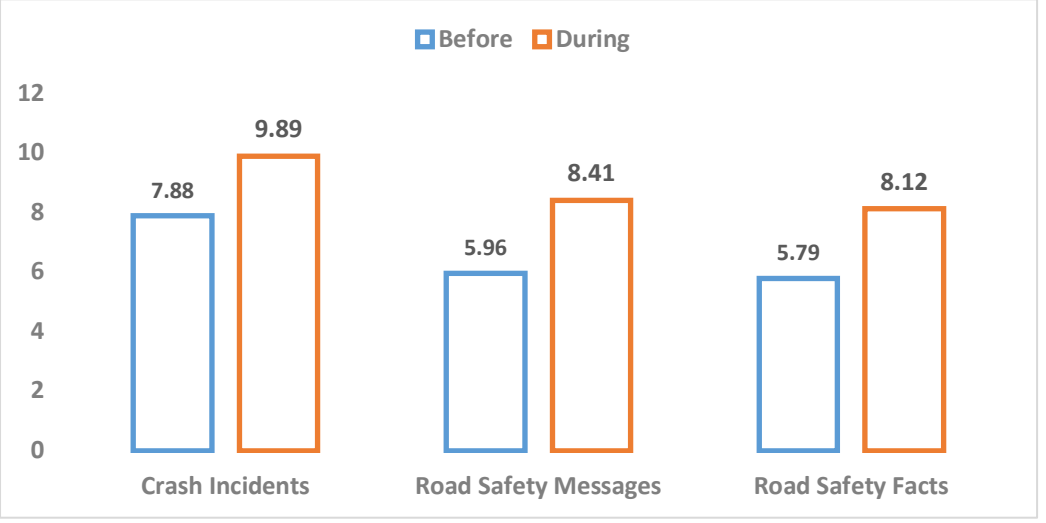


Figure 24 Mean scores of types of road safety news

In response to exposure towards road safety advertisements, the survey shows that there is a slight increase from 71.0% to 87.0% of respondents that were exposed to road safety advertisements during OPS compared to before OPS (Figure 25). Referring to the medium whereby the respondents received road safety advertisement, the most highly seen road safety ads were via social media followed by television, radio and newspaper (before and during OPS) as shown in Figure 26 below. For social media, the mean increased from 7.11 to 7.13, the mean for television increased from 6.74 to 6.92, the mean for radio decrease from 6.07 to 6.05 while mean for newspaper decrease from 5.62 to 5.11. Similar to road safety news, social media is reported to have a higher likelihood that the respondents received the road safety advertisement from and followed by television which recorded the second highest mean.

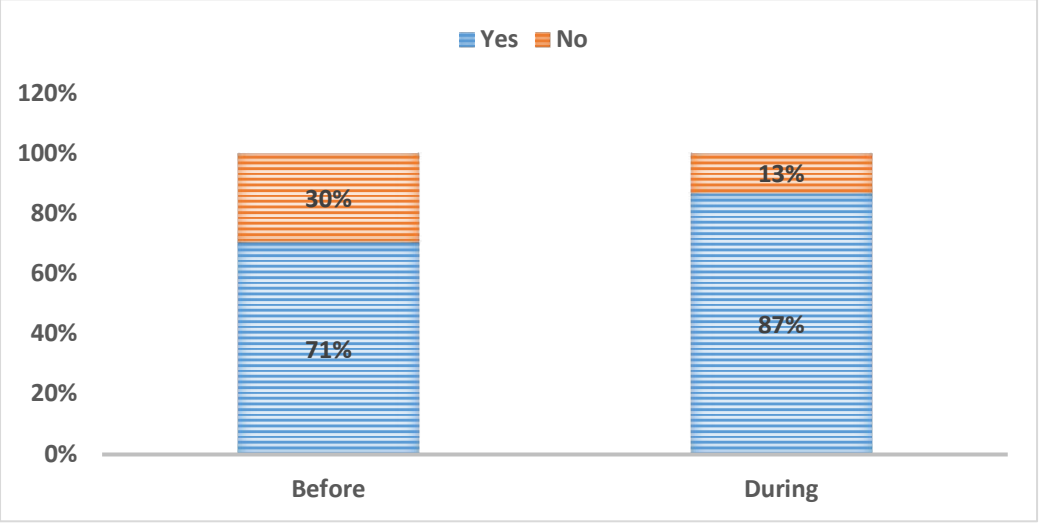


Figure 25 Percentage of respondents' exposure towards road safety advertisements

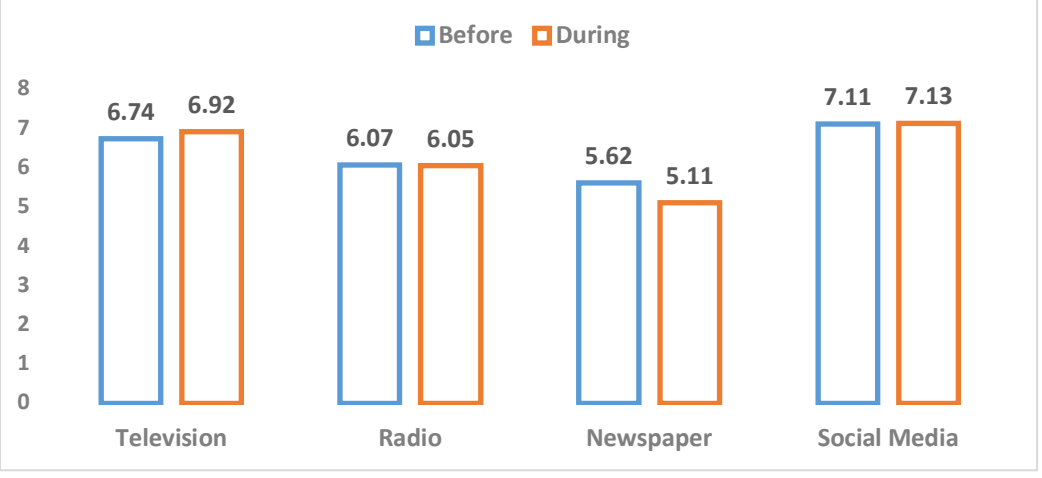


Figure 26 Mean scores of source of road safety advertisement received

From the survey, Figure 27 below shows that through television, messages on the usage of the zebra crossing, overtaking on double lines and traffic lights regulation were highly received before OPS (42%, 41% and 40% respectively). During OPS, the top road safety

advertisement received were helmet usage, do not run the red lights and overtaking on double lines (37% respectively) as shown in Figure 27.

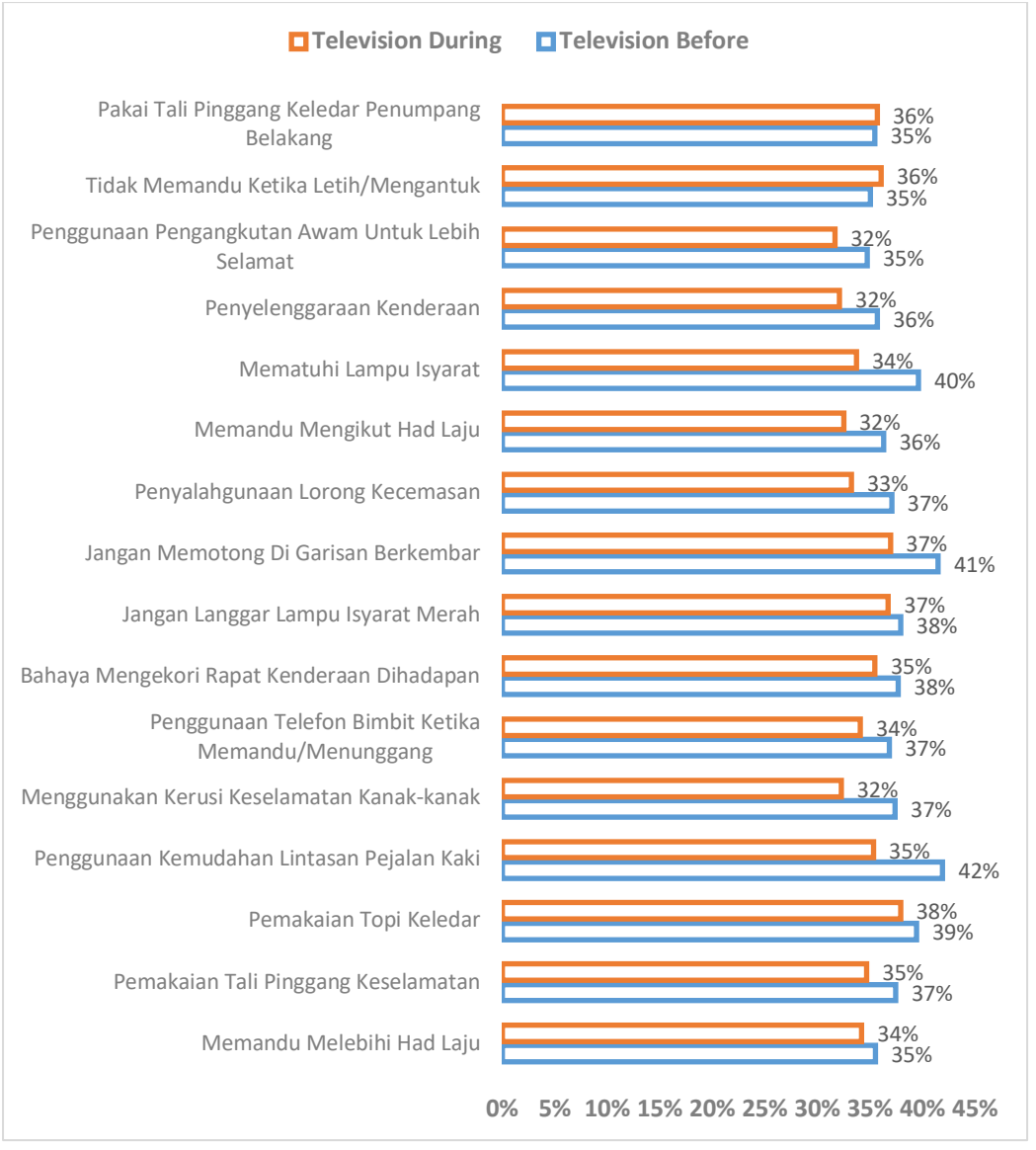


Figure 27 Percentage of most received road safety messages through television

As for road safety advertisement through radio, Figure 28 shows that before OPS, most of the respondents were exposed to messages on obeying the traffic lights (29.0%), seat belt usage, helmet usage and car maintenance (28.0% respectively). On the other hand, during OPS, messages through radio emphasize more on driving capabilities when tired (28.0%), driving more than the speed limit and seat belt usage (27.0% respectively).

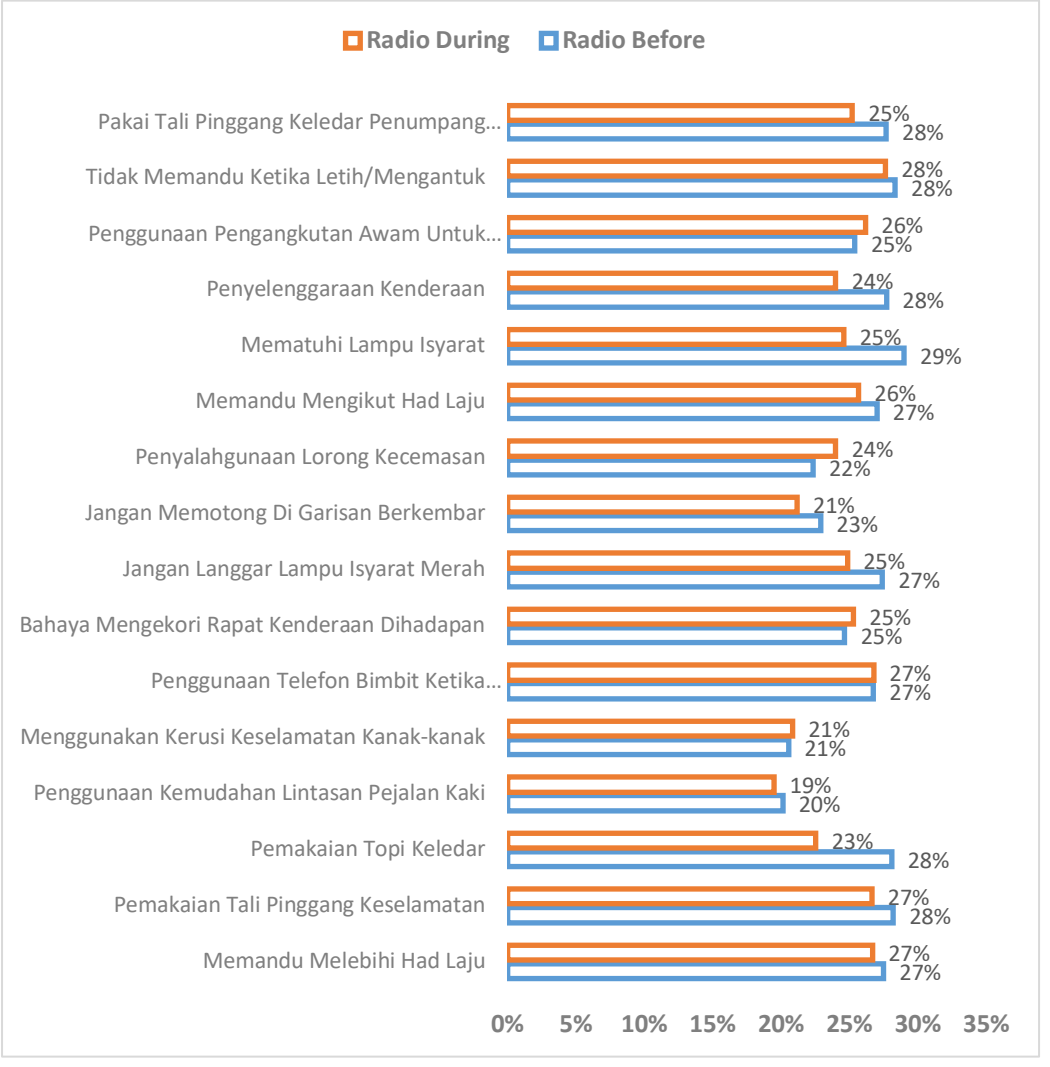


Figure 28 Percentage of most received road safety messages through radio

For newspaper as seen in Figure 29, respondents reported that, before OPS, they mostly received road safety advertisement on public transport (16%), usage of seat belt at rear seat (13%), driving exceeds the speed limit (13%), and the usage of crossing facilities which is zebra crossing (12%). For during OPS, respondents reported that they mostly received advertisement on usage of zebra crossing (16%), usage of helmet (15%) and seat belt wearing (14%).

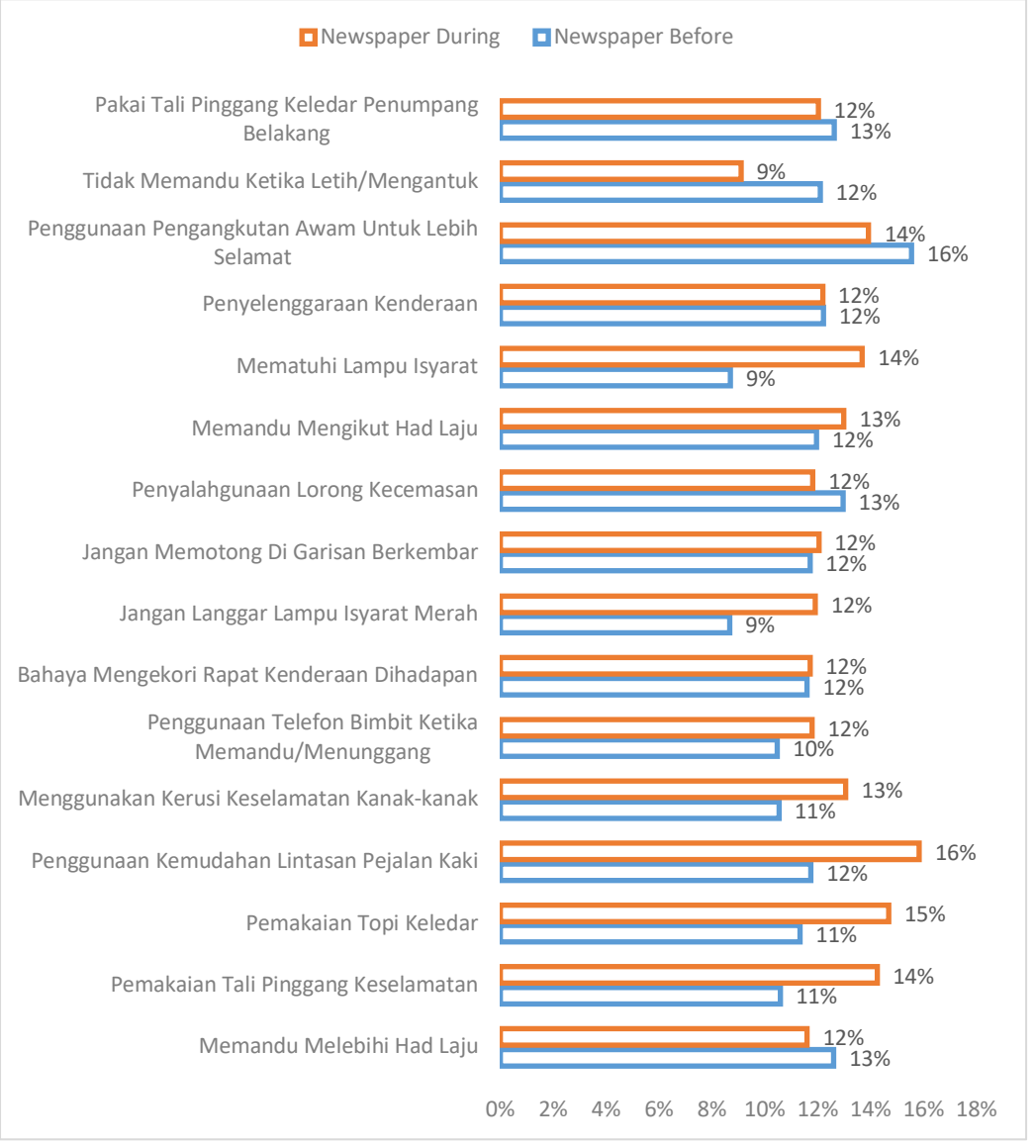


Figure 29 Percentage of most received road safety messages through newspaper

From Figure 30, the survey shows that most road safety messages received through social media for before OPS is the usage of the child seat (27%) and usage of handphone, the danger of the following car in front closely and do not hit the traffic lights (24%). For

during OPS, the highest advertisement received is on car maintenance (30%), usage of child seat (29%), overtaking on double lines and misuse of emergency lane (27%).

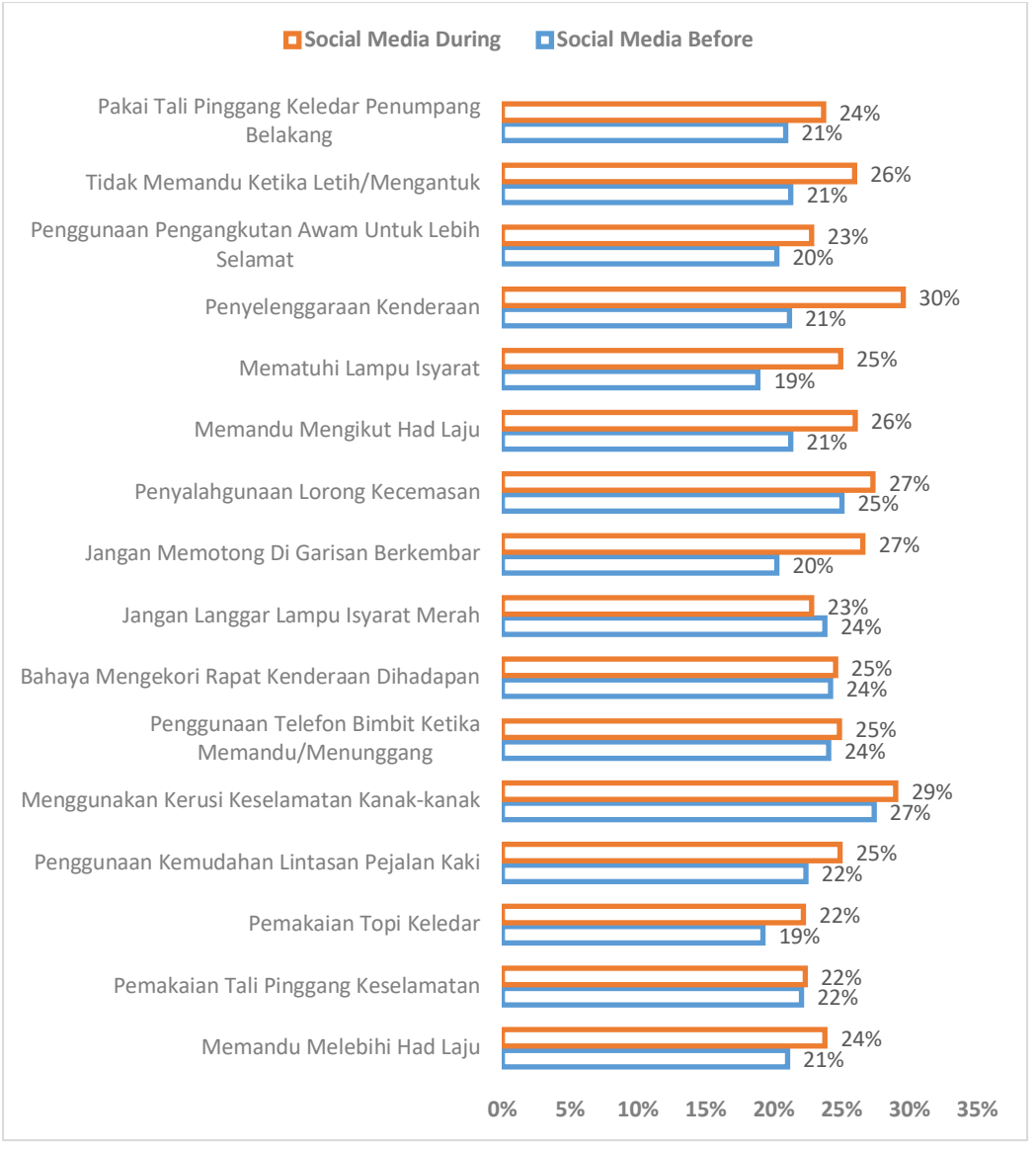


Figure 30 Percentage of most received road safety messages through social media

As we know, there are many social media platforms nowadays. Figure 31 showed the most popular social media platform chosen by the respondents. From Figure 31, it shows that the most popular social media is Facebook. In which, before OPS, 44% of respondents chose Facebook while 41% of the respondents chose Facebook as the most popular medium, during OPS. Second highest medium is WhatsApp as 37% (before) and 33% (during) of respondents chosen the medium as the most used social media. Lastly, the least chosen medium is Blog in which only 3% (before) and 2% (during) of the respondents chose the medium as their most used social media.

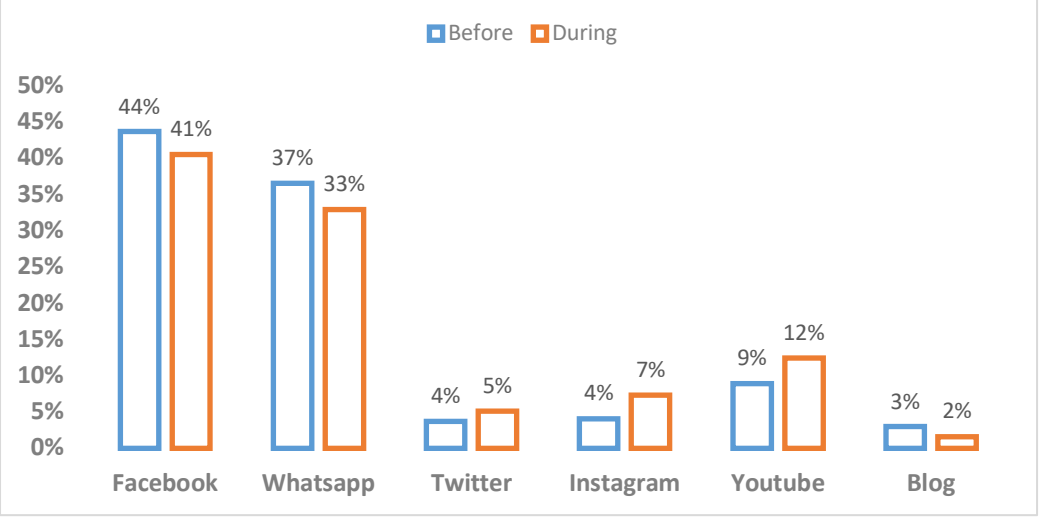


Figure 31 Percentage of most popular social media

Based on Figure 32, it can be seen that the respondents reported that they mostly comply on the usage of the emergency lane. In which, before OPS, 61% of respondents reported that they obey the law while the percentage increases to 69% during OPS Bersepadu. The second highest compliance, on the other hand, is overtaking on double lines in which 59% reported that they comply to the law before OPS and the percentage increases to 65% during OPS.

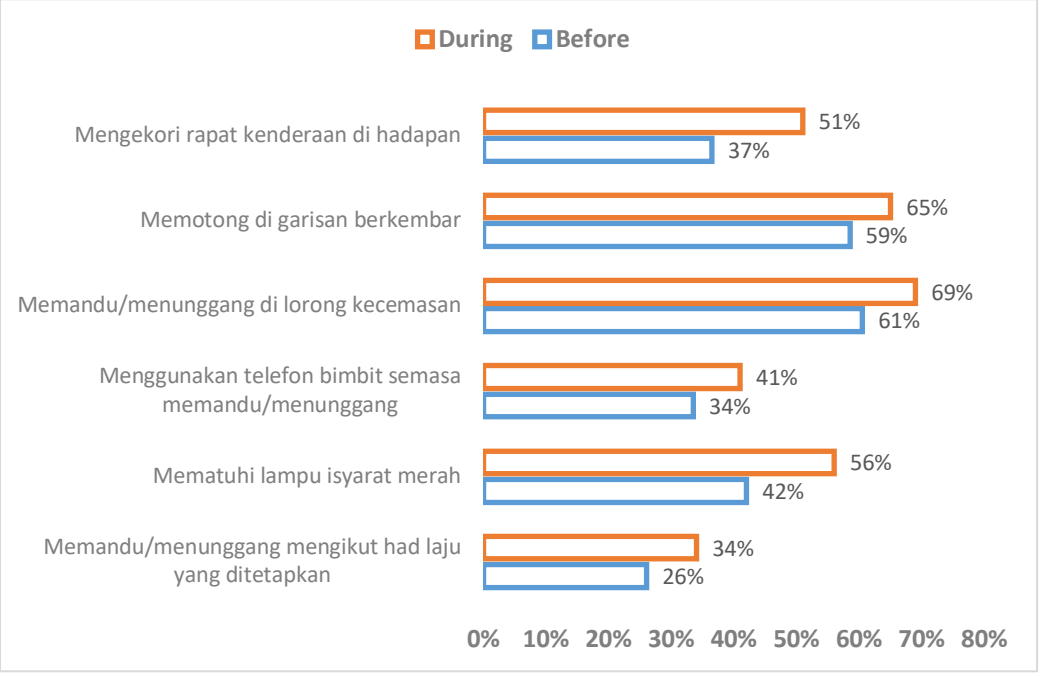


Figure 32 Percentage of compliance to traffic regulations

On the other hand, as portrayed in Figure 33, the respondents reported that the mean of them wearing seat belt or helmet is the highest among another behaviour. However, the mean decreases from 7.54 for before OPS to 7.41 during OPS. Second highest mean is the behaviour for vehicle maintenance in which the mean is 7.14 for before OPS and 7.04 for during OPS.

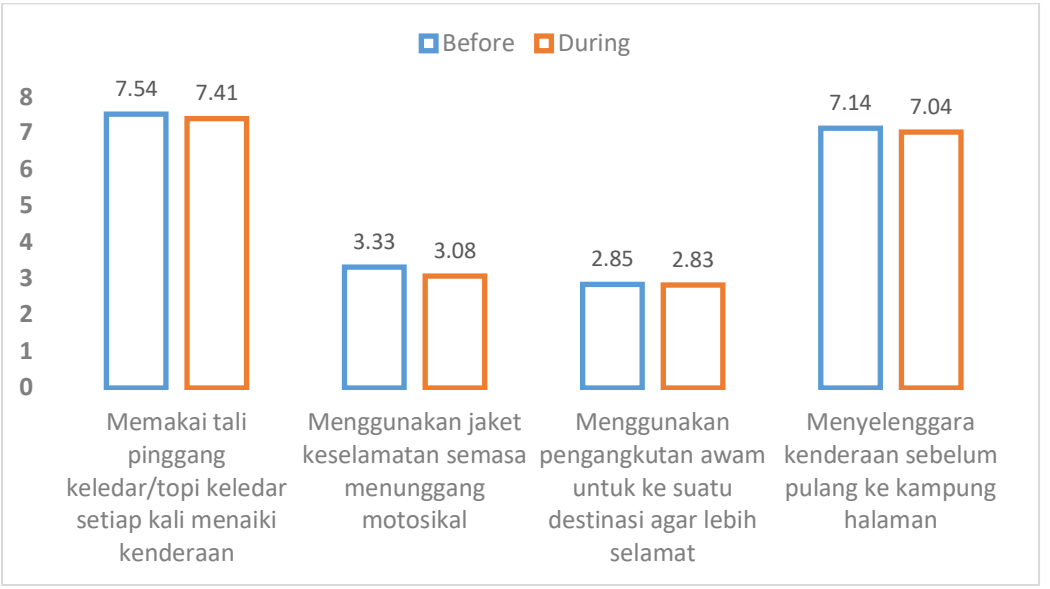


Figure 33 Mean of scores for positive road safety behaviour

7.5 Conclusion and Recommendations

This study was conducted to answer the specified objectives mentioned earlier. The dosage of road safety news and messages were quantified and the publics' exposure towards road safety messages was measured.

This study shows that road safety messages play an important role in enhancing awareness among road users. Road safety messages should be published and disseminated throughout the year and not only focusing during the festive period. However, the messages must be focused (e.g. do not speed) and not in general (such as be safe on the road) to tailor the road users in complying to specific traffic regulations.

In conveying the messages, the right medium must be selected. As discussed earlier in the study, social media shows the most received road safety messages. Therefore, the selection of medium plays an important role in conveying messages towards these

target group. There the most popular should be chosen in dissemination messages in which in this study, the respondents reported Facebook as the most popular medium.

Lastly, it has shown that the respondents have better compliance during OPS compared to before OPS. This could be due to the awareness that the respondents have during OPS as media tends to highlight road safety news and messages more during this period of time. Even though there are some road safety behaviour showed lower means, however, the difference is not big and does not indicate anything.

8. Evaluation of Traffic Speed Characteristics During OPS Bersepadu Hari Raya Aidilfitri 2017

8.1 Introduction

One of the common measures to improve safety performance during the festive season is the reduction of speed limit on all federal and state roads. This Hari Raya Aidilfitri festive season was not excluded which was also mark the 11th OPS Selamat program. One of the countermeasure to increase road safety performance is to reduce speed limit on federal roads from 90 kph to 80 kph. To evaluate the effectiveness of the change of speed limit, this study will be conducted during and after OPS Selamat Aidilfitri 2017 period by observing the traffic speed on selected locations. The findings for this study may reflect the performance of speed limit reduction countermeasures.

8.2 Objectives of the Study

This study aims to evaluate the effect of speed limit reduction during OPS Selamat Aidilfitri 2017 period.

The specific objectives of the study are:

i. To measure the traffic speed characteristics at the selected locations
ii. To determine the speed difference between during and after OPS period

The outcomes of this study can provide some insight into the safety policy by the related transport agencies.

8.3 Scope and Limitations

This study only covers seven (7) locations with straight sections on federal roads throughout Peninsular Malaysia. Data collection was carried out during the day with dry surface pavement for one hour to get the free-flow speed.

8.4 Methodology

The design of this study is generally similar to the previous study carried out during the last OPS Selamat. The following figure shows the framework methodology for the speed study conducted during the OPS Selamat period.

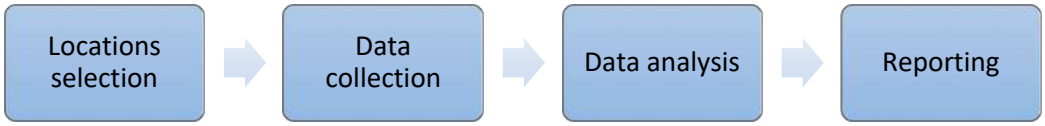


Figure 34 Methodology framework

8.4.1 Location Selections

Seven (7) locations were selected for this study. The identified locations are located on federal roads with a speed limit of 90 km/h. Spots were selected based on the blackspot data from Jabatan Kerja Raya (JKR) and Jabatan Pengangkutan Jalan (JPJ). Table 22 shows the characteristics of the selected locations for this study.

Table 22 Characteristic of the sites

No.	Location	Road number	Carriageway type
1	Jalan Kangar – Alor Setar	F7	2L1C
2	Jalan K. Perlis – Changlun	F194	4L2C
3	Jalan Jitra – Kodiang	F176	4L2C
4	Jalan Alor Setar – Butterworth	F1	2L1C
5	Jalan Muar – Batu Pahat	F5	2L1C

6	Jalan Tanjung Malim – Kuala Lumpur	F1	2L1C
7	Jalan Bentong – Raub	F8	2L1C

Legend:
4L2C = Four-lane two carriageway, 2L1C = Two-lane single carriageway

8.4.2 Data Collection

Data collection was conducted on straight road sections with dry pavement surface where traffic is not interrupted such as near to junction, work zone and obstructions. Nevertheless, the minimum required to set up the data collection point was to have a distance of 100 – 500 m after the speed limit sign. In this study, radar gun and smart sensor were used to collect the free flow spot speed data and video recorder to record the traffic. For each location, a minimum of 100 spot speed data was collected for the duration of one hour. In order to obtain the free flow speed, the collection was conducted during the off-peak period of either, from 10.00 am to 12.00 am or 2.00 pm to 4.00 pm.

8.4.3 Data Analysis

Descriptive statistical analysis on the speed data was carried to determine the speed's central tendency i.e. mean speed, 85^{th} percentile speed. In addition, T-test was also conducted on the mean to determine the speed difference between during and after OPS period. The traffic volume was analysed to complement the study to understand if there was any relationship between the speed and the volume on the selected sites.

8.5 Results and Findings

During OPS Selamat, the speed limit on federal roads is reduced from 90 kph to 80 kph. Table 23 shows the change of speed limit sign during and after OPS at study locations. It was observed that all the speed limit sign was at 80 kph during OPS. After the OPS, four

(4) speed limit signs changed to 90 kph while three (3) speed limit sign was unchanged and remained at 80 kph.

Table 23 Speed limit sign during and after OPS

Spot	Location	Speed limit sign during OPS	Speed limit sign after OPS	Change of speed limit sign
1	Jalan Jitra – Alor Setar	80	90	Yes
2	Alor Setar – Butterworth	80	80	**No**
3	Jalan Kangar – Alor Setar	80	90	Yes
4	Jalan Kangar – Padang Besar	80	90	Yes
5	Jalan Tanjung Malim – Kuala Lumpur	80	90	Yes
6	Jalan Muar – Batu Pahat	80	80	**No**
7	Jalan Bentong – Raub	80	80	**No**

8.5.1 Average Speed of Traffic

This section presents the findings of the traffic speed distribution during and after the OPS Selamat program that is represented by the mean speed (refer to Table 2). Only cars were included in the sample to determine the mean speed for this table to reduce the effect of another vehicle to the mean speed. This is because each vehicle type had different average speed and vehicle composition for each spot was not similar.

The highest mean speed was 92 kph recorded at spot 7 (Jalan Bentong – Raub, F8) occurred after the OPS. The average speed is higher than the national speed limit. Meanwhile, the lowest speed was 63 kph observed at spot 4 (Jalan Kangar – Padang Besar, F7) also occurred after the OPS. There are numerous minor access points along the section at spot 4. Vehicles were seen to turn in to the access points and therefore reduce the average speed of vehicle in this spot.

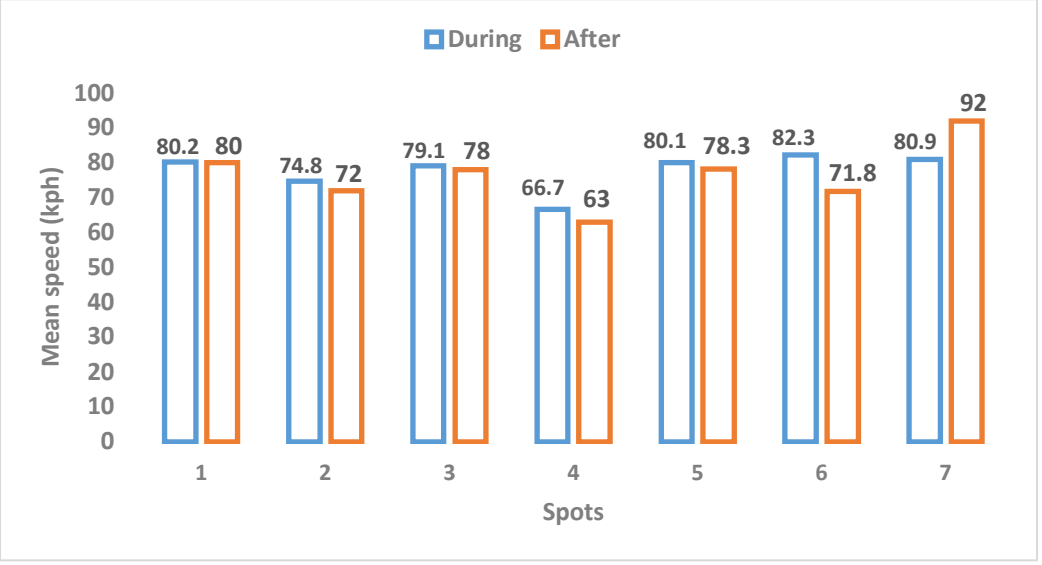


Figure 35 Mean speed by spot

8.5.2 Speed Difference

In another analysis, independent sample t-test was used to compare the mean speed between during and after OPS. Generally, it was found that there was no significant difference in mean speed during and after the OPS.

Only three (3) spots were identified to have a significant speed difference. At Jalan Kangar – Padang Besar, F7 (Spot 4), speed was significantly lower after OPS. While at Jalan Muar – Batu Pahat, F5 (Spot 6), speed also was significantly lower after OPS. The result at these spots had the opposite effect of the speed limit reduction strategy. The speed was seen to be higher during OPS period and lower after the OPS. Although, the speed limit sign at spot 5 was not changed back to 90 kph. Further studies could be carried out at these areas to understand these results.

On the contrary, it was found that there was a significant increase in speed after OPS at spot 7, Jalan Bentong – Raub, F8. The reason for the significant increase in speed after

OPS was unknown and further studies could be carried out at this area to investigate the speeding behaviour.

Table 24 Mean speed by spots

Spot	Spot	Road no.	Mean speeds (kph)		Increase/ Decrease between during and after OPS	Statistically significant
			During	After		
1	Jalan Jitra – Alor Setar	F1	80.2	80.0	Decrease	No
2	Alor Setar – Butterworth	F1	74.8	72.0	Decrease	No
3	Jalan Kangar – Alor Setar	F7	79.1	78.0	Decrease	No
4	Jalan Kangar – Padang Besar	F7	66.7	63.0	Decrease	**Yes**
5	Jalan Tanjung Malim – KL	F1	80.1	78.3	Decrease	No
6	Jalan Muar – Batu Pahat	F5	82.3	71.8	Decrease	**Yes**
7	Jalan Bentong – Raub	F8	80.9	92.0	Increase	**Yes**
All spots			77.6	77.0	Decrease	No

** Significant at 0.05*

8.5.3 Speed Limit Violation Rate

Table 25 shows the speed limit violation rate by spot. The speed of vehicles was compared against the speed limit of 80 km/h during OPS and the speed limit of 90 km/h after OPS, with an additional comparison against speed of 90 km/h during OPS.

The lowest speed violation rate occurred at Jalan Kangar – Padang Besar, F7 (spot 4). Only 2.5% of road user exceeded the speed limit of 80 kph and 0.8% exceeded the speed of 90 kph during OPS. After OPS, only 1.6% of road users travel above 90 kph.

During OPS, the highest speed violation rate occurred at Jalan Muar – Batu Pahat, F5 (spot 6). It was found out that 50% of road users travel at more than 80 kph and 25% exceeded the speed of 90 kph. After OPS, the highest speed limit violation rate occurred

at Jalan Bentong – Raub, F8 (spot 8). Since the speed limit sign was not changed back to 90 kph at this spot, the comparison was made for both 80 kph and 90 kph speed limit. It was observed, 84.7% exceeded the speed of 80 kph and 55.9% exceeded the speed of 90 kph. This area needs further studies as most road users were speeding and exceeded the speed limit.

Table 25 Speed limit violation rate by spots

Spot	Spot	Road no.	Exceeded 80 kph		Exceeded 90 kph	
			During (%)	After (%)	During (%)	After (%)
1	Jalan Jitra – Alor Setar	F1	43.3	56.0	21.7	25.5
2	Alor Setar – Butterworth	F1	24.8	25.0	7.4	7.1
3	Jalan Kangar – Alor Setar	F7	40.8	38.7	13.3	17.5
4	Jalan Kangar – Padang Besar	F7	2.5	7.9	0.8	1.6
5	Jalan Tanjung Malim – Kuala Lumpur	F1	43.0	40.7	18.0	13.9
6	Jalan Muar – Batu Pahat	F8	50.0	20.8	25.0	9.2
7	Jalan Bentong – Raub	F5	40.0	84.7	19.2	55.9
All spots			34.4	41.9	14.8	19.8

8.5.4 Speed Characteristics by Vehicle Type

Figure 36 shows the mean speed by vehicle type during and after OPS. Cars were recorded to have greater mean speed compared with other vehicle types. The mean speed for cars was 77.2 kph one of the reasons for this was due to a reason that cars have more power to weight ratio, more aerodynamic and better petrol engine design than another vehicle.

While motorcycles travelled the slowest with speed of 62.8 kph as engine capacity of most of the motorcycles on the road in Malaysia is less than 150cc.

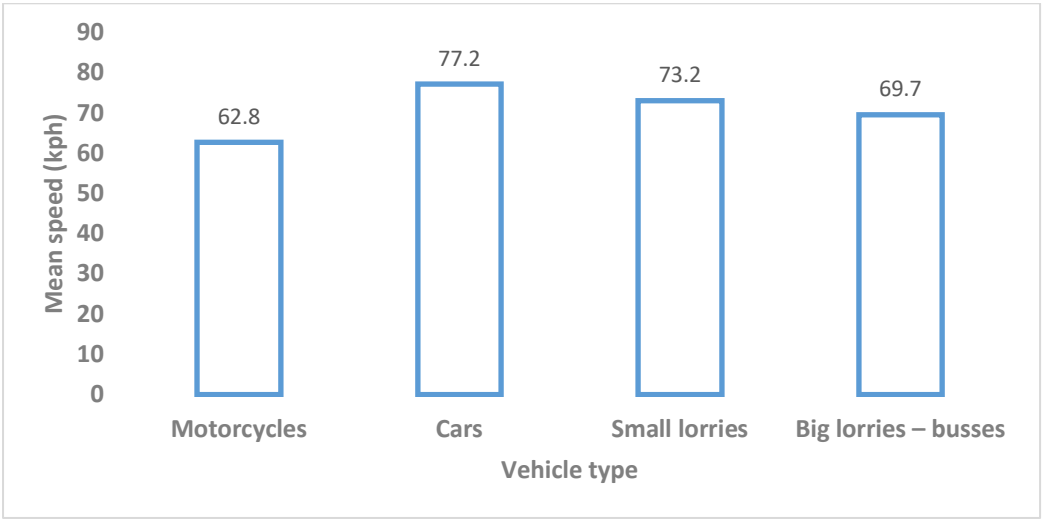


Figure 36 Mean speed by vehicle type

Figure 37 shows the speed violation rate by vehicle type for during and after the OPS period. Most cars exceeded the speed of 80 kph and 90 kph respectively. While motorcycles were the least speeding above the 80 kph and 90 kph respectively. This is in line with the mean speed by vehicle type result.

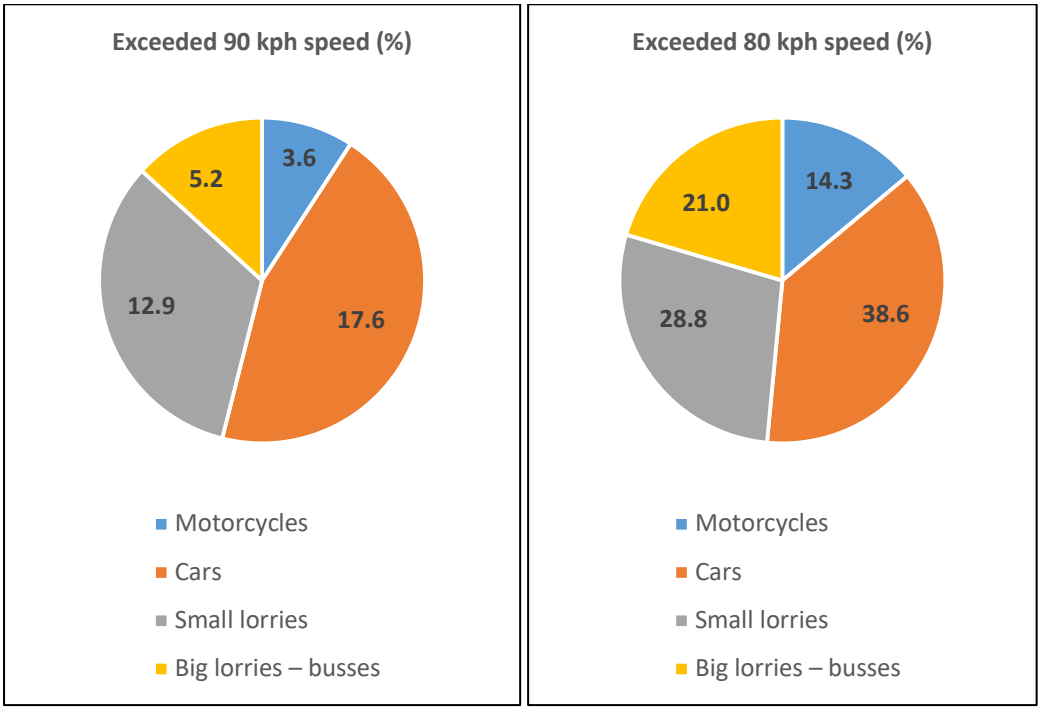


Figure 37 Speed violation by vehicle type

8.6 Conclusions and Recommendations

This study found that the mean speed during OPS was 77.6 kph while mean speed after OPS was 77.0 kph. Even after the speed limit was increased back to 90 kph, there were no significant changes in mean speed. This may be due to a reason that road users perceived MIROS data collection team as enforcers and therefore, did not travel at high speed.

However, it was observed that the speed limit violation rate of 80 kph and 90 kph was lower during OPS as compared to after OPS.

Following is the spots according to the highest and lowest speed limit violation rate (exceeded 80 kph) during OPS:

i. The highest speed limit violation rate occurred on Jalan Muar – Batu Pahat, F5 (50%)
ii. The lowest speed limit violation rate occurred on Jalan Kangar – Padang Besar, F7 (2.5%). This may be due to the high number of minor access along the road
iii. Following is spots according to the highest and lowest speed limit violation rate (exceeded 90 kph) after OPS:
iv. The highest speed limit violation rate occurred at Bentong, F8 (55.9%)
v. Similar to during OPS, the lowest speed limit violation rate occurred on Jalan Kangar – Padang Besar, F7 (1.6%)

It was also observed that some speed limit signs were not changed back to the national speed limit of 90 kph after the OPS. Therefore, it is recommended to the road authorities to change all the speed limit signs to 80 kph during OPS and change back to 90 kph after OPS.

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Research Report

Compilation of OPS Bersepadu Studies Conducted During Hari Raya Aidilfitri 2017

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