

**MRR No. 363**

## **Research Report**



# **Road Safety Education in Primary Schools, Malaysia Evaluating the Short-Term Effectiveness of RSE Module among Form 1 Secondary School Children in Malaysia Via Observational Study of Their Expected Positive Road Safety Practices on the Road. “Pre-and-Post Intervention”**

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## **Executive Summary**

One of the national road safety strategies implemented in Malaysia is through educating road safety aspects to the school-aged children with the intention that in the long run it will produce a better generation of road users who are responsible and ethical when on the roads. In year 2012, Road Safety Education (RSE) modules embedded in the Bahasa Malaysia subject was introduced once in every 2 weeks to the Form 1 school children for a period of 16 weeks (an equivalent of 8 hours dosage).

Three states in Malaysia namely; Melaka, Selangor and Sarawak were identified for the RSE observational study. Melaka (Alor Gajah) represented the southern region, Selangor (Klang) the central region, and Sarawak (Kuching) for East Malaysia. A total of 8 Sekolah Menengah Kebangsaan (SMK) were selected to evaluate the RSE intervention. The pre-intervention study was conducted from 18 July 2012 to 30 August 2012 (5 weeks) while the post-intervention observation study was conducted from 8 January 2013 to 7 February 2013 (4 weeks).

Statistical analysis was made to compare the number of positive behaviour between before and after RSE module implementation. Results showed a significant improvement in positive road safety behaviour with regard to wearing car seat belt for front passenger and also wearing helmet properly ( $p < 0.05$ ) after the RSE modules were implemented for the Form 1 school children. It is anticipated that higher positive road safety behaviours would be observed among the school-aged children over continuous and longer period of RSE dosage.

## Ringkasan Eksekutif

Salah satu daripada strategi keselamatan jalan raya Malaysia yang telah dilaksanakan ialah melalui aspek pendidikan keselamatan jalan raya kepada kanak-kanak sekolah. Ia bertujuan dalam jangka masa panjang, pendidikan keselamatan jalan raya ini akan menghasilkan suatu generasi pengguna jalan raya yang lebih baik dan mempunyai sikap bertanggungjawab dan beretika apabila berada di jalan raya. Modul Pendidikan Keselamatan Jalan Raya (PKJR) yang diserapkan ke dalam mata pelajaran Bahasa Malaysia telah diperkenalkan sekali dalam masa 2 minggu kepada pelajar Tingkatan 2 bagi jangka masa 16 minggu (bersamaan dengan 8 jam).

Tiga negeri di Malaysia, iaitu Melaka, Selangor dan Sarawak telah dikenal pasti untuk kajian pemerhatian PKJR. Negeri Melaka (Alor Gajah) mewakili daerah selatan, Selangor (Klang) mewakili daerah tengah, dan Sarawak (Kuching) mewakili Malaysia Timur. Sejumlah 8 Sekolah Menengah Kebangsaan (SMK) telah dipilih sebagai sampel untuk intervensi pra-dan-pasca PKJR. Kajian pra-intervensi telah dijalankan dari 18 Julai 2012 hingga 30 Ogos 2012 (5 minggu) sementara kajian pemerhatian pasca-intervensi telah dijalankan dari 8 Januari 2013 hingga 7 Februari 2013 (4 minggu).

Analisis statistik telah dijalankan bagi perbandingan bilangan tingkah laku positif sebelum dan selepas modul PKJR dilaksanakan. Hasil kajian menunjukkan peningkatan yang signifikan bagi tingkah laku positif keselamatan jalan raya berkaitan pemakaian tali pinggang keledar kenderaan penumpang hadapan dan juga pemakaian topi keledar dengan betul ( $p < 0.05$ ) setelah modul PKJR dilaksanakan bagi pelajar Tingkatan 1. Tingkah laku positif terhadap keselamatan jalan raya dianggarkan menjadi lebih tinggi dalam kalangan pelajar sekolah hasil daripada penghayatan PKJR secara berterusan dalam jangka masa yang lebih panjang.

## 1. Introduction

The Malaysian government is committed to ensure that the road crash fatalities to be reduced from 3.98 deaths per 10,000 vehicles in year 2006 to 2.0 deaths per 10,000 vehicles by the year 2010. Towards achieving this target, various strategies and plans have been formulated for implementation under the Malaysian Road Safety Map 2006-2010. In all, nine strategies were being outlined and the first strategy targets at the road safety education among school children. The main goal of this road safety education among school children is to inculcate awareness and good practices among the young children so that 10 years down the line the country will have a new generation of road users with good road safety attitudes and responsibilities. In consideration that this road safety intervention program is long-term and involved a huge amount of investment, it is therefore necessary to have a continuous evaluation on the effectiveness of this on-going program so that findings along the way could be used as inputs to correct or even reinforce the program towards achieving its final goal.

The Road Safety Research Center (RSRC), University Putra Malaysia has been appointed by the Ministry of Transport Malaysia to evaluate the effectiveness of Road Safety Education (RSE) programs in secondary schools in Malaysia. This Research Report is the final outcome of the RSE program in year 2012 among Form 1 school children in selected districts in Malaysia from the aspects of observational studies. The general objective of this study is to evaluate the effectiveness of the RSE modules embedded in the Bahasa Malaysia subject for Form 1 school children over a period of 16 weeks. The specific objective of this research report is to observe whether there are positive behaviour improvements in relation to the RSE learning outcomes among the Form 1 school children.

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## 2. Literature Review

In general, the approaches to address road safety problems are traditionally categorized into three divisions, i.e. Engineering, Enforcement and Education or sometimes called “The 3 E’s”. The Engineering approach covered measures related to the road infrastructure and environment. The Enforcement approach focuses on measures to deter road users from committing traffic offences. While, the Education approach encompasses to sufficiently educate and equip road users to participate safely in traffic. These involved the transfer of knowledge, training of skills, and influencing opinions in all manners, for example by school education, driver training, or information campaigns.

### 2.1 Measuring the Effectiveness of an Education Programme

We often assess the extent to which a measure contributes to road safety by means of empirical evidence (SWOV, 2008). A good assessment study is one which is designed in such a manner that one can be fairly sure about the causal relationship between measure and effect. In this case: is the observed effect indeed resulted from the education programme, and can we exclude alternative explanations? Can we expect that this programme will produce the same results in another, similar group? There are many manuals that specify the requirements that this sort of assessment study should meet but two requirements that are especially important for road safety are control group and treated group (SWOV, 2008).

#### 2.1.1 Control Group

A control group is a group of subjects whose characteristics are similar to the treated group but who have not received any education, e.g. a course and/or information. By

comparing the control and treated groups, one can determine whether any effects, including undesired ones, have appeared through external influences. Suppose that during the study, the police had greatly increased their enforcement efforts. As both groups encounter these increased efforts, both will be influenced by them. If, in spite of this, there are demonstrable differences between the groups, we can conclude that these were caused by the road safety education.

### **2.1.2 Treated Group**

A control group is particularly valuable if the researcher, preferably at random, has allocated the subjects to the control or treated group. After all, if the choice is left to the subjects themselves, the chance of volunteer bias is greater. This means that those who chose for the education programme will differ too much from those who chose for the control group. However, in most education studies the subjects themselves choose to take part in an experiment. Even if they are randomly assigned to control and treated groups, volunteer bias still plays a role. After all, their choice to participate is not accidental, but is often influenced by interest in road safety. In such a case it is doubtful if the effects of the education programme found can be generalized, and would occur in a group that did not volunteer. So, volunteer bias also threatens the generalisability of the education effects here.

### **2.1.3 Pre- and Post-Intervention Study**

Because it is often not possible to meet all these scientific requirements, it is important to know what the differences are between the control and treated groups. That is why, as extra check, a pre-test and post-test is necessary, i.e. a measurement among all subjects before the education programme begins and after programme is implemented.

## 2.2 Reliable Assessment Criterion in Traffic Education Programme

Since one of the most important aims of road safety is to prevent casualties, it seems that any safety effects of remedial measures are expressed in terms of the number of casualties saved. However, the effects of traffic education are hardly ever studied in terms of crash or casualty numbers (Dragutinovic & Twisk, 2006). This is because education programmes need an assessment criterion that is directly related to the behaviour to be taught. Meanwhile, crashes rarely happen and are caused by a concurrence of, often random, circumstances.

That is why researchers often choose to measure education effects by using intermediate variables such as self-reported behaviour or observed behaviour. For example, if children get lessons about safe behaviour in the vicinity of lorry, the evaluation in the first place looks at children's behaviour around lorries, and the criterion is not the number of children that were killed or injured by a lorry. The choice of such intermediate criteria is also the only possibility of improving education programmes before implementing them on a large scale.

In order to determine whether the use of intermediate assessment criteria is exclusive to traffic education, Dragutinovic and Twisk (2006) made a comparison with other preventative education, viz. health education about 'good eating', for instance. In general, health programmes are not assessed using 'health damage' as the final criterion, but an intermediate criterion, such as the eating habit. The final criterion plays a background role, but is not seen as a compelling prerequisite for effectiveness. The latter can possibly be explained by the fact that the health damage often only becomes visible after many years. What is also relevant here is that the ultimate state of health is also influenced by very many other factors than healthy behaviour. Therefore, health education is regarded as being successful when the behavioural change intended, the intermediate criterion, has been achieved.

The parallels between health and traffic education show once again that behavioural change is also the correct success criterion for traffic education, and not the number of casualties saved. This is why, in traffic as well as health education, the relation with the intended behaviour is stronger than with the intended final effect.

There is, however, a closer relation between traffic behaviour and the final effect in road safety than there is between healthy behaviour and good health. After all, someone behaving unsafely increases his risk of being immediately involved in a crash, whereas unhealthy behaviour increases the risk of a disease that manifests itself often only much later. This closer relation makes the related behaviour the more reliable as assessment criterion in traffic education.

### **2.3 Related Studies on Road Safety Education**

Rosenbloom, Ben-Eliyahu and Nemrodov (2008) discuss the behavior of children when crossing the crosswalk. From their studies, there are four main unsafe behaviors noted. The most common children's unsafe behavior is not stopping at kerbs followed by not looking before crossing, and attempting to cross when car is coming closer. The least common mistake done by the children is running across the street.

Meanwhile, Hugo H. van der Molen (1982) found that children commit to similar behaviour on the road. He suggested that adults especially parents become better examples when crossing the road with their children. A two-dimensional scaling was introduced to analyze both groups behaviour and from the analysis it was shown that adults perform better than children in certain aspects. He then came out with five recommendations, i.e. (i) stop together before crossing; (ii) make the children look as well; (iii) make children aware of the road crossing task; (iv) make sure that they do not lag behind; and (v) run ahead to avoid being on the crosswalk together with cars.

In other studies, researchers come out with suggestions to train the children to reduce the risk of crossing the road. One suggestion is for the adults to supervise the children while crossing the street (Rothengatter, 1984). However, there is a limitation with this



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method that is to make sure no mistakes are made while street-crossing. Young and Lee (1987) suggest a road side simulation which involves a single-lane and a two-way lane crossing roadside. The simulation allows children to develop and safely explore their capabilities when crossing the actual road.

In its 2003-2006 research program, SWOV has studied the effectiveness of traffic education in the Netherlands. This assessment study that was carried out together with a large number of partners assessed 11 projects. The assessments focused on the effects based on actual or self-reported behaviour. The study showed that approximately half of the programmes resulted in a small, but statistically significant improvement that was still present one month after the programme had terminated. The other programmes did not show to be effective. These finding led to adjustments being made in some of the programmes that were studied (SWOV, 2008)

### 3. Methodology

In evaluating the effectiveness of the RSE programme through the Bahasa Malaysia subject, this study aims to measure whether there are any positive improvements in the road safety behaviours of the Form 1 school children in relation to the expected learning outcomes of the RSE modules. In doing so, the study attempts to be fairly sure about the causal relationship between the intervention (RSE modules) and the effect (positive road safety behaviours). For instance, is the observed effect actually resulted from the RSE programme, and can we exclude alternative explanations? Can we expect that this RSE programme will produce the same results in another, similar group? There are a number of manuals specifying the requirements that this kind of assessment study should meet. But two requirements that are important for road safety studies are the control group and treated group (SWOV, 2008). In order to know the differences between the control and treated groups, a pre-intervention and post-intervention study is therefore necessary. This is a measurement among all subjects before and after the RSE education programme has been implemented. However, in this study since all Form 1 school children are the treated group, it is reasonably acceptable to consider all Form 2 school children as the control group after taking into account that there is not much difference in terms of their physical and mental capabilities.

#### 3.1 The Observation Study

In general, the procedure of measurement for an observation study is closely related to the event for which information are to be gathered. It is important to realize that this kind of study is liable to biasness from the observer and from the subject in question. In order to control biasness and to reduce errors, the enumerators need to be specific on what is to be observed and recorded. Additionally, the subject under observation should not be aware that they are being observed from the aspects of road safety behaviour.

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The pre-intervention study was conducted from 18 July 2012 to 30 August 2012 (5 weeks) while the post-intervention observation study was conducted from 8 January 2013 to 7 February 2013 (4 weeks).

### **3.2 Road Safety Module Learning Outcomes**

In deciding on what kind of behaviours should be observed and measured for the evaluation of this RSE program, the initial step is to identify the learning outcomes that are expected from the school children after they had undergone the road safety module in schools over 16 weeks (an equivalent of 8 hours dosage). The learning outcomes of the road safety modules in Form 1 for this study may be briefly described as follows:

#### **RSE Learning Outcomes for Form 1:**

- i. Understand the nature and scale of road accident problems.
- ii. Exhibit positive and responsible attitude when on the road.
- iii. Able to cross the road safely on his/her own.
- iv. Understand the use of safety gadgets (safety helmet, car seat belt, reflective material).

From the above mentioned RSE learning outcomes for Form 1, the following positive behavioural aspects were considered to be observable in the field:

#### **Form 1: Observe RSE Learning Outcome Behaviours:**

- i. Proper wearing of motorcycle helmet.
- ii. Wearing of seat belt in the car.
- iii. Safe and alert crossings.

It is important to note that for measurable behaviours, only Items 1-2 are considered to be directly contributed by the observed school children. Meanwhile, Item 3 may or may not be the direct behaviours of the school children due to some external factors like parents parked haphazardly on the roads while waiting for the school children and also

the built environment around the school. It should also be noted that, a school children may be wearing seat belt in the car because he/she was asked to put it on by his/her parents. Or perhaps the car itself does not have seat belts fixed especially in the rear seats. Similarly, he/she may not be wearing motorcycle helmet unless the parents took the initiative to buy one.

Having taken these situations into account, it was decided that all observations would be made but the interpretation of the results should be taken with caution.

### **3.3 Identification of Form 1 (Treated) and Form 2 (Control) School Children**

Much thought were given on the best and practical approach towards the identification of the Form 1 and Form 2 school children when they are leaving the school. To minimize errors and biasness, a passive identification approach would ensure that children are not aware that they are being observed for road safety practices or else it may affect their behaviours. After much deliberation, it was finally decided that school children under observations are identified by special coloured name tag attached to their bags. With the assistance of the class teacher, these school children were told to fix the tags to their school bags and not to take them while leaving the school on the same day. They were told to put the tags given by the supplier so that later on observations by video will be done to study the reflectivity of the coloured tags. They are not aware that RSE observational study is to be conducted at the exit of the school gate.

For the pre-intervention study, Form 1 (treated) school children were given a bright red tag (Figure 1), the Form 2 (control) school children were given a bright blue name tag (Figure 2). As for the post-intervention study, the treated groups were given bright orange tag (Figure 3) while the control groups were given bright green tags (Figure 4). The bright coloured tags can be seen by the enumerators from a considerable distance.

### 3.4 Location of Study

The observation study on the Form 1 and Form 2 school children was carried out for 8 sample SMK's in the states of Melaka, Selangor and Sarawak. The south region is represented by Melaka (Alor Gajah), Selangor (Klang) represented the central region, and Sarawak (Kuching) for East Malaysia. Pre and post intervention study were conducted for all selected schools.

### 3.5 Minimum Sample Size of Schools

In order to determine the minimum sample size of schools, it was initially established that the testing for the number of positive road safety compliance of school children is to be at 95% confidence level and the following values were assumed:

Pre-Intervention	=	20% compliance
Post-Intervention	=	40% compliance
Range (R)	=	(40% - 20%) = 20% compliance
Standard Deviation ( $\sigma$ )	=	$20/4 = 5\%$
Sampling Error (SE)	=	5% (assumed)
Sample Size (n)	=	$(z_{\alpha})^2 (\sigma)^2 / (SE)^2$
	=	$(z_{0.025})^2 (5)^2 / (5)^2 \approx 4$ schools (min.)

### 3.6 Background of Selected Schools

Based on the calculated minimum sample size of 4, this study covers 8 SMK schools over the three states. For the purpose of consistencies, each of the selected schools should have their main entrances situated adjacent to the major road.

Overall, the total number of students in all 8 schools during pre-intervention (Year 2012) is 2,145 (Form 1) and 2,132 (Form 2). Meanwhile during post-intervention (Year 2013), the total number of students is 1,990 (Form 2) and 2,056 (Form 3).

The followings are the list of selected schools together with their total number of students in Form 1 (treated) and Form 2 (control) during pre-intervention in Year 2012, and also total number of students in Form 2 (treated) and Form 3 (control) during post-intervention in Year 2013.

**1) SMK Kg. Jawa, Klang, Selangor (with OPB)**

**Pre: 18 July 2012 (Wednesday)**

*Form 1 (Red tags) = 380 (Leave: 6.30 pm)*

*Form 2 (Blue tags) = 360 (Leave: 6.30 pm)*

**Post: 7 February 2013 (Thursday)**

*Form 2 (Orange tags) = 273 (Leave: 6.35 pm)*

*Form 3 (Green tags) = 368 (Leave: 1.05 pm)*

**2) SMK Ghafar Baba, Alor Gajah, Melaka (with Zebra Crossing)**

**Pre: 23 July 2012 (Monday)**

*Form 1 (Red tags) = 240 (Leave: 2.30 pm)*

*Form 2 (Blue tags) = 230 (Leave: 2.30 pm)*

**Post: 8 January 2013 (Tuesday)**

*Form 2 (Orange tags) = 189 (Leave: 4.30 pm)*

*Form 3 (Green tags) = 173 (Leave: 4.30 pm)*

**3) SMK Batu Unjur, Klang, Selangor**

**Pre: 26 July 2012 (Thursday)**

*Form 1 (Red tags) = 450 (Leave: 5.30 pm)*

*Form 2 (Blue tags) = 480 (Leave: 5.30 pm)*

**Post: 5 February 2013 (Tuesday)**

*Form 2 (Orange tags) = 465 (Leave: 6.40 pm)*

*Form 3 (Green tags) = 453 (Leave: 1.05 pm)*

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**4) SMK Methodist ACS, Klang, Selangor**

**Pre: 1 August 2012 (Wednesday)**

Form 1 (Red tags) = 285 (Leave: 5.30 pm)

Form 2 (Blue tags) = 285 (Leave: 5.30 pm)

**Post: 6 February 2013 (Wednesday)**

Form 2 (Orange tags) = 285 (Leave: 6.40 pm)

Form 3 (Green tags) = 285 (Leave: 1.10 pm)

**5) SMK St. Mary, Kuching, Sarawak (with OPB)**

**Pre: 28 August 2012 (Tuesday)**

Form 1 (Red tags) = 138 (Leave: 1.30 pm)

Form 2 (Blue tags) = 138 (Leave: 1.30 pm)

**Post: 21 January 2013 (Monday)**

Form 2 (Orange tags) = 138 (Leave: 12.45 pm)

Form 3 (Green tags) = 138 (Leave: 12.45 pm)

**6) SMK St. Thomas, Kuching, Sarawak (with OPB)**

**Pre: 28 August 2012 (Tuesday)**

Form 1 (Red tags) = 180 (Leave: 6.25 pm)

Form 2 (Blue tags) = 161 (Leave: 6.25 pm)

**Post: 21 January 2013 (Monday)**

Form 2 (Orange tags) = 180 (Leave: 6.25 pm)

Form 3 (Green tags) = 161 (Leave: 12.45 pm)

**7) SMK Pending, Kuching, Sarawak (with OPB)**

**Pre: 29 August 2012 (Wednesday)**

Form 1 (Red tags) = 200 (Leave: 6.25 pm)

Form 2 (Blue tags) = 200 (Leave: 6.25 pm)

**Post: 22 January 2013 (Tuesday)**

Form 2 (Orange tags) = 200 (Leave: 12.45 pm)

Form 3 (Green tags) = 200 (Leave: 6.15 pm)

**8) SMK St. Joseph, Kuching, Sarawak (with OPB)**

**Pre: 30 August 2012 (Thursday)**

*Form 1 (Red tags) = 272 (Leave: 6.25 pm)*

*Form 2 (Blue tags) = 278 (Leave: 6.25 pm)*

**Post: 23 January 2013 (Wednesday)**

*Form 2 (Orange tags) = 260 (Leave: 6.25 pm)*

*Form 3 (Green tags) = 278 (Leave: 12.45 pm)*

### **3.7 Data Collection**

Before any data collections were being conducted, the appointed enumerators undergo a short training session where they were briefed about the goal of the RSE program and the standard procedures to be undertaken before and during the observation exercise. Among the initial tasks given to the enumerators in this observations study is to conduct site appraisal study an hour earlier around the selected schools on the actual observation study. Upon arrival at the school compound, the enumerators collected the following general information:

- i. Capture photographs of the site.
- ii. Identification of the school main entrance and other active entrances.
- iii. Major activities at the vicinity of the school area.
- iv. Identification of suitable positions for enumerators.
- v. Visit school administration together with the key researcher to inform of study to be conducted later on that day.
- vi. Enumerators visit the classroom and with the help of the class teachers, supply the coloured name tags and showed the children how and where to fix the tags.

### **3.8 Site Observation on the Actual Day**

Observations were conducted at schools for one-hour after the school (morning or afternoon sessions) ends. Enumerators who are positioned at their identified locations



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near the entrance and exit gates then observed and recorded the number of positive behaviours (compliance) and negative behaviours (non-compliance) into the forms using tally marks. The observed behaviour for seatbelt wearing behaviour is shown in Table 1, while motorcycle helmet wearing behaviour is shown in Table 2 respectively.

**Table 1** Seatbelt wearing behaviour

Item	Observed Behaviours	Treated		Control	
		Pre	Post	Pre	Post
1	Wearing (Front)	17	77	5	14
2	Wearing (Back)	2	8	1	0
3	Not Wearing (Front)	173	121	157	85
4	Not Wearing (Back)	243	243	216	170

**Table 2** Motorcycle helmet wearing behaviour

Item	Observed Behaviours	Treated		Control	
		Pre	Post	Pre	Post
1	Wearing properly	24	64	19	17
2	Wearing but loosely clipped	49	19	27	21
3	Wearing but unclipped	29	5	25	14
4	Not Wearing	8	6	9	9

Video recording were done from each side of the school entrance/exit gate which is handled by two enumerators. The purpose is to observe the school children crossing behavior. However, the problems arise from the lack of vantage height at the vicinity of the school entrance and exit gates. Further, the video recorder may not be able to capture the entire desired area since the view are usually blocked by the vehicles parked by the parents.

## 4. Results and Discussions

On the observation day, only those Form 1 and Form 2 detected by enumerators are considered as participants. Some of the behaviour was in fact non-observed either because the tags were not properly attached to the bags that they could not be easily spotted; the children were not in a position to perform the expected behaviour, or for other reasons. For example if they leave the school and aboard the car which stopped by the school side, so they did not need to cross the road. In this case the ‘cross at safe place’ are non observable (it does not necessarily mean that they do not comply with them). Similarly, if the car stopped far enough from the enumerator position, he/she might not be able to see whether the seat belt was engaged or not. Further, some of the behaviour does not fully reflect the school children’s own conduct rather the parent play the main role. For instance if the parents do not buy their child a motorcycle helmet, then they will not wear a motorcycle helmet even if they wish. The behavior for wearing motorcycle helmet is classified into positive (wearing properly) and negative (wearing but not clipped, wearing but loosely clipped, not wearing). Meanwhile for wearing seatbelt in the car, the positive behavior is when the school children wear the seat belt as a front or rear passenger. On the other hand, negative behavior refers to them not wearing seat belt either in front or at the rear passenger seat. In practice, during the observation, there were many children (and parents) moving around the school main gates that it was not possible to spot all the distributed tags. Many were missed, either the positive or negative behaviour and especially the crossing behavior when all the children were going out of the school almost at the same time and managing themselves through the available spaces of parked cars along the road.

A chi-square analysis was performed on seatbelt wearing behavior and motorcycle helmet wearing behaviour against the treated and controlled group (Table 3, Table 4, Table 5 and Table 6). The analysis revealed that there is a significant increase ( $p < 0.01$ ) in the seatbelt wearing behaviour among the treated group after RSE module

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implementation (Table 3, relative odd is equal to 5.11). On the other hand, the controlled group showed a slight increase in the behaviour of seatbelt wearing (Table 4, relative odd is equal to 0.29). In Tables 5 and 6, motorcycle helmet wearing behaviour also found significantly increase among treated group ( $p < 0.01$ ) compared to the controlled group (relative odd for treated group is 7.64, while relative odd for control group is 0.81).

**Table 3** Seatbelt wearing behaviour among treated group

<b>Observed</b>	<b>Wearing</b>	<b>Not wearing</b>	<b>Total</b>	<b>Odds ratio</b>
<b>Pre-survey</b>	19	416	<b>435</b>	<b>0.05</b>
<b>Post-survey</b>	85	364	<b>449</b>	<b>0.23</b>
<b>Total</b>	<b>104</b>	<b>780</b>	<b>884</b>	
<b>Chi-squared</b>	<b>45.14</b>			
<b>p-value</b>	<b>0.00</b>			
<b>Relative odd</b>	<b>5.11</b>			

**Table 4** Seatbelt wearing behaviour among control group

<b>Observed</b>	<b>Wearing</b>	<b>Not wearing</b>	<b>Total</b>	<b>Odds ratio</b>
<b>Pre-survey</b>	6	373	<b>379</b>	<b>0.02</b>
<b>Post-survey</b>	14	255	<b>269</b>	<b>0.05</b>
<b>Total</b>	<b>20</b>	<b>628</b>	<b>648</b>	
<b>Chi-squared</b>	<b>6.90</b>			
<b>p-value</b>	<b>0.01</b>			
<b>Relative odd</b>	<b>0.29</b>			

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**Table 5** Motorcycle helmet wearing behaviour among treated group

<b>Observed</b>	<b>Wearing</b>	<b>Not wearing</b>	<b>Total</b>	<b>Odds ratio</b>
Pre-survey	24	86	110	0.28
Post-survey	64	30	94	2.13
<b>Total</b>	<b>88</b>	<b>116</b>	<b>204</b>	
<b>Chi-squared</b>	<b>44.23</b>			
<b>p-value</b>	<b>0.00</b>			
<b>Relative odd</b>	<b>7.64</b>			

**Table 6** Motorcycle helmet wearing behaviour among control group

<b>Observed</b>	<b>Wearing</b>	<b>Not wearing</b>	<b>Total</b>	<b>Odds ratio</b>
Pre-survey	19	61	80	0.31
Post-survey	17	44	61	0.39
<b>Total</b>	<b>36</b>	<b>105</b>	<b>141</b>	
<b>Chi-squared</b>	<b>0.31</b>			
<b>p-value</b>	<b>0.58</b>			
<b>Relative odd</b>	<b>0.81</b>			

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## 5. Conclusions

It should also be noted that even though it cannot be objectively measured, there is a possibility that some of these improvements may arise from community programs or from various media on road safety campaigns.

Overall, it may be concluded that even though observational studies have its limitations, the results of the pre-and-post RSE implementations in Form 1 and Form 2 has proved to be positive. The weaknesses in some of the individual RSE behaviours may be improved by putting more stress in future RSE modules in secondary schools. It is also anticipated that higher positive road safety behaviours would be observed among the school children when the RSE dosage is continuously given to them over a longer period of time.

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## Appendixes



**Figure 1** Bright red name tags for Form 1 (treated) pre-intervention



**Figure 2** Bright blue name tags for Form 2 (control) pre-intervention



**Figure 3** Bright orange name tags for Form 2 (treated) post-intervention

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Figure 4 Bright green name tags for Form 3 (control) post-intervention







## Research Report

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