

MRR No. 337

Research Report

Car Users' Knowledge and Practices on Tyre Maintenance in Malaysia



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MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH

ASEAN ROAD SAFETY CENTRE

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Published by:

Malaysian Institute of Road Safety Research (MIROS)

Lot 125-135, Jalan TKS 1, Taman Kajang Sentral,
43000 Kajang, Selangor Darul Ehsan, Malaysia.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Muhamad Syukri Abdul Khalid

Car Users' Knowledge and Practices on Tyre Maintenance in Malaysia/
Muhamad Syukri Abdul Khalid, Mohd Hafzi Md Isa, Zulhaidi Mohd Jawi,
Azhar Hamzah, Mohd Syazwan Solah, Noor Faradila Paiman, Muhamad Arif
Fahmi Abdul Wahab, Mohd Rasid Osman, Siti Zaharah Ishak,
Khairil Anwar Abu Kassim.

(Research Report; MRR No. 337)

ISBN 978-967-2078-84-5

1. Automobiles--Tires--Maintenance and repair--Research--Malaysia.
 2. Automobiles--Tires--Research--Malaysia.
 3. Automobile drivers--Research--Malaysia.
 4. Automobiles--Maintenance and repair--Research--Malaysia.
 5. Government publications--Malaysia
 - I. Mohd. Hafzi Md. Isa. II. Zulhaidi Mohd Jawi.
 - III. Azhar Hamzah. IV. Mohd Syazwan Solah.
 - V. Noor Faradila Paiman. VI. Muhamad Arif Fahmi Abdul Wahab.
 - VII. Mohd Rasid Osman. VIII. Siti Zaharah Ishak.
 - IX. Khairil Anwar Abu Kassim.
 - X. Title. XI. Series.
- 629.24820720595

Printed by:

VISUAL PRINT SDN BHD (186281-A)

No. 47, 47-1, Jalan Damai Raya 1,
Alam Damai, 56000 Cheras,
Kuala Lumpur.

Typeface: Calibri

Size: 11 pt.

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Acknowledgements

This study would not be completed without the support from the previous Director-General of the Malaysian Institute of Road Safety Research (MIROS), Dr Siti Zaharah Ishak, former Director of the Vehicle Safety and Biomechanics Research Centre (VSB), Ir. Mohd Rasid Osman, the research team and members of the VS102118 research project from Crash Safety Engineering Unit (CRASE). The authors would also like to express their sincere appreciation to the research team members and research assistants team for their kindness assist and contribution in completing the project.

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Abstract

Tyre is arguably one (1) of the main important parts in vehicle whereby it is the only medium to move and manoeuvre a vehicle. However, tyre maintenance is often disregarded by users and it shows when vehicles can be seen frequently stranded on the roadside due to tyre failure especially heavy vehicles. The previous study found that 43% of private vehicle users have to stop and park their vehicles on the roadside due to tyre problems in 2017. This study aims to assess car users' knowledge and their practices on tyre maintenance. A total of 247 responses were collected and the results show that the majority of them have a lack of knowledge on their tyre specification in terms of sizes, manufacturing date and authenticity. Despite most of the respondents did check their tyre at least once a month in terms of air pressure and tread condition, it is found that 33% of their tyres are in under-inflated conditions during the physical checking. In addition, half of the respondents never check their spare tyre condition and a few suggested that they have no idea in the presence of spare tyre in their car. In conclusion, users should understand more on tyre knowledge and practice a frequent checking of their tyre so that tyre failure crash can be avoided while maintaining the car roadworthiness. Apart from that, it is recommended to install a Tyre Pressure Monitoring System (TPMS) as it may help efficiently in determining tyre pressure and condition status.

1. Introduction

Tyre is arguably one (1) of the main important parts in vehicle and is the only medium to move and manoeuvre a vehicle. Apart from that, tyres are also designed to withstand the vehicle load, absorb road shocks and control the movement of a vehicle. Therefore, it is important for users to understand the importance of maintaining their vehicles' tyres in order to ensure the safety of the tyres and the roadworthiness of the vehicle.

Roadworthiness, as described by Mohd Jawi et al. (2012; 2017), is the ability of a vehicle to be in a good operating condition before being used on the road. To ensure a vehicle is in roadworthy condition, proper maintenance for every mechanical and electrical part of a vehicle is necessary. Tyre is one (1) of the critical parts that require regular maintenance in terms of its inflation, tread depth and its conditions. In addition, in order to ensure the tyre is in good condition, it is important for users to have a quality knowledge and understanding on the tyre especially in terms of size and specification so that they will be able to perform self-assessment on their tyres, make the right decisions on tyre maintenance and avoid from being a victim of fraud cases.

Poor knowledge may lead to poor maintenance attitude and thus, lead to being a victim of fraud cases (Mohd Jawi et al., 2017). In Malaysia, it is reported that complaints on motor vehicles workshop are increasing along the years and were in the top ten on the list of complaints every month in 2016 (Abdul Wahab et al., 2017). Furthermore, based on the records by National Consumer Complaints Centre (NCCC), 1,572 reported cases were related to automobile workshops whereby 5.3% of the total cases were related to fake or second-hand parts (Abdul Wahab et al., 2017). It can be observed that many of general workshops sold second-hand old tyres without considering its conditions like

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ageing, cracks and so on. In fact, some general workshops found to have sold fake re-tread tyres andnock (re-grooved) tyres¹.

Users with a lack of knowledge would eventually buy and use these fake and substandard tyres without knowing the potential hazard that may occur. On the other hand, Abdul Wahab et al. (2018) reported that most of car users preferred to change tyre, rim or valve at general workshops, even though most of them expected to get cheated by the general workshops. Therefore, without proper knowledge on tyre and its maintenance especially in identifying tyres' labels and specifications, users may have a high possibility of getting cheated by mechanics from general workshops which may result to a higher risk of tyre failure related crashes.

In general, improper tyre maintenance may result in tyre failure. Factors such as tyre inflation, tread condition, tyre condition, regular rotation and alignment may be the causes of tyre blowout and failure. A study from Abdul Khalid et al. (2018) found that in 2017, more than 40% of private vehicle users experienced tyre failure during their commuting which had got them in an emergency and forced them to stop their vehicle on the road. To make it worse, there were also a few cases where crashes occurred while users were in the middle of changing their blowout tyres as shown in Figure 1. This fatal crash could be preventable if the tyres were properly maintained and in good conditions.

¹ An old tyre that has been used until the tread reached to the limit, is cut and tapped again to create a tread groove



Figure 1 Newspaper article on fatal crashes while changing his blowout vehicle tyre

Nevertheless, it was found that there was a lack of local studies that can be referred to understand Malaysian car users' knowledge and practices on tyre maintenance. This information is important to related stakeholders in identifying key issues with regards to knowledge and practices on tyre maintenance.

1.1 Objectives of the Study

The main objective is to identify the car users' knowledge and their practices in maintaining their tyres in Malaysia. The specific objectives of this study are:

- i. To determine the ownership profile of car users.

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- ii. To assess car users' knowledge on tyre maintenance.
- iii. To assess car users' practices on tyre maintenance.
- iv. To investigate car users' tyre condition characteristics in terms of tire pressure, tread depth and surface profile.

1.2 Scope of the Study

For this study, the area of study covered almost similar area from Abdul Khalid et al. (2018) in which is based on the role of users in vehicle ownership as elaborated by Mohd Jawi et al. (2012) with the combination of the pre-emergency event based on another familiar road safety concept by Haddon, 1999 and illustrated as in Figure 2. The study also focuses on car users only who stay and commute in Klang Valley area.

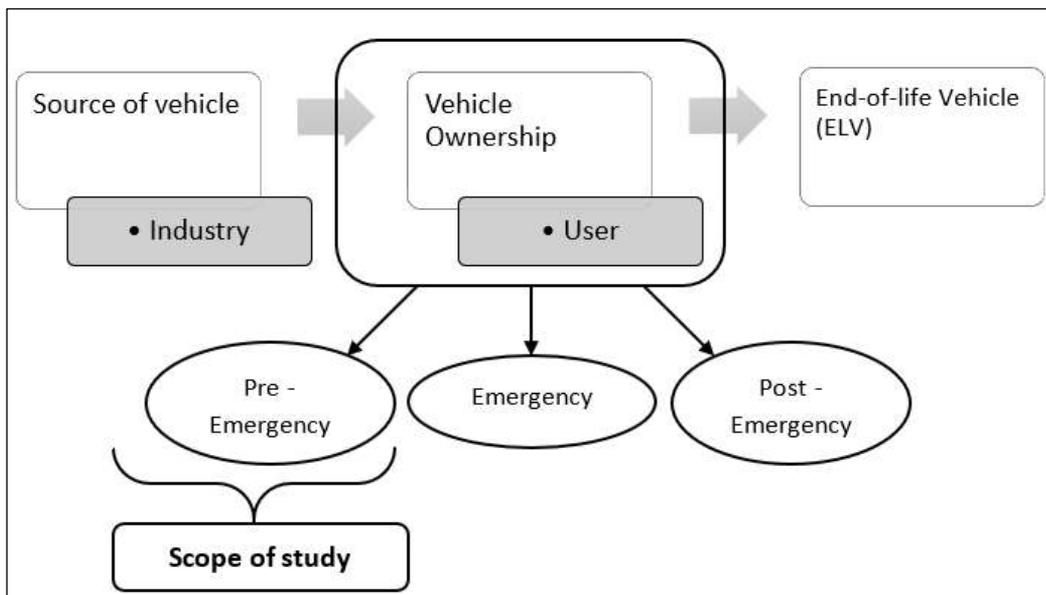


Figure 2 Scope of study from the simplified automotive ecosystem and Haddon Matrix viewpoints (Abdul Khalid et al., 2018)

2. Methodology

2.1 Study Overview

Two methods which consist of an interview and physical checking as implemented by Ratrout (2005) were employed in this study to achieve all objectives.

In the interview session, respondents were asked several questions related to demographic profiles, ownership status, knowledge and practices on tyre maintenance using a self-developed questionnaire that was constructed by the authors.

The physical checking session was done after the interview session in which the respondents' car tyres' condition in terms of tyre pressure, tread depth and condition and spare tyre condition were assessed and recorded. Pressure gauge, tread depth measurement, and other related instruments were used to collect and record the required data.

Multi-stage sampling was employed in this study which includes stratified and convenience sampling. Only car users were assessed and the respondents were among the users who were commuting in Klang Valley area. The sample size was determined based on Krejcie and Morgan (1970) with an initial target of at least 384 respondents to be assessed. However, targeted respondents number was reduced to 250 due to budget and time constraints.

Data collection was done at different places with different approaches as described in Table 1.

Table 1 Data collection activity

Location	Approaches
Public places (shopping malls, petrol stations, shop lots, etc.)	<ul style="list-style-type: none"> Data collection was done during JKJR awareness campaign at selected shopping malls, petrol stations and shop lots. Random users were selected and requested to involve in the assessment. Petrol station owner and team volunteered to be part of the respondents.
Offices & factories	<ul style="list-style-type: none"> Data collection was done during road safety talk requested by several companies at their offices and factories. Staff were asked to volunteer as the respondents.
Schools	<ul style="list-style-type: none"> Data collection was done during road safety talk and campaign requested by schools. Respondents were among teachers and staffs. Selected randomly and some were volunteered.

2.2 Survey Instrument

For the interview session, the questions were developed based on the objectives of the study and the details elaborated as in Table 2. While for the physical checking session, the details of the car recommended tyre as in placard and the current tyre used by the users were recorded.

Table 2 Questionnaire items and variables

Section	Sub-sections	Descriptions
Section A Demography & travel pattern	A1 – Demography	<ul style="list-style-type: none"> Age, gender, marital status, races, occupation, monthly income (individual & household)
	A2 – Vehicle ownership	<ul style="list-style-type: none"> Car make and model

Section B Tyre maintenance knowledge	A3 – Driving license ownership	<ul style="list-style-type: none"> ● Driving license status
	B1 – Tyre status	<ul style="list-style-type: none"> ● Last time change tyre ● Current tyre manufacturing date ● Current tyre & rim size
	B2 – Manufacturer recommendation on tyre	<ul style="list-style-type: none"> ● Recommended tyre size ● Recommended rim size ● Recommended tyre pressure ● Image questions on the car's placard
	B3 – Tyre symbol understanding	<ul style="list-style-type: none"> ● Image questions on symbols stamped on tyres ● E.g.: tyre width, manufacturing date symbols
	C1 – Tyre pressure maintenance	<ul style="list-style-type: none"> ● Respondents method to determine the correct pressure to fill in ● Frequency of filling air pressure to tyre
	C2 – Tyre tread maintenance	<ul style="list-style-type: none"> ● Respondents method to check their tyre tread depth and condition ● Frequency of checking tyre tread and condition
	C3 – Tyre mechanical maintenance	<ul style="list-style-type: none"> ● Frequency of checking tyre rotation, balancing and alignment

2.3 Data Tabulation

A pilot study was conducted among MIROS staffs before data collection started to test and ensure that the questions developed were able to capture and collected the required information and more importantly, achieving the objectives. Data collection was conducted from October 2017 until March 2018 among car users.

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All the collected data were analysed and presented using Statistical Package for Social Science (SPSS) for descriptive analysis and tabulation and Microsoft Excel for graphical presentation.

3. Results and Discussion

Results of this study are represented according to the objectives and discussed accordingly.

3.1 Demographic Profiles

A total of 247 responses were successfully collected throughout the survey. Table 3 represents the overall demographic profile of respondents. The mean respondent age is 33.07 (SD = 9.01) whereby the youngest is 21 years old while the oldest is 76 years of age (mode = 26, N = 13.4%). The majority of respondents were Malay (86.6%). Male and female respondents make up almost equal percentages (with 50.2% for male, 49.8% for female).

Furthermore, 51% of respondents hold a degree certificate with almost 90% of respondents worked in the government sector (31.6%) and private sector (56.3%) with a majority of them having RM2001 – RM5000 in monthly income both for own (60.7%) and household (44.5%). The respondents' main vehicle shows that both national car makers, Perodua (37.2%) and Proton (27.1%), are widely used by respondents with another 27.5% comprising a combination of the "Big 3" (Honda-Toyota-Nissan) (Mohd Jawi et al., 2017) and other manufacturers (8.1%).

On the other hand, the majority of respondents used a 2011–2015 manufactured year car as their main vehicles (39.3%) with most of them owned their driving licenses in 2001–2010 (49.8%).

Table 3 Demographics of participants

Description	Category	Frequency (N)	Percentage (%)
Age	20 and below	0	0
	21–30	123	49.8
	31–40	81	32.8
	41–50	28	11.3
	51 and above	15	6.1
*Age	<i>Mean: 33.07; Mode: 26 (13.4%); Range: 21–76; Std. deviation: 9.01</i>		
Gender	Male	124	50.2
	Female	123	49.8
Races	Malay	214	86.6
	Chinese	13	5.3
	Indian	18	7.3
	Others	2	0.8
Education	Secondary school	25	10.1
	Diploma – STPM – A-Level	71	28.7
	Degree	126	51.0
	Master – PhD	22	8.9
	Others	3	1.2
Occupation	Government	78	31.6
	Private	139	56.3
	Business	5	2.0
	Self-employed	5	2.0
	Students	12	4.9
	Retire	3	1.2
	Others	5	2.0
Monthly income (Own) (RM)	2000 and below	45	18.2
	2001–5000	150	60.7
	5001–8000	43	17.4
	8001–12000	7	2.8
	12000 and above	2	0.8
Monthly income (Household) (RM)	2,000 and below	29	11.7
	2001–5000	110	44.5
	5001–8000	57	23.1
	8001–2000	29	11.7

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	12000 and above	22	8.9
Car manufacturer (Respondents main vehicle)	Perodua	92	37.2
	Proton	67	27.1
	“Big 3” (Honda, Toyota, Nissan)	68	27.5
	Nissan)	20	8.1
	Others		
Car year of manufactured (Year)	1990 and before	0	0
	1991–2000	16	6.5
	2001–2010	64	25.9
	2011–2015	97	39.3
	2015 and after	55	22.3
	Unsure	15	6.1
Driving license ownership (Year)	1990 and before	15	6.1
	1991–2000	39	15.8
	2001–2010	123	49.8
	2011–2015	57	23.1
	2015 and after	13	5.3

3.2 Knowledge on Tyre Maintenance

In the interview session, several questions were asked to respondents on the knowledge of maintaining their car tyres while for the physical checking session, respondent car tyres details were assessed and recorded.

The first question was about their car maintenance responsibility and the answers are shown in Figure 3 whereby 75.7% of the respondents are responsible to maintain their vehicles on their own. While from Figure 4, it shows that 90.7% of female respondents require their spouses to assist them in their car maintenance.

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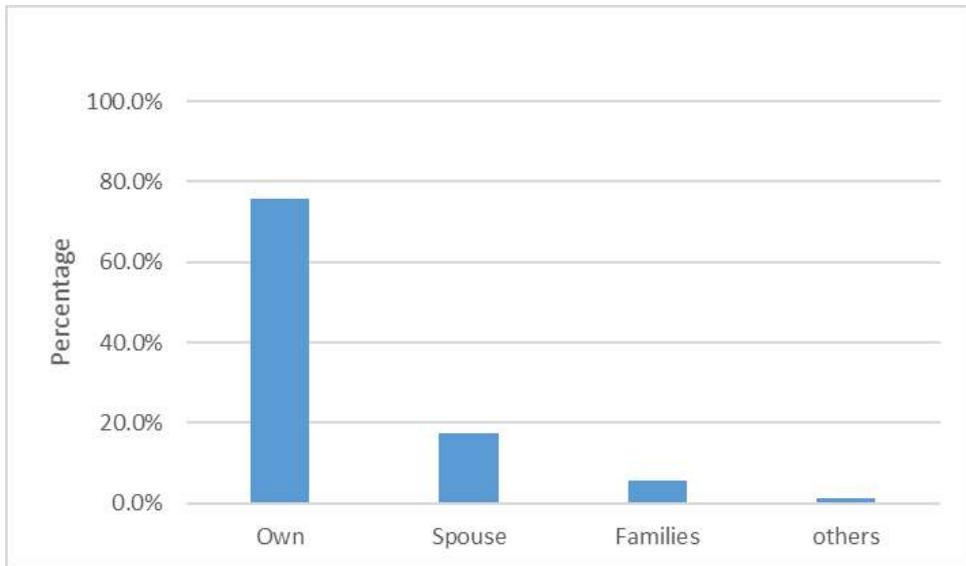


Figure 3 Car maintenance responsibility

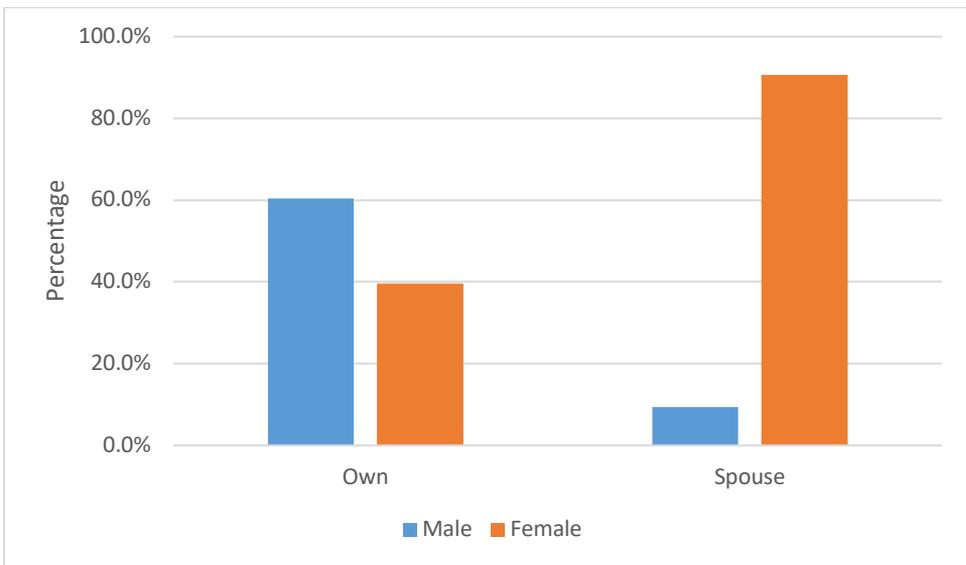


Figure 4 Breakdown of "Own" & "Spouse" responsibility between male vs female respondents

Respondents were then asked for their knowledge whether they know or not on their car tyre details in terms of manufacturing date, current and recommended tyre size and to provide the value of the details. Figure 5 shows that 40.9% of the respondents believed they know their tyre manufacturing date. However, the results show a significant change when compared with physical checking results whereby only 17.6% of the respondents answered correctly.

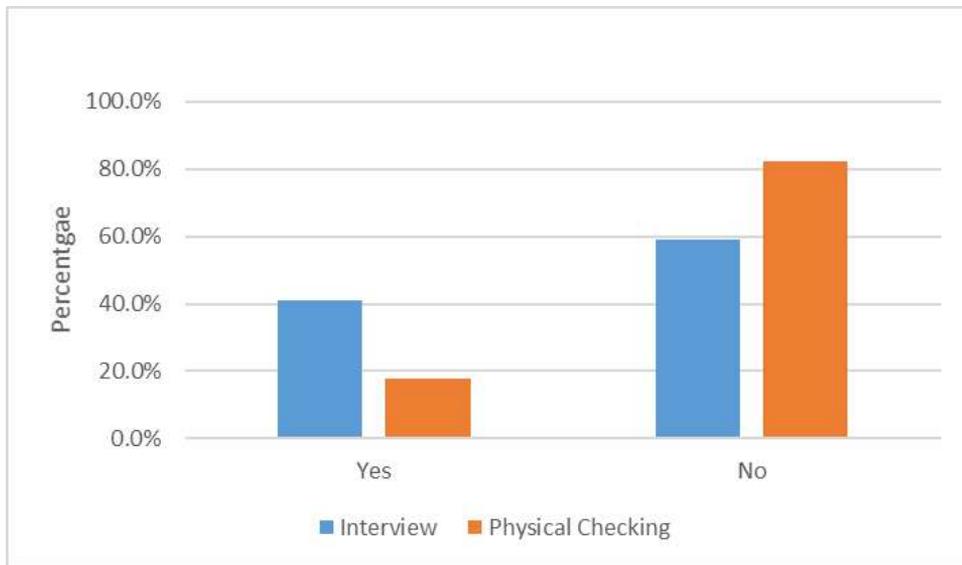


Figure 5 Respondents knowledge on their tyre manufacturing date. Comparison between interview vs physical checking

Figure 6 shows that 61.5% of the respondents believed they know their current tyre size and 41.3% know their recommended tyre size. However, analysis from physical checking proved that only 37.6% of the respondents know their current tyre size while 29.4% of them know their recommended tyre size by their car manufacturers.

On the other hand, Figure 7 shows that only 41.3% of the respondents agreed that they know the recommended tyre size from the manufacturer of their car. However, during physical checking, it was found that only 29.4% of them know their car tyre

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recommended size. Thus, it explains that most of the respondents are not aware of their tyre details and specifications.

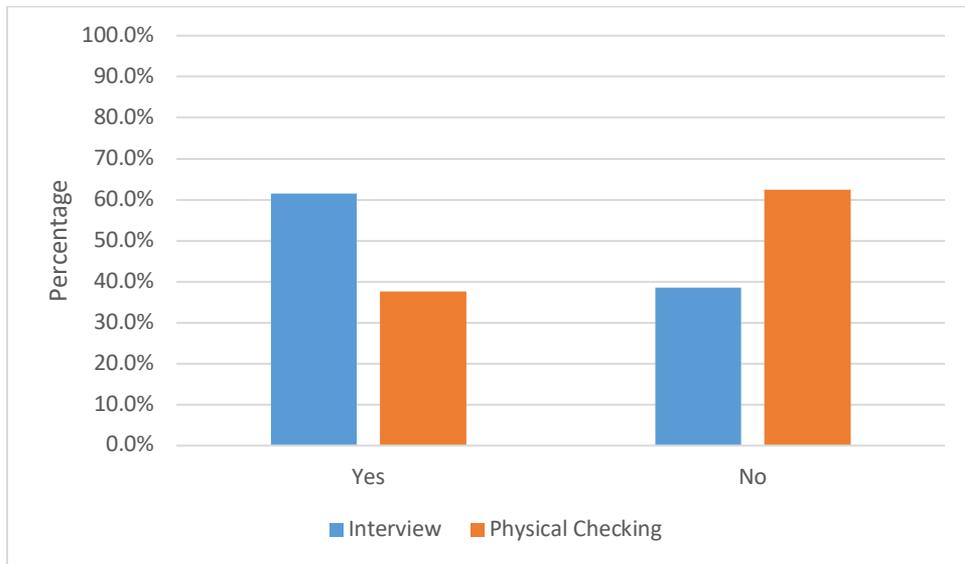


Figure 6 Respondents knowledge on their tyre size. Comparison between interview vs physical checking

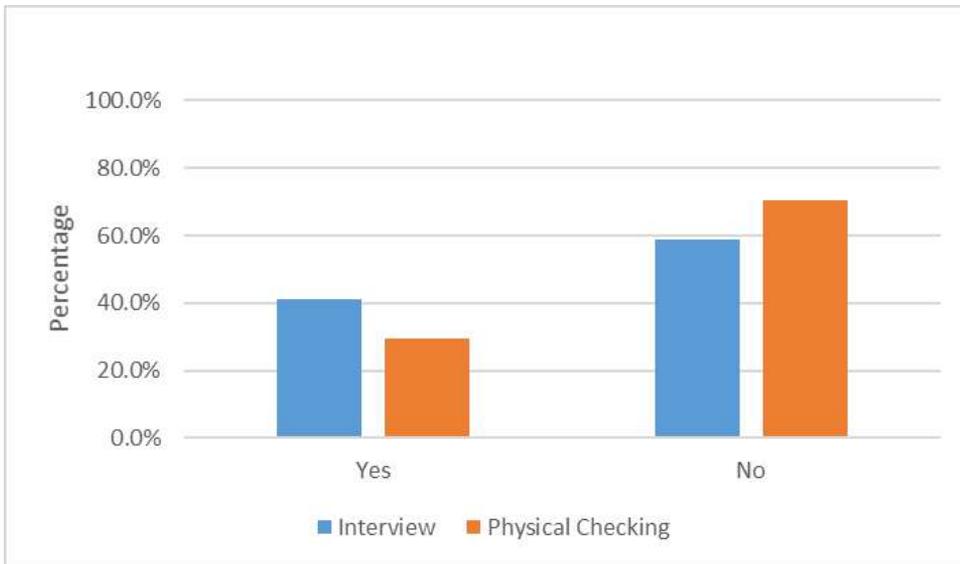
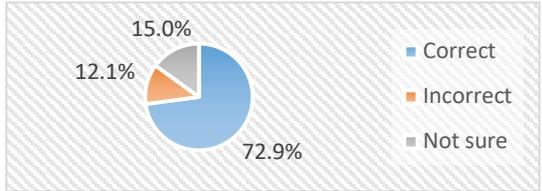
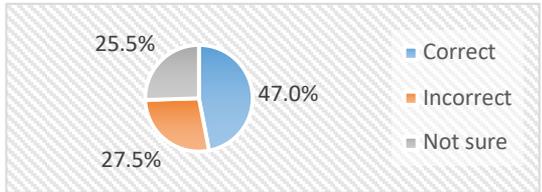
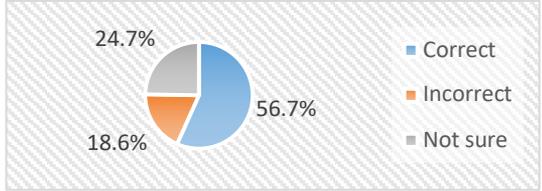
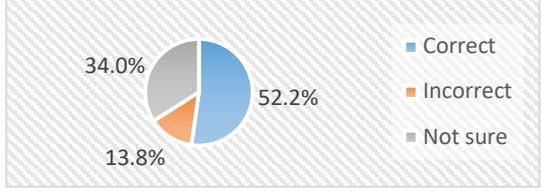
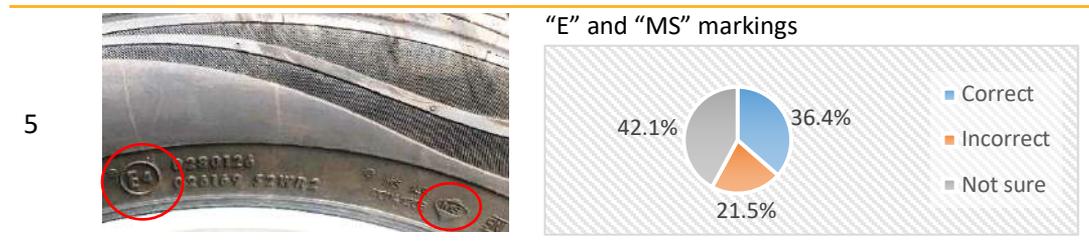


Figure 7 Respondents knowledge on their recommended tyre size. Comparison between interview vs physical checking

At the end of the interview questions, respondents were asked to answer a few image questions to assess their knowledge and awareness of tyre symbols. The results are tabulated as in Table 4. 72.9% of the respondents described correctly on the placard image. For tyre width symbol, only 47% can describe correctly with most of the incorrect answers are “tyre pressure”. 56.7% of the respondents know the tyre diameter symbol and 52.2% of the respondents respond correctly on tyre manufacturing date symbol. However, only 36.4% of the respondents are aware of the standards markings with most of them only recognize the “MS” marking but unsure on what it indicates for the tyre, while most of them are not familiar with the “E” marking symbol.

Table 4 Image questions on tyre symbols

No.	Image question	Results								
1		<p>Placard: Information on the recommended tyre size, specification and air pressure.</p>  <table border="1"> <caption>Results for Placard question</caption> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Correct</td> <td>72.9%</td> </tr> <tr> <td>Incorrect</td> <td>12.1%</td> </tr> <tr> <td>Not sure</td> <td>15.0%</td> </tr> </tbody> </table>	Response	Percentage	Correct	72.9%	Incorrect	12.1%	Not sure	15.0%
Response	Percentage									
Correct	72.9%									
Incorrect	12.1%									
Not sure	15.0%									
2		<p>Tyre width (in millimetre)</p>  <table border="1"> <caption>Results for Tyre width question</caption> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Correct</td> <td>47.0%</td> </tr> <tr> <td>Incorrect</td> <td>27.5%</td> </tr> <tr> <td>Not sure</td> <td>25.5%</td> </tr> </tbody> </table>	Response	Percentage	Correct	47.0%	Incorrect	27.5%	Not sure	25.5%
Response	Percentage									
Correct	47.0%									
Incorrect	27.5%									
Not sure	25.5%									
3		<p>Tyre diameter (in inch)</p>  <table border="1"> <caption>Results for Tyre diameter question</caption> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Correct</td> <td>56.7%</td> </tr> <tr> <td>Incorrect</td> <td>18.6%</td> </tr> <tr> <td>Not sure</td> <td>24.7%</td> </tr> </tbody> </table>	Response	Percentage	Correct	56.7%	Incorrect	18.6%	Not sure	24.7%
Response	Percentage									
Correct	56.7%									
Incorrect	18.6%									
Not sure	24.7%									
4		<p>Tyre manufacturing date</p>  <table border="1"> <caption>Results for Tyre manufacturing date question</caption> <thead> <tr> <th>Response</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Correct</td> <td>52.2%</td> </tr> <tr> <td>Incorrect</td> <td>13.8%</td> </tr> <tr> <td>Not sure</td> <td>34.0%</td> </tr> </tbody> </table>	Response	Percentage	Correct	52.2%	Incorrect	13.8%	Not sure	34.0%
Response	Percentage									
Correct	52.2%									
Incorrect	13.8%									
Not sure	34.0%									



3.3 Practices on Tyre Maintenance

In the interview session, respondents were asked on their practices with regards to tyre maintenance in terms of how they determine the correct pressure to fill into their car tyres and how they practice checking their tyre tread depth in order to ensure the roadworthiness of their tyres and cars. Figure 8 shows that the majority of the respondents (42.9%) referred to car placard details to determine the correct pressure to fill into their car tyre while 36.4% of them set based on their experience. 55.9% of the respondents opt for a quick visual to check on their tyre tread depth and condition as shown in Figure 9. Unfortunately, only 7.3% of the respondents check their tyre tread using the Tread Wear Indicator (TWI) located on their tyres even it is the ideal way to check the car tyres tread depth.

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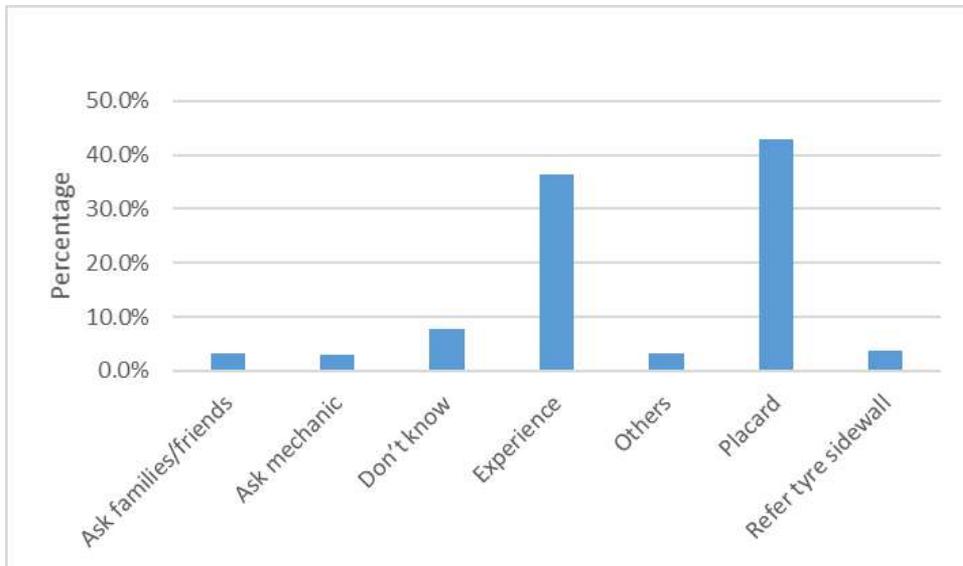


Figure 8 Respondents method to determine the correct pressure to fill in their tyres

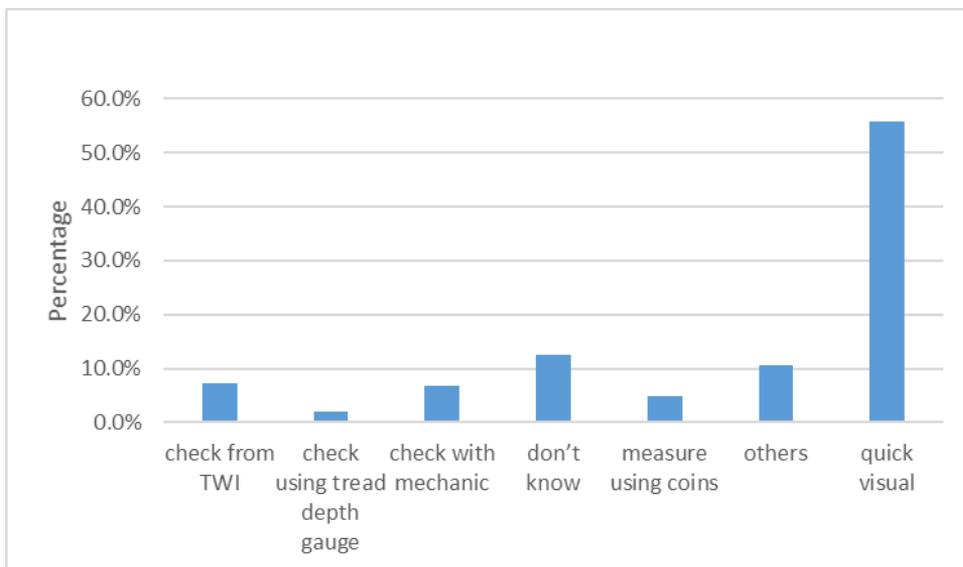


Figure 9 Respondents method to measure and ensure their tyre tread depth is safe

The next part of the interview session was asking on respondents' practices on how frequent they do the maintenance in maintaining their car tyres. Figure 10 shows the frequency of respondents filling air into their tyres while Figure 11 shows the frequency of respondents checking their tyre tread depth and physical conditions. It can be seen that 59.9% of them fill in air into their car tyres and 36.8% of the respondents did check their tyre tread depth & physical condition at least once a month. These findings shows that majority of the respondents did follow the same recommendation by most of tyre manufacturer whereby it is recommended to check the tyre tread, condition and to fill air in vehicle tyre at least once a month (Bridgestone, 2016; Continental; Dunlop; Goodyear; Michelin) in order to ensure the tyres are properly maintained and thus ensure the vehicle roadworthiness. On the other hand, 36% of the respondents check and did the tyre alignments every six (6) months as shown in Figure 12. It can be explained that most of them did the tyre alignments during the regular service time as most of the car manufacturers in Malaysia recommended the car to be serviced within 10,000 km mileage or six (6) months whichever is earlier.

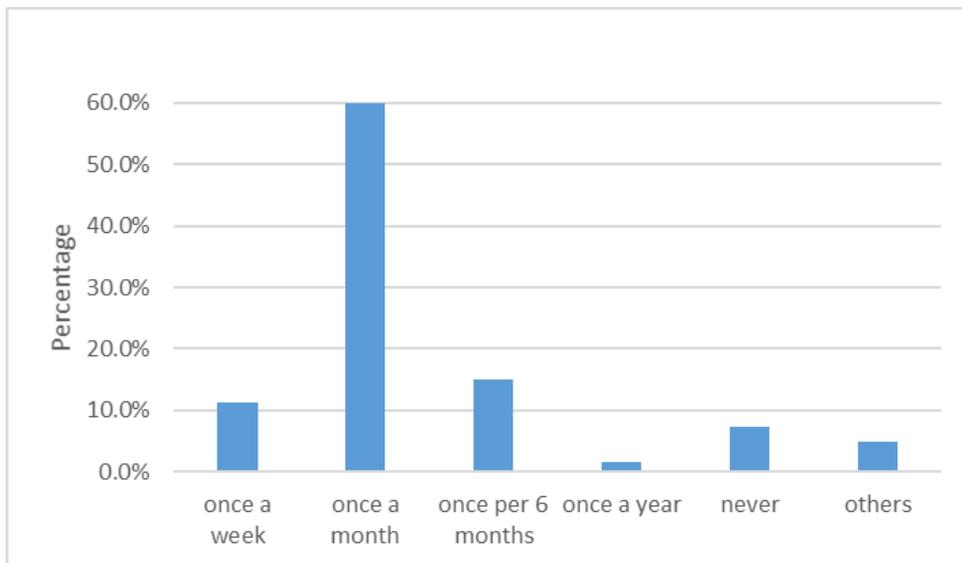


Figure 10 Frequency of the respondents filling air into their tyres

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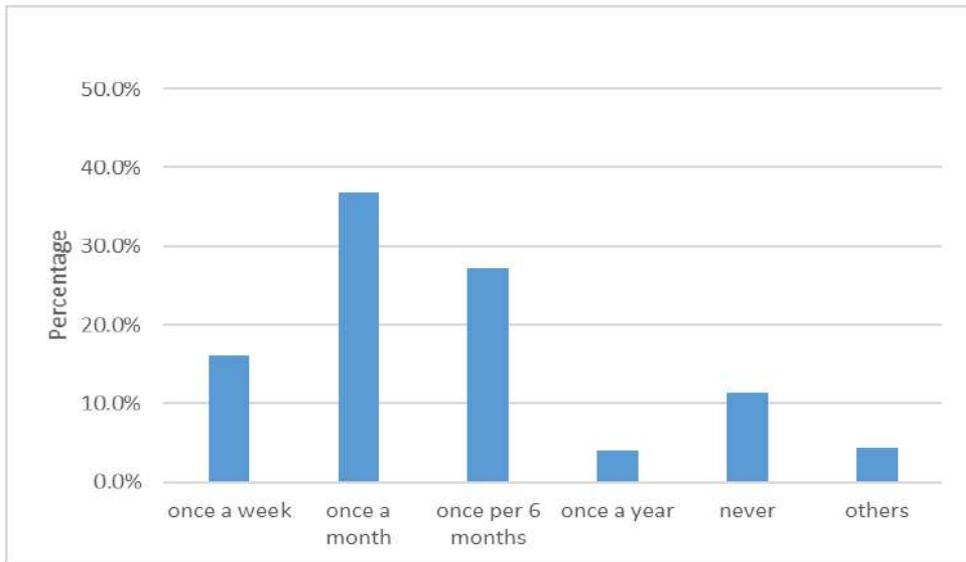


Figure 11 Frequency of the respondents checking their tyre tread and physical conditions

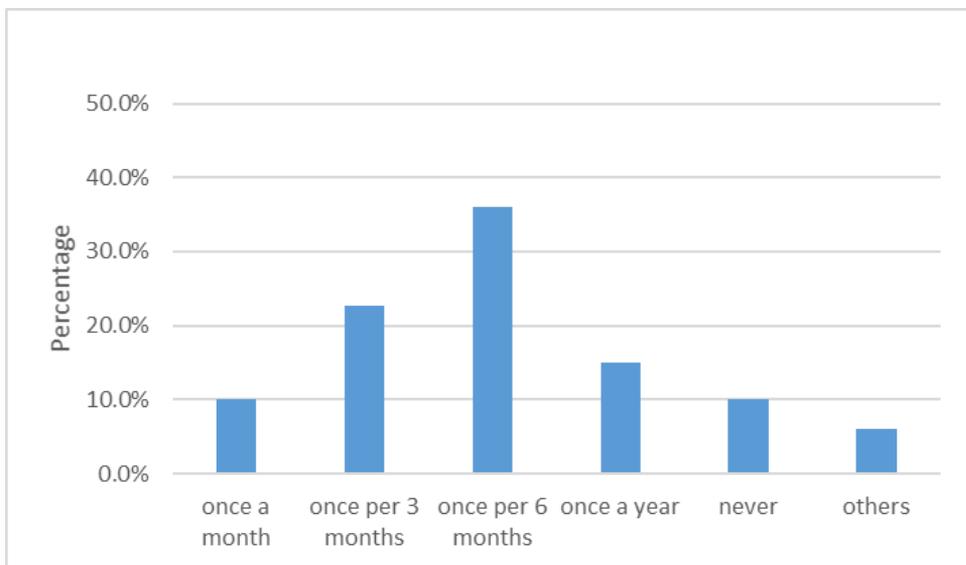


Figure 12 Frequency of the respondents checking and do their tyre alignment

On the physical checking session, several parts of the cars mainly on the tyres were inspected and recorded. Figure 13 shows the tyre brands used by all the respondents categorized based on its brands rank (Tyre Shopper, 2017). It can be seen that almost 60% of the respondents used premium tyre brands. In Figure 14, tyre brands from all the cars for all tyres were compared and it shows most of the respondents (78.6%) used different tyre brand on the front and rear tyre. However, there are still a few who use different tyre brands for all four (4) tyres and it is not recommended to do so as it may affect the tyre performances in terms of tread function ability, traction and grip.

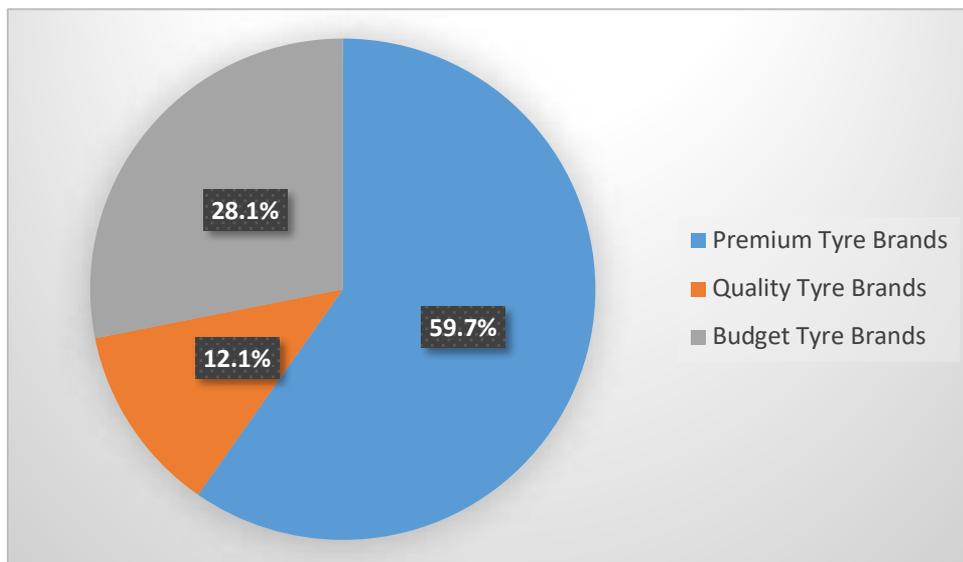


Figure 13 Tyre brands categories used by respondents

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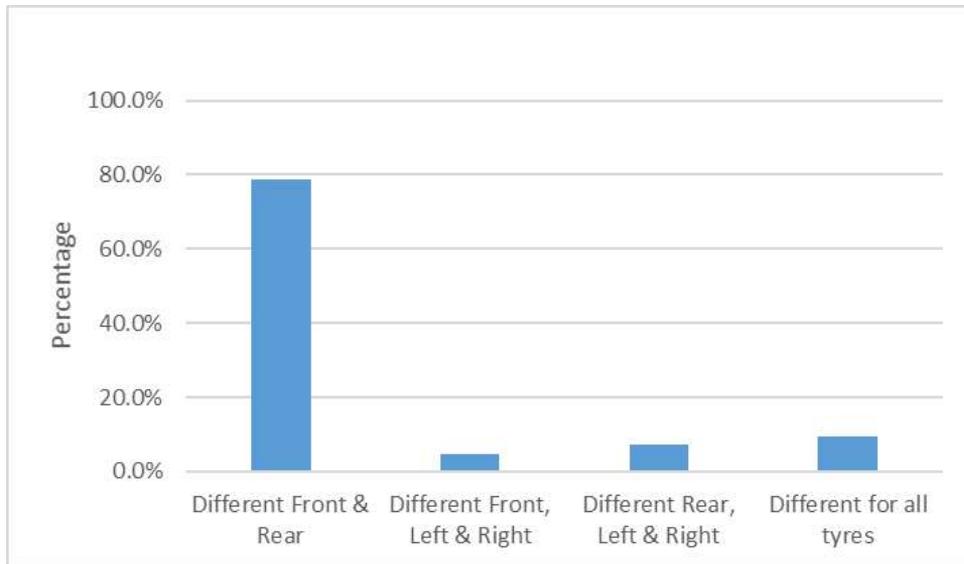


Figure 14 Tyre brands comparison for all tyres used by respondents

From physical checking session, it is found that 63.2% of the respondents did use similar size tyres as recommended by manufacturers as shown in Figure 15. On the other hand, 33.2% of them opt to bigger size tyres as they thought that it will provide more stability and better performance (Mohd Jawi et al., 2017). However, technically, by changing or upsizing the car tyres may result in heavier car and changing of the centre of gravity. The heavier car requires more power to move and manoeuvre and thus, it may affect the fuel economy. It also may affect the speedometer accuracy as the tyre diameter getting bigger, the revolution per minute of the tyre might as well change.

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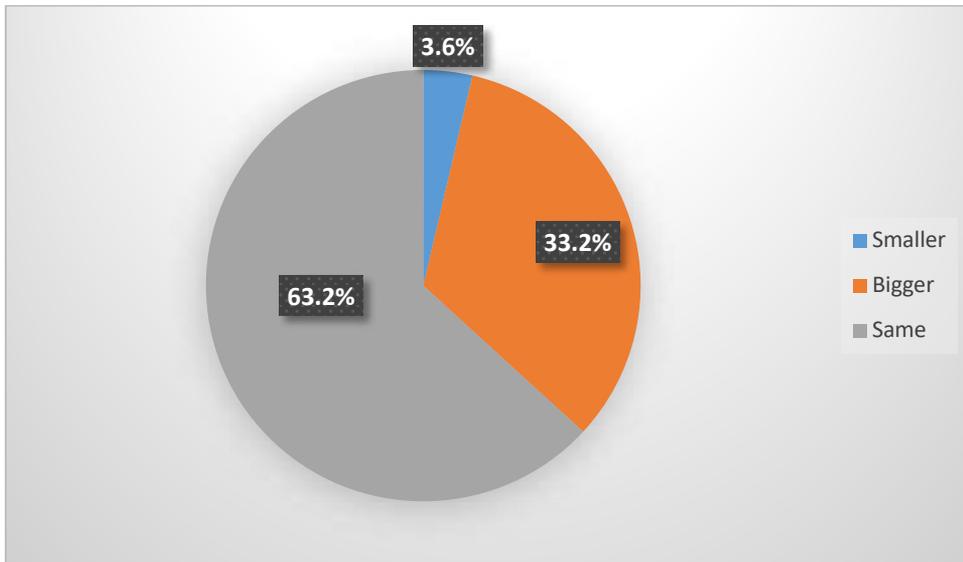


Figure 15 Respondents current tyre size compared with recommended size from their car manufacturers

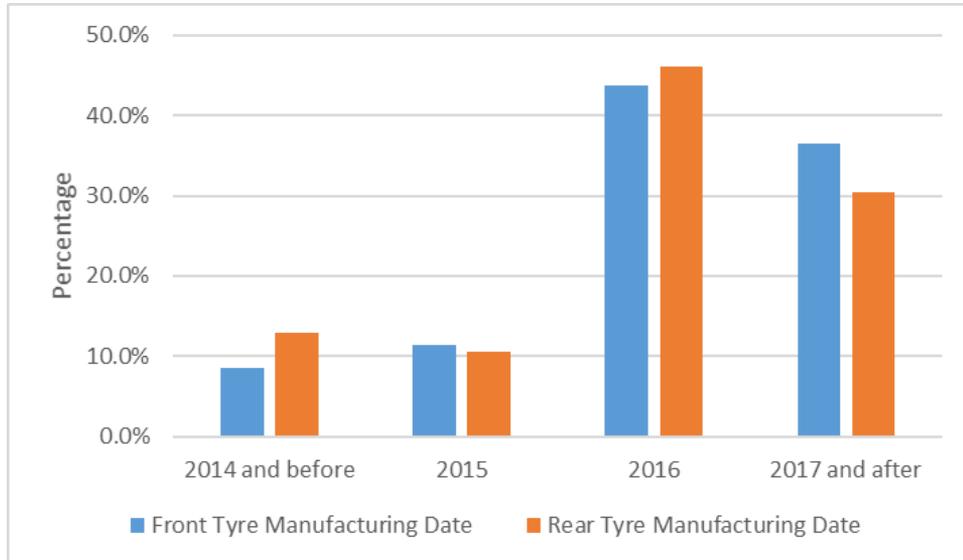


Figure 16 Tyre manufacturing date used by respondents

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From the tyres inspected, it can be seen from the manufacturing date that most of the respondents did use the current year production tyres whereby almost 80% of them used 2016 and 2017 tyres date for both front and rear tyre as shown in Figure 16. However, it can be seen that the manufacturing date is not the same for all tyres and it shows in Figure 17 where 25.5% of them did use different tyre date for their tyres and in Figure 18, it shows that most of the respondents who used different tyre date, only have a different date for front against rear only. However, few respondents did have a different date for all the tyres. It is believed that most of the car users in Malaysia tend to change their tyres depending on which tyres run out of tread earlier.

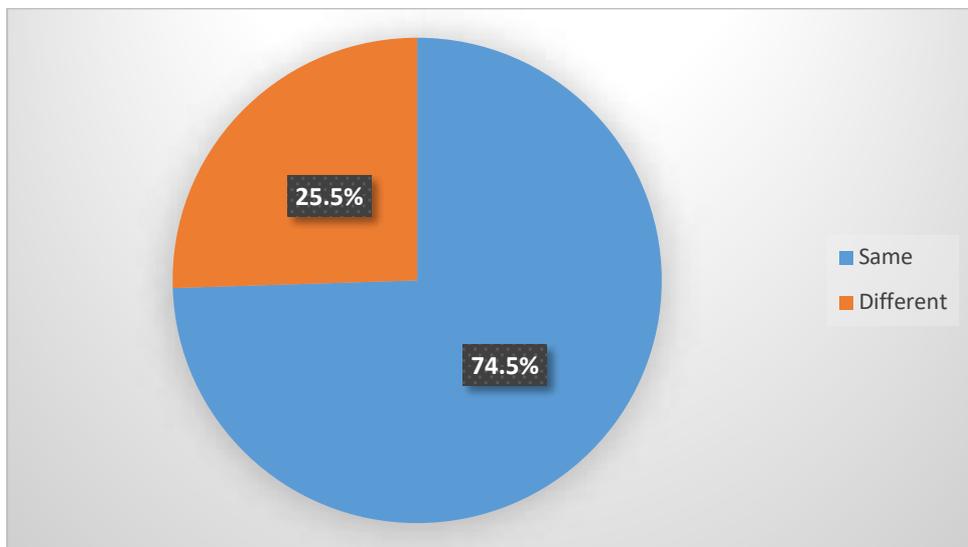


Figure 17 Comparison of tyre manufacturing date used by respondents on their vehicle

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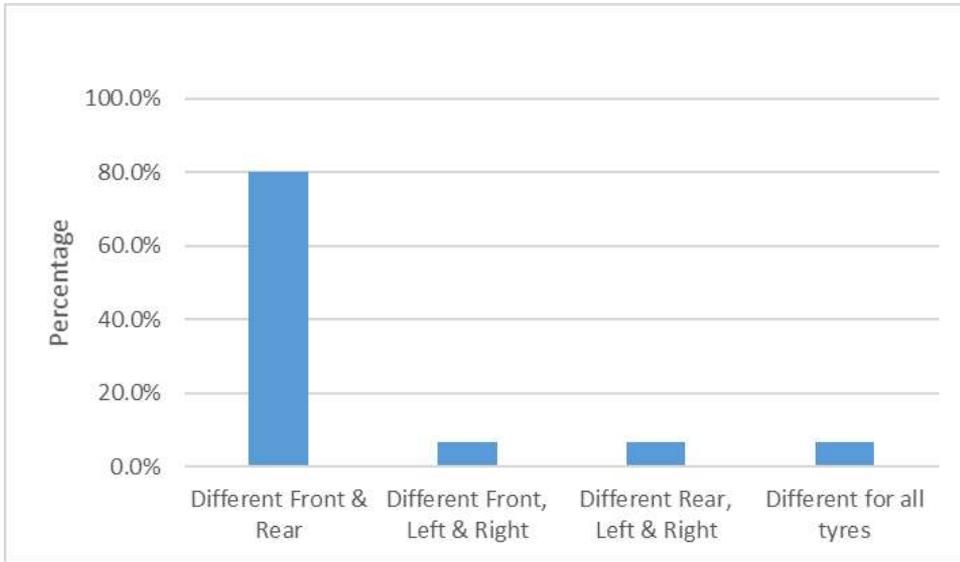


Figure 18 Comparison of tyre manufacturing date for all tyres

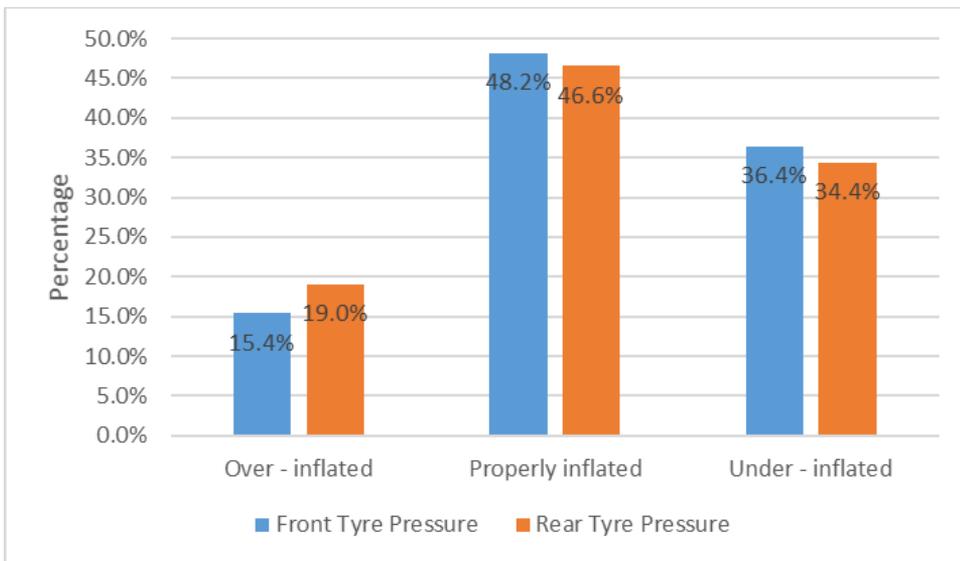


Figure 19 Tyre pressure recorded during physical checking for car front against rear tyres

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Tyre pressure for all tyres have been recorded during the physical checking session and the results are tabulated in Figure 19. The calculation to determine the inflation of the tyres was based on a study done in Saudi Arabia by Ratrout (2005). Almost half of the respondents did maintain and ensure their tyres are properly inflated. However, up to 35% of the respondents did use under-inflated tyres for both front and rear tyres. It may be due to their lack of knowledge in determining the correct air pressure to fill in as most of the under-inflated tyres are from the respondents who set the air pressure based on their experience. From Figure 18 also, it can be found that there are few cars recorded to have different tyre inflation pressure from the front and rear tyres and the differences are explained in Figure 20. Sadly, there few respondents recorded different inflation pressures for all of their four car tyres.

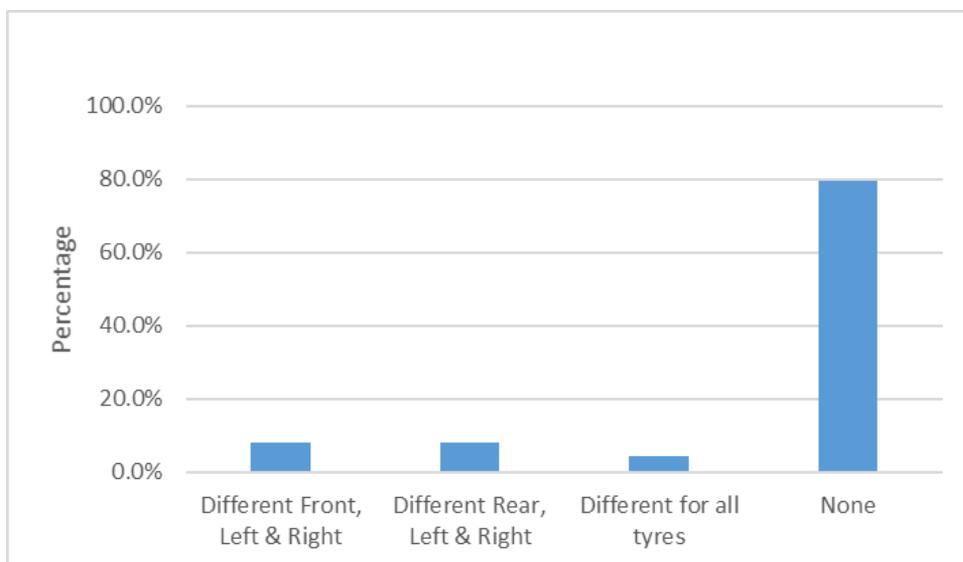


Figure 20 Comparison of tyre pressure recorded for all tyres

Figure 21 shows the range of tyre tread recorded during physical checking sessions. It is found that most of the respondents have a fair tread depth whereby almost more than 90% of them equipped their cars with tyres of more than 3 mm tread depth. The tread depth of above 3 mm is considered a fair tread condition as it is still capable to function well however, the owner must be prepared and ready to change to a new tyre in few

weeks depending on the travel pattern. Below 3 mm tread depth should need to be more careful and aware as the traction may not work as good as before and it is recommended by the tyre manufacturer to change the tyre once its tread reaches below 3 mm. It is illegal for users to ignore and just let their tyres to be bald in Malaysia as it may endanger other road users. Thus, it is recommended to immediately change once the tyre tread reduces to 1.6 mm and below.

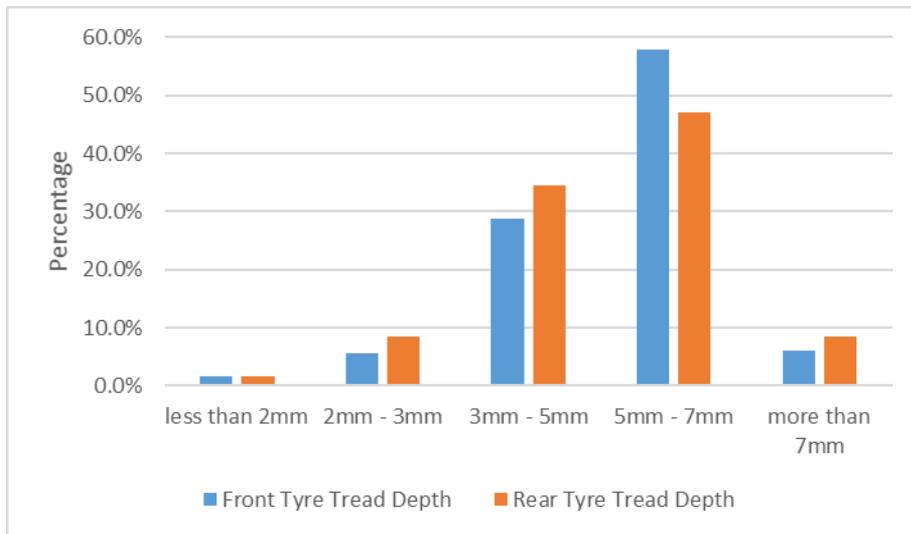


Figure 21 Tyre tread depth recorded during physical checking for car front against rear tyres

Car Users' Knowledge and Practices on Tyre Maintenance in Malaysia

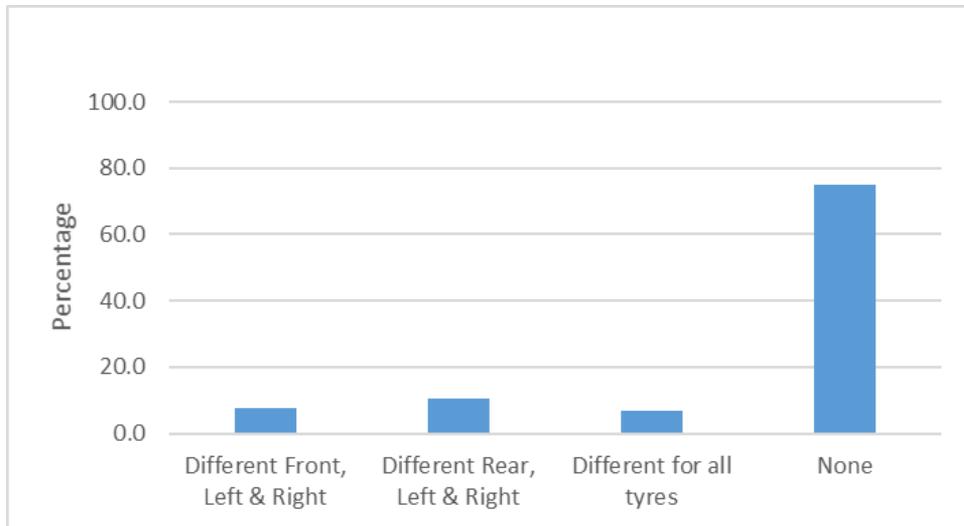


Figure 22 Comparison of tyre tread depth recorded for all tyres

Tread depth normally are different for front tyres against rear tyres as normally users only change their tyres one part (front tyres only or rear tyres only) and it shows in Figure 21 that the value of tread depth for front did not equal to the rear tyres. However, from the recorded tread depth, it is also found that some tyres were found to have a different value of tread depth for each tyre and it shows in Figure 22. It may have the same reason as to why the respondents opt to use different tyre brands for all tyres.

All the tyres conditions were also inspected in terms of its physical condition and the results are tabulated as in Figure 23. 49% of the respondents have fine working tyre conditions. A few have shoulder wear (10.1%) and centre wear tyres (7.3%) due to under-inflated and over-inflated tyres. Tyre ageing and bald are found in 4% of the respondents and most of them are using old tyres which are dated in 2014 and before as shown in Figure 24. These type of tyre conditions may lead to tyre burst and cause road crashes. Therefore, it is compulsory to check and regularly maintain the car tyres and ensure the tyres are always in a roadworthy condition.

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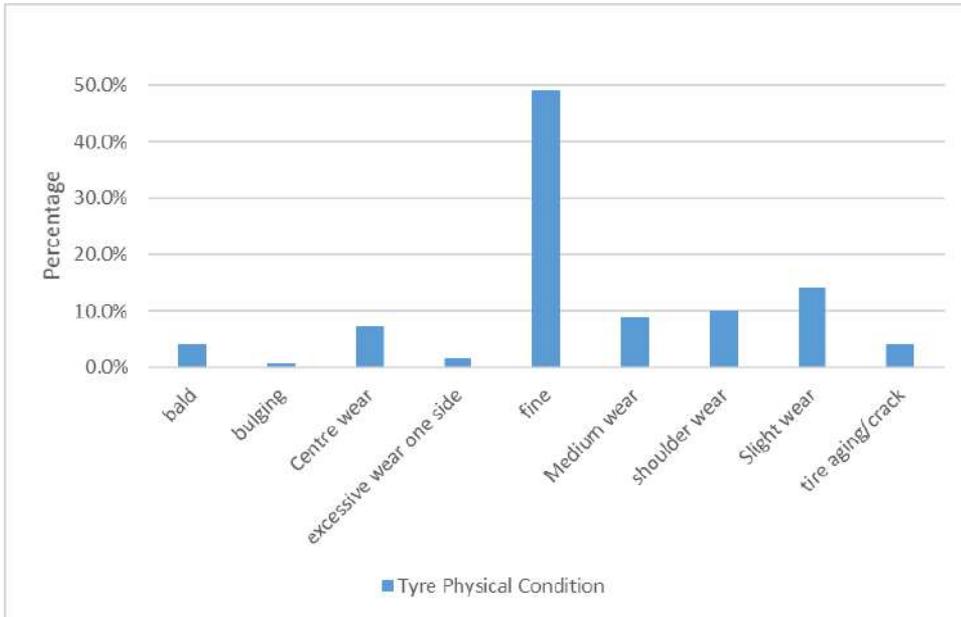


Figure 23 Tyre physical condition recorded from all the inspected cars

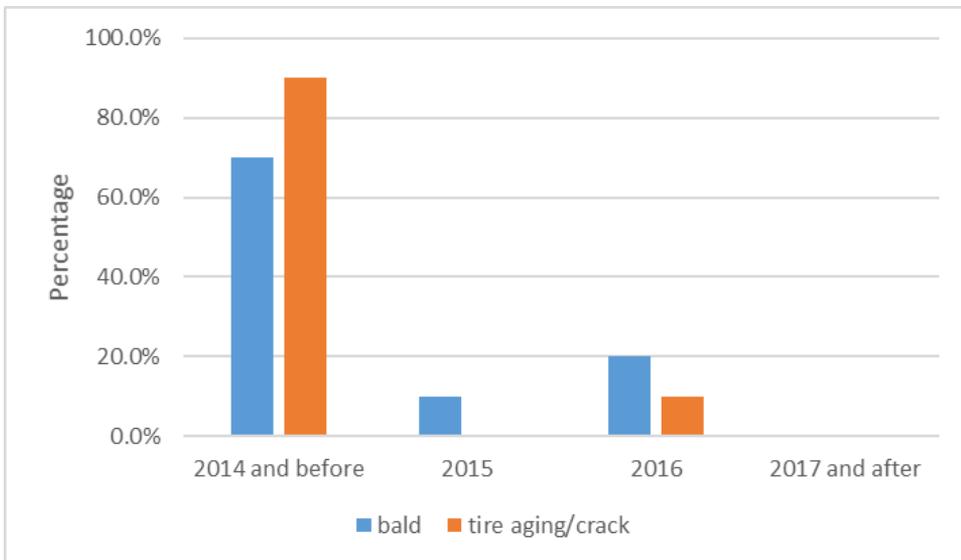


Figure 24 Tyre date compare to bald & ageing conditions of tyres

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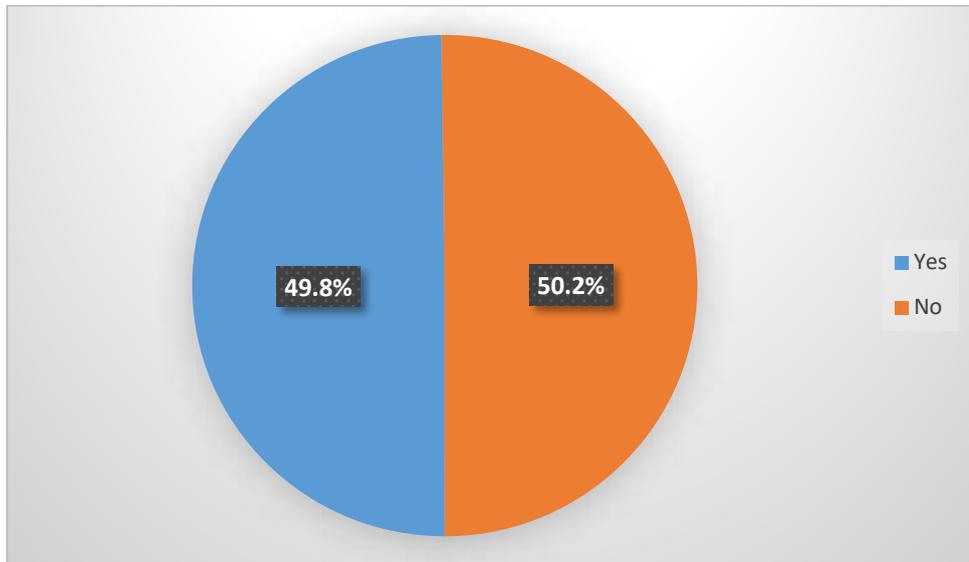


Figure 25 Spare tyre condition check by respondents

At the end of the session, respondents were asked whether or not they check regularly on their spare tyre conditions and the results are shown in Figure 25. Surprisingly, half of the respondents did not check their spare tyre condition and in fact, some of them never check since the first day they used the car while some did not know whether their car is equipped with spare tyre or not. It is important to ensure the spare tyre is in good working condition too as it may be crucial for users if bad occasions with regards to car tyres occur during driving.

4. Conclusion

It is essential for car users to understand the importance of tyre maintenance and to practice an ideal maintenance schedule in order to ensure the tyres are always in good operating condition while maintaining the car roadworthiness and hence, preventing any emergency on the road or road crashes due to tyre failure.

It is also important for car users to learn and understand the information of the tyres in terms of the markings especially on the size, dimensions details, manufacturing date and approval standards so that fraud cases with regards to tyre purchase can be avoided.

Users knowledge on their tyres are still a big concern and it shows when a comparison between interview session and physical checking of their tyre manufacturing date, sizes and recommended sizes gives a significant result which concludes that most of them do not know their tyre information. Moreover, in the image questions part whereby nearly 50% of them do not know the meaning of the symbol on tyre markings especially on "MS" and "E" markings whereby only 36% of respondents managed to answer it correctly.

Despite almost 60% of the respondents claimed that they did fill in air pressure to their tyres every month, only 48% of them have their tyre inflated properly while the others were under-inflated (36%) and over-inflated (16%). The results explained that maybe only half of them know the correct air pressure to fill in their tyres or maybe they filled in air pressure to their tyres, not in cold tyre condition.

On the other hand, results show that less than 50% of them have their tyres in fine conditions. This may due to the majority of them claimed that they only do a quick visual on checking their tyre tread condition which is why they do not notice the wear pattern on their tyres. Apart from that, 50% of the respondents did not check their spare tyre

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condition which shows that users' practices in maintaining their tyres are also a big concern.

In summary, these results indicate that car users need more educational programs and awareness campaign in terms of tyre information and its maintenance practices so that they would understand better and are aware of the importance of tyre maintenance and thus, allow them to ensure their tyres are always in good condition while maintaining their car roadworthiness.

In addition, it is best to start the correct way of tyre maintenance practices from day one. In current Driving Education Curriculum (DEC) in Malaysia, the checking part on the tyre were explained in general while no detail explanation on tyre information in terms of tyre symbols, markings, conditions, authenticity, re-tread or fake tyres and other important information (RTD, 2014). Thus, it is recommended that tyre maintenance knowledge and practices be elaborated more in current DEC.

Furthermore, responsible parties should look into the possibility of mandating the use of Tyre Pressure Monitoring System (TPMS) in every vehicle in Malaysia as this device have the ability to determine tyre pressure as well as its conditions while driving and potentially help in avoiding crashes due to tyre failure. Comprehensive study is needed to assess its practicality with regards to Malaysia situation.

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Research Report

Car Users' Knowledge and Practices on Tyre Maintenance in Malaysia

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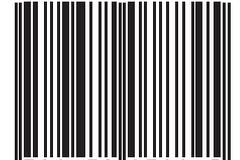
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ISBN 978-967-2078-84-5



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