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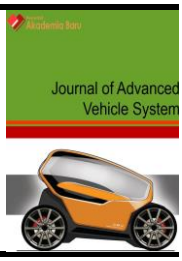

Malaysian Cyclist: How visible they are

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ABSTRACT

Nowadays, cycling become a trend among Malaysian and their safety issues have drawn attention of the government as well as enforcement agencies especially when they are cycling on the street. Over 90% of the cyclist are cyclist for leisure or physical sport activities and age group 26 to 45 years old. Previous study shows over 40% from them likely to cycle at main carriageway and road shoulder. Therefore, this paper explores how visible the cyclist in major road in Malaysia. These results would provide fundamental information relating to distribution of cyclist formation on road and cyclist gear in terms of visible aids usage. In return the finding would be beneficial in identifying proper countermeasures increase safety of the cyclists and enhance the road traffic enforcement.

Keywords:
On-street cyclist; Cyclist formation; Visible aids;

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1. Introduction

Cyclist as one of the vulnerable road users has been a challenging road safety component in many countries, especially in Asia. In regard to cycling safety in Malaysia, lack of lane infrastructures and facilities, among other factors, has really put them in an undesirable situation, with the high number of crash involvements and crash injuries. At present, cyclists' safety issues have led the government to enhance road traffic rules enforcement activities, in order to increase their safety on the roads. Efforts to provide more cycle lanes have been going on for some times in residential and recreational areas, in many localities, to encourage people to cycle for health and safety.

Pandemic Covid-19 giving more pressure on human activities globally. People not only have to live a new normal life, but even some have limited their activities, including social activities such as sports and leisure. Since the MCO directive was issued, several sports centres such as gyms have been closed. This indirectly affects Malaysians to be more inclined towards cycling. Recently safety involving cyclists is increasingly taken seriously by the government. This includes the government reemphasized the rule to strictly prohibit cyclists to use the highway roads and a fine up to RM1,000.00 would be imposed if disobeyed (M-Star, 2020) The government also conducts "Op-Sikal" for cyclists in ensuring they comply with traffic laws and from 2019 until August 2020, a total of 222

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summonses were issued by the RMP nationwide against cyclists (Hadzman, 2020) Furthermore, according to Rules 35, the bicycle should be equipped with a white light on the front and a red light on the rear (Road traffic rules 1959 (LN166/1959)).

The previous study shows over 70% of cyclist in Malaysia was an on-road cyclist. They also tend to cycle at the main carriageway and road shoulder. Furthermore, the majority of the cyclist lives in urban area with a percentage of 85.3. Since this group of cyclists is the domain group and they usually must share the cycling path with other motor vehicle, cyclist safety should attain great concern. Study by Du W, 2014 shown that cyclists are more vulnerable to fatality in road crashes.

2. Study Objective

This research aims to describes how visible on-street cyclist in Malaysia.

3. Methodology

Data on-street cyclist (Figure 1) in this study obtained from roadside observations. Observers were located at the selected locations in Kuala Lumpur and Selangor including high-speed road and major road at the city centre and residential area during the weekends from 0700 until 0900 hours. The observers will record their observation manually into developed observation form. The observation form consists of the cyclist formation, shirt colour, the colour of helmet used and usage of bicycle light blinker or reflective aids at rear or front of their bike. To avoid the colour conflicts and control the data quality, only two observers were placed throughout the study period. The colour in this study was group into two; bright (light colour such as yellow, green, blue, or cyan, orange) and dark (black, brown, red).

Figure 1: On-street cyclist

4. Results and Discussion

This study conducted roadside observations to assess the visibility of cyclist while on the road. In total, about 757 (n value) of the cyclists was observed in the study (Figure 2). Out of this number, 88.9% (673) was male while 11.1% (84) was female. This finding is supported other study by John Parkin (2008) and Cleary (1996) which most of the cyclist was male. Males were more likely than females to cycle for recreation and transportation, and they cycled for longer periods of time. Men were also more likely to cycle on-road (Kristiann C Heesch, 2012) (Perry, 2017) (Boucher, 2016).

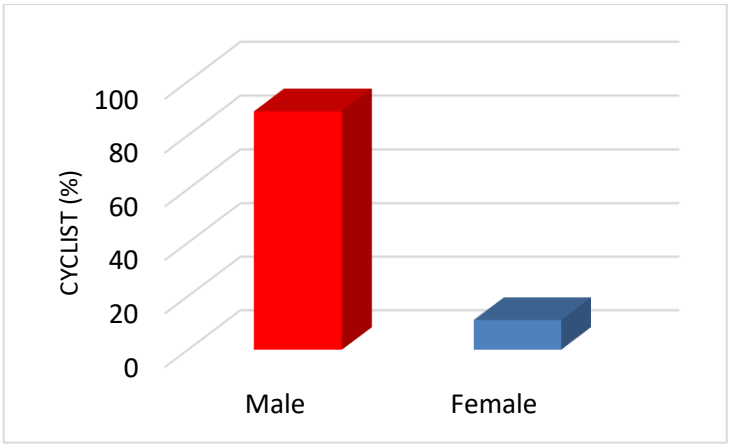

Figure 2: Cyclist gender

4.1 Cyclist Formation

The study also observes the formation of cyclist during cycling on the street (Figure 3). Observation found (Figure 4), over 44.4% (336) from them likely to cycling in solo or alone, 26.4% (200) from them likely to cycling in couple or group of two and 29.2% (221) likely to cycling in form of a big group (more than 2 cyclists). Thus, can conclude most of the cyclist unlikely to cycling alone. These could improve their overall road safety. Each rider is responsible for the safety of the others. The only way for a group to ride securely together is for the riders in the front and back to act as the group's ears and eyes, and for messages to be sent through the lines. When the lead cyclist notices a pothole, signal it before others go around it so that the rider behind you is aware of what you're about to do and can avoid the hole as well as another impediment, parked car, etc. (Ballinger, 2020). According to other studies, cyclists who draft with the group can save up to 40% on energy expenditures compared to cyclists who do not draft with the group. A cyclist must be as near to the bicycle in front of him as feasible to be efficient at drafting. (Doherty, n.d.)In additional, it also will keep cyclist safer and help them to have more fun out on the road (Green, n.d.). Figure 5 below shows the group of cyclists stop at the road shoulder due to bicycle technical failure.

Figure 3: Cyclist formation on-street ‘solo, couple/group of 2 and more than 2’

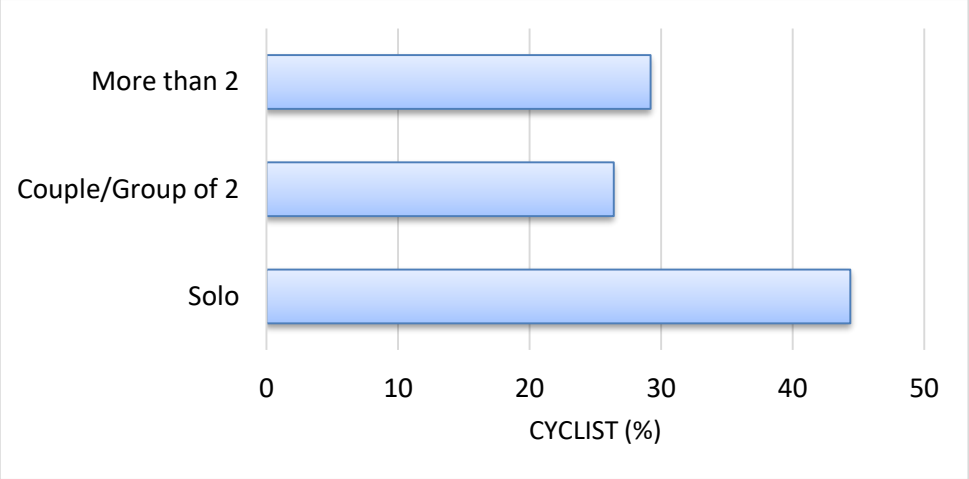

Figure 4: Trend of cyclist formation on-street

Figure 5: Group of cyclists stop at shoulder due to technical failures.

4.2 Role of Colours

The study showed no significant difference between the number of riders who wear dark clothes and bright (Figure 6). The observation shows that 52.3% (396) of them wear dark shirts while cycling. Likely all high-speed road cyclist wears a safety helmet. Fortunately, the different trend shows at urban or city roads especially at the city centre and residential area where most of the cyclist did not wear a helmet. Meanwhile, 47.7% (361) of them wear bright shirts. In contrast, 52.4% (397) of them wear bright helmets and only 47.6% (360) wear dark helmets. Although no studies have been conducted to determine which color generates the best contrast, the bright color is a suitable choice because it is often used on highway safety and construction signs (i.e., drivers associate it with danger) and is more apparent to drivers. However, fluorescents simply do not work at night, when there is no natural sun for the fabric to reflect (Lindsay, 2017) (Mapstone, 2006). Figure 7 below

shows the driver view during raining and night-time whereas the weather conditions result in the limitation of driver view. This finding is supported by other study by Guptab, 2013.

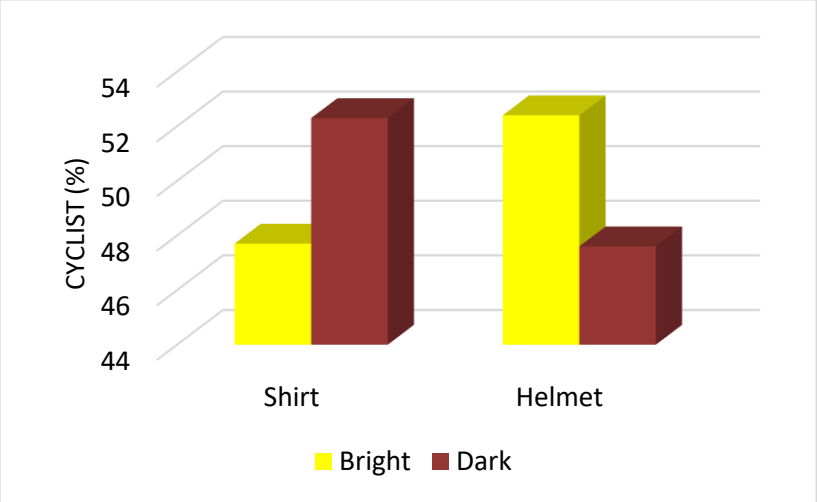

Figure 6: Trend of cyclist gear colour

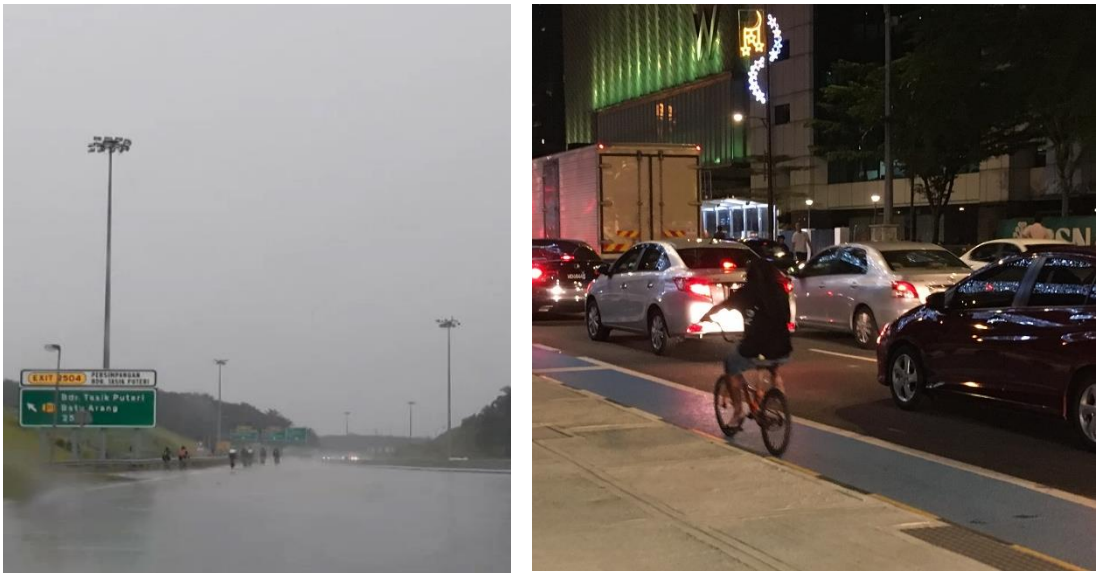

Figure 7: Driver view during raining and night-time

Other New Zealand investigations evaluated the length of time spent in crashes involving a cyclist and a motor vehicle. They discovered that cyclists who did not wear fluorescent cycling gear spent eight times as much time away from the cyclists who did (SJ Thornley, 2007) .

4.3 Bicycle Head and Rear Lights

As a preventative measure against bicycle accidents, road lighting must include appropriate obstacle detection in addition to increasing cyclist visibility to other road users (Steve Fotios H. Q., 2016). Bicycle lights, on the other hand, can play a significant role in encouraging and making cycling safer after dark. Although one of the functions of these bike lights is to increase the visibility of the

cyclist to other road users, another function of the front light is to highlight the path ahead to aid in hazard detection (Steve Fotios J. U., 2019). While Malaysian law requires the use of lights on the bicycle, but studies show low compliance rates. Figure 8 below presented the use of bicycle lights among cyclists. It is unfortunate to discover that the usage of light or blinker at the cyclist's bicycles were quite low, 39.6% (299). The study found cyclist likely to equip their bicycle with either front or rear light, 0.3% (2) and 34.9% (264) respectively. Surprisingly result also found only 4.4% (33) of cyclist equipped their bicycle with light at the booth (front and rear). Meanwhile, 60.5% (458) of cyclist did not equip their bicycle with any lights. This is contrary with (Wood, 2012) who mentioned that as a cyclist, they are encouraged to increase their visibility on the road. They also should increase their brightness and use visibility aids. Bicyclist clothing significantly affected driver's response and attention to bicyclists.

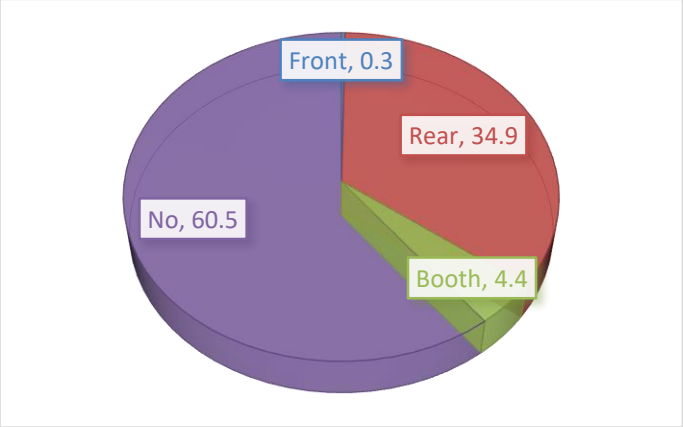

Figure 8: Rate of usage bicycle lights

Brands have made significant progress in boosting the output and reducing the weight of their bike lights during the last decade. The switch to efficient LED lighting, which emit far less light per watt than earlier halogen or metal-halide bulbs, and lithium batteries, which pack more power into smaller packages, are driving this improvement. As a result, smaller, lighter systems can produce brighter lights with equivalent or longer run times. Many of the lights will make the journey easier and safe.

5. Conclusions

Malaysian cyclist likely to cycling at main carriageway and road shoulder especially at high-speed road and major road (city centre and residential). They also most likely exposed to risk when cycling at shared path with motor vehicles. Study also found most of the cyclist are likely to cycle in group rather than cycling alone. Therefore, it is important to measure and evaluate how visible they are on-street to ensure their safety. On the other hand, this study also shows even Malaysian traffic law requires the use of lights on the bicycle, but studies show low compliance rates. Literature also advise cyclist to wear fluorescent shirt in order to increase their visibility.

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References

[1] Ballinger, A. (2020). How to cycle in a group: Essential guide to group cycling. Retrieved from Cycling Weekly: https://www.cyclingweekly.com/fitness/training/guide-group-cycling-119044

[2] Boucher, T. (2016). The Science Behind Cycling's Enormous Gender Discrepancy. Retrieved from Cool Green Science:https://blog.nature.org/science/2016/08/29/the-science-behind-cyclings-enormous-gender-discrepancy/

[3] Cleary, H. M. (1996). Cycle facilities and cyclists' safety: Experience from Greater Nottingham and lessons for future cycling provision. *Transport Policy*, 67-77.

[4] Doherty,P.(n.d.). *ScienceCycling*. Retrieved from Ecploratorium: https://www.exploratorium.edu/cycling/aerodynamics2.html

[5] Du W, Y. J. (2014). Epidemiological profile of hospitalised injuries among electric bicycle riders admitted to a rural hospital in Suzhou: A cross-sectional study. *Injury and Prevention*, 128-133.

[6] Green, S. (n.d.). *10 Rules to Group Ride Like a Pro*. Retrieved from active.com: https://www.active.com/cycling/articles/10-rules-to-group-ride-like-a-pro

[7] Guptab, N. C. (2013). Analysis of Driver Behaviour and Crash Characteristics during Adverse Weather Conditions. *2ndConference of Transportation Research Group of India (2nd CTRG)*, 1048-1057.

[8] Hadzman, M. (2020). *Penunggang basikal tidak terlepas tindakan undang-undang.* Kuala Lumpur: Utusan Malaysia.

[9] John Parkin, M. W. (2008). Estimation of the determinants of bicycle mode share for the journey to work using census data. *Transportation*, 93-109.

[10] Kristiann C Heesch, S. S. (2012). Gender differences in recreational and transport cycling: a cross-sectional mixed-methods comparison of cycling patterns, motivators, and constraints. *International Journal of Behavioral Nutrition and Physical Activity* .

[11] Lindsay, J. (2017). *The Science of Being Seen: A Guide to Safer Riding*. Retrieved from Bicycling: https://www.bicycling.com/bikes-gear/g20017365/the-science-of-being-seen-a-guide-to-safer-riding/

[12] Mapstone, K. I. (2006). *Interventions for increasing pedestrian and cyclist visibility for the prevention of death and injuries.* Cochrane: John Wiley & Sons, Ltd.

[13] M-Star. (2020, 9 18). Ingkar larangan berbasikal di lebuh raya, penunggang berdepan denda sehingga RM 1,000. Retrieved from https://www.mstar.com.my/lokal/semasa/2020/09/18/ingkar-larangan-berbasikal-di-lebuh-raya-penunggang-berdepan-denda-sehingga-rm-1000

[14] Perry, J. (2017). *Cycling and gender: how and why male and female cyclists need to train differently*. Retrieved from Cycling Weekly: https://www.cyclingweekly.com/fitness/cycling-and-gender-how-and-why-male-and-female-cyclists-need-to-train-differently-344365

[15] SJ Thornley, A. W. (2007). Conspicuity and bicycle crashes: preliminary findings of the Taupo Bicycle Study. *Injury Prevention*, 11-18.

[16] Steve Fotios, H. Q. (2016). A pilot study of road lighting, cycling lighting and obstacle detection. *Lighting Research and Technology 49(5)*, 1-17.

[17] Steve Fotios, J. U. (2019). The influence of road lighting on cyclist numbers and safety. *Proceedings of the 29th Quadrennial Session of the CIE*, 68-76.

[18] Wood, J. M. (2012). Using reflective clothing to enhance the conspicuity of bicyclists at night. *Accident Analysis & Prevention*, 726-730.