

The Relationship Between Technology Acceptance Factors and Ride E-Hailing Service Adoption

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Abstract

The rapid growth of app-based e-hailing services has reshaped mobility patterns in urban areas by offering flexible, on-demand travel options, yet persistent issues related to user safety, digital capability, and data privacy remain particularly relevant in developing towns such as Batu Pahat. This study investigates the extent of technology acceptance among youths in Batu Pahat, examines their level of ride e-hailing usage, and analyses the association between acceptance factors and service adoption. A quantitative survey design was employed, involving 303 youth respondents and a structured questionnaire measuring perceived ease of use, perceived usefulness, and user attitudes. Data were analyzed using descriptive statistics and Spearman's rho correlation. The results show that youths in Batu Pahat demonstrate strong acceptance of e-hailing applications and favorable attitudes toward their use, with statistically significant and positive relationships identified among ease of use, usefulness, and attitude variables ($p < 0.01$). Overall, the findings indicate that usability and functional value are central in shaping youth acceptance of e-hailing services in semi-urban contexts, and they offer practical direction for service providers to enhance digital inclusion, user confidence, and the effectiveness of app-based transport systems, while encouraging future research explore the model's expansion through the integration of additional variables, including trust, perceived risk, social influence, and cost considerations.

1. Introduction

Digital technologies have transformed the transportation sector, with e-hailing services such as Grab, inDriver, and AirAsia Ride offering a convenient alternative to traditional taxis. These platforms use mobile applications to connect drivers and passengers in real time, providing features such as location tracking, fare estimation, and digital payments (Rayle *et al.*, 2016). E-hailing services are particularly popular among youths, who are more digitally literate and receptive to new technologies (Alemi *et al.*, 2018). In Malaysia, their adoption is increasing due to urbanization, traffic congestion, and the high cost of car ownership (Ndiomewese, 2018). However, most studies focus on major cities, with limited research on smaller urban areas such as Batu Pahat.

Batu Pahat, the second most populous district in Johor, is undergoing rapid urban development and growing transportation demand, making it a suitable location to examine youth adoption of e-hailing services (Mazlin Basir, 2023; Ismail & Ambak, 2021). This study is significant in several aspects. Academically, it extends the TAM framework within a localized, semi-urban Malaysian context. Practically, it provides e-hailing providers with insights to better tailor their platforms to youth preferences. Additionally, the findings may assist service

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providers and urban planners in formulating inclusive digital transportation strategies aligned with Malaysia's digital economy and urban mobility goals.

Digital technologies have changed a lot of industries, including transport (Kartsan & Mavrin, 2022). The rise of ride-hailing services like Uber, Grab, and DiDi is due to mobile connectivity and the widespread use of smartphones. These services offer flexible, app-based, on-demand transportation. Due to urbanisation, traffic problems, and the growing need for personalised transportation options, these services have become very popular in Southeast Asia. Grab has features like cashless payments, GPS tracking, fare estimates, and driver ratings to ensure ease of use, making this application more famous in Malaysia (Southeast Asia Infrastructure, 2024). Malaysia supports digital transformation on a national level with policies like the National Transport Policy 2019–2030 and the MyDIGITAL Blueprint. These policies encourage the use of digital technology in public services, such as transport. Ride-hailing is very popular in cities like Kuala Lumpur and Johor Bahru, but in smaller towns like Batu Pahat, where the population is more urban, the patterns of use are different. People in these areas may be more or less likely to use the platform depending on how familiar they are with technology, how useful they think it is, how much they trust the platform, and their socio-economic status.

The Technology Acceptance Model (TAM) by Davis (1989) is used to explain these differences. It focusses on Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as the main factors that affect whether people adopt technology. This study's main goal is to look at the link between TAM variables and youth in Batu Pahat use of ride-hailing services. The goal is to add to the academic and practical conversation about digital mobility. Youths, often early adopters of digital platforms, face worries about e-hailing service such as inconsistent regulatory enforcement, safety concerns, and limited trust in driver credibility (Pretorius, 2022). Reports of crimes involving e-hailing services have led to public anxiety and distrust (The New Straits Times, 2017; Roughton, 2020). Additionally, digital trust issues influenced by family or members with lower digital literacy further affect adoption decisions (Maryum, 2019). Despite built-in security features, passengers still encounter privacy issues, ranging from data misuse to inappropriate driver behavior (Md Isa *et al.*, 2024; Sinar Daily, 2024; Hirson, 2015). Such concerns highlight that privacy and safety encompass both digital and interpersonal elements. Moreover, the determinants of e-hailing adoption in developing regions like Malaysia differ significantly from those in developed nations due to infrastructural and regulatory limitations (Lee & Wong, 2021a; Nguyen-Phuoc *et al.*, 2020). Therefore, this study aims to examine how perceived usefulness and ease of use that act as key components of the Technology Acceptance Model, influence the adoption of e-hailing services among youths in Batu Pahat, thereby addressing a critical gap in the current understanding of mobility in semiurban contexts.

Therefore, to achieve the research objectives, the level of technology acceptance factors and e-hailing service adoption among youth in Batu Pahat are determined. Consequently, the relationship between technology acceptance factors and the adoption of ride e-hailing services is identified.

2. Literature Review

The literature review section describes all relevant literature related to the adoption of e-hailing services and the Technology Acceptance Model (TAM). The review focuses on the components of TAM, including Perceived Usefulness and Perceived Ease of Use, and how these factors influence users' attitude towards technology-based services.

2.1 E-Hailing System

E-hailing systems, also known as ride-hailing or ride-sourcing services, have revolutionized the transportation industry by connecting drivers and passengers via mobile apps equipped with GPS tracking, fare estimates, digital payments, and user feedback. In Southeast Asia, Grab dominates the market, alongside global players like Uber and Lyft (Rayle *et al.*, 2016). The rise of mobile technology and widespread internet access have made these services easily accessible, eliminating the need for traditional taxi-hailing or advance bookings (Olayode *et al.*, 2023). Younger, educated, and urban populations are the primary users of e-hailing services due to factors such as convenience, affordability, urban congestion, and the high cost of car ownership (Hoang-Tung *et al.*, 2022; Ndiomewese, 2018). Youth, including college students and early-career professionals, mostly to use e-hailing service due to their digital literacy and openness to innovation (Alemi *et al.*, 3 2018). Their preferences are shaped by service efficiency, pricing, and usability (Yuan *et al.*, 2025; Zulaikha *et al.*, 2022). Despite its advantages, the e-hailing sector faces concerns about safety, including incidents of harassment and misconduct, particularly affecting female passengers (Wang *et al.*, 2025). Nevertheless, the flexibility, user-friendly interfaces, and ability to complement inadequate public transport continue to drive its popularity. Overall, e-hailing signifies a major shift in mobility, especially for digitally savvy youth, highlighting the transformative power of digital convenience in daily life.

2.2 Regulatory Framework of E-Hailing in Malaysia

The rapid growth of e-hailing services in Malaysia initially operated in a legal grey area, raising concerns regarding safety, fairness, and regulatory oversight. In response, the Malaysian government introduced formal regulations to ensure accountability and public safety (Md Isa *et al.*, 2024). In 2017, amendments to the Land Public Transport Act 2010 and the Commercial Vehicles Licensing Board Act 1987 officially recognized e-hailing as a legal mode of public transport under the jurisdiction of the Land Public Transport Agency (APAD). This was followed in 2019 by a requirement for e-hailing drivers to obtain a Public Service Vehicle (PSV) license, which includes background checks, medical examinations, and mandatory approved training (Salim *et al.*, 2020). In addition, e-hailing vehicles must undergo annual PUSPAKOM inspections, carry special insurance coverage, and platforms are required to register with SPAD, ensure transparent data management, and implement driver rating systems to enhance service safety and accountability (Salleh *et al.*, 2021). These regulatory measures aim to align e-hailing services with traditional taxi standards and create a safer, more regulated environment for users.

2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM), introduced by Davis (1989), is one of the most widely used models to explain user behavior toward adopting new technologies. This study focuses on three key constructs: Perceived Ease of Use (PEOU), Perceived Usefulness (PU), and attitude towards e-hailing service adoption.

2.3.1 Perceived Ease of Use

Defined by Davis (1989), perceived ease of use (PEOU) is the degree to which a person feels using a given system will be free of effort. Within the framework of e-hailing services, PEOU refers to the simplicity of app download, account creation, ride booking, payment processing. Studies have repeatedly shown that users' intention to adopt e-hailing services is much influenced by perceived ease of use. (Maruf *et al.*, 2021; Suhud *et al.*, 2019). For example, Yan *et al.* (2024) found that Malaysian university students were more likely to use e-hailing apps when they thought they fit their lifestyle and perceived them as convenient. Four basic elements of PEOU are simplicity, comprehension, user-friendly, and accessible are found by Tandon *et al.* (2021). Nguyen-Phuoc *et al.* (2021) underlined the role of mobile app design that have a user-friendly interface and simple navigation greatly improve perceived ease of use.

2.3.2 Perceived Usefulness

Davis (1989) defined perceived usefulness (PU) as the degree to which a person feels using a given system enhances their performance or daily activities. PU in the context of e-hailing services relates to the supposed advantages including time savings, convenience, dependability, and low transportation costs. Research repeatedly shows a strong positive relationship between PU and consumers' intention to adopt e-hailing services. According to Lu and Wang (2020), users see e-hailing service as a solution for typical problems with conventional transportation including long wait times, parking scarcity, and 4 unpredictable prices. Faster arrivals, route customizing, and better service quality help to contribute to a better user experience. For urban users in Malaysia who rely on e-hailing because of traffic congestion and limited parking, perceived usefulness is significant (Goel & Halder, 2020). The integration of digital payment systems like Alipay and WeChat Pay's enhances perceived usefulness (Long *et al.*, 2023). Another important aspect of PU is economic gains (Adji and Bernarto, 2024). Especially for budget-conscious consumers, discounts and loyalty programs raise the apparent value of ride-hailing services.

2.3.3 Attitude Towards E-Hailing Service Adoption

Attitude refers to an individual's positive or negative evaluation of performing a specific behavior activity (Ajzen, 1991). Within the framework of e-hailing, ride-hailing attitude reflects consumers' general impressions of the reliability, cost-effectiveness, safety, and convenience of the offering. Attitude is a fundamental component of both the extended Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB), and influences behavioral intention and actual adoption of technology significantly. Davis (1989) suggests that attitude moderates the link between behavioral intention, perceived ease of use, and perceived usefulness. Arora *et al.* (2022) found that users' positive attitudes toward e-hailing apps are largely driven by their perceptions of the apps' usefulness and ease of use. For example, when users believe that a ride-hailing app is easy to use and brings value to their daily lives, they are more likely to develop a favorable attitude toward using it (Shamim *et al.*, 2021). Similar results also found by Palos- Sanchez *et al.* (2021) where user attitudes showed significant positive relationship between perceived ease of use and attitude. However, several studies show negative perceived ease of use by consumer and cause unfavorable attitude towards e-hailing service. According to some research, complex apps cause negative attitudes and lower intention to reusing the service (Aw *et al.*, 2019). Rahmawati

and Marsasi (2025) also found a insignificant link between attitude and perceived ease of use. Thus, these conflicting findings point to the need of more research.

2.4 Conceptual Framework

The conceptual framework in Fig. 1 examines the factors influencing users' attitudes toward the adoption of e-hailing services. It is based on the Technology Acceptance Model (TAM), which highlights perceived ease of use and perceived usefulness as key determinants of technology acceptance model.

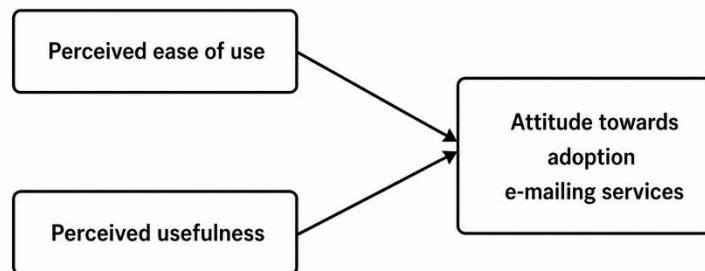


Fig. 1 Conceptual Framework

3. Research Methodology

This study uses a quantitative research method, which is a survey, to gather numerical data for statistical analysis. This survey aims to assess variables such as, Perceived Ease of Use (PEOU), Perceived Usefulness (PU) and attitude towards e-hailing adoption to test hypotheses and investigate the links between TAM components and the adoption of e-hailing services among youths in Batu Pahat.

3.1 Research Instruments

The primary research instrument for this study is a structured questionnaire. The questionnaire consists of three sections, which are Section A, Section B, and Section C. Section A consists of seven elements, which are gender, age, race, educational level, employment status, since when use of ride-hailing, and frequency of using ride-hailing apps. Meanwhile, for Section B evaluates the level of technology acceptance among youth in Batu Pahat based on perceived ease of use and perceived usefulness of e-hailing services. This section was adapted from Elnadi & Gheith (2022); Lee & Wong (2022); Min *et al.*, (2019). Lastly, Section C evaluates relationship of e-hailing consumers attitude based on TAM theory.

3.2 Population and Sample

This study targets youth aged 15 to 40 in Batu Pahat, Johor, aligning with Malaysia's National Youth Policy and recognizing this group's active engagement with smartphones and digital technology, making them ideal participants for research on e-hailing service adoption. Batu Pahat was chosen due to its status as a rapidly growing urban centre with rising transport needs and increasing use of mobility solutions like e-hailing (Ismail & Ambak, 2021). It is also the second most populous district in Johor, reinforcing its relevance for this study (Mazlin Basir, 2023). Prior studies in Batu Pahat and similar areas have successfully examined youth technology adoption, providing a methodological precedent (Ismail & Ambak, 2021; Aiman & Rashid, 2023; Yan *et al.*, 2024). The sample size was determined using the Krejcie & Morgan (1970) method, identifying 384 respondents as sufficient for a population of approximately 120,000 youths, ensuring statistical validity with a 95% confidence level and 5% margin of error. Purposive sampling was employed for the sampling method.

3.3 Pilot Study

To evaluate the dependability and clarity of the research instrument before the full-scale data collecting, a pilot study comprising fifteen respondents aged 15 to 40 from Batu Pahat was carried out. The pilot study aims to guarantee that the questionnaire to measure variables which is Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Attitude towards e-hailing adoption are reliable and understandable by the respondents. Cronbach's Alpha reliability analysis allowed SPSS to assess the internal consistency of the questionnaire items. A Cronbach's Alpha value of 0.7 considered acceptable. (Bonett & Wright, 2015).

3.4 Data Analysis

This study employs both descriptive and inferential data analysis methods to address its research objectives. Descriptive analysis is used to identify the level of technology acceptance and the ride e-hailing service adoption among youth in Batu Pahat, providing a clear overview of user perceptions and usage patterns. Meanwhile, inferential analysis is applied to examine the relationship between technology acceptance and the adoption of e-hailing services. This approach allows the study to not only describe current trends but also determine the strength and significance of the association between key variables.

4. Results and Discussion

4.1 Response Rate

The target population for this study consisted of 380 individuals, of whom 303 completed and returned the questionnaires, resulting in a response rate of 79.7% ($303/380 \times 100$). This response rate is considered adequate and desirable in social science and quantitative research, as higher response rates improve sample representativeness and reduce the risk of nonresponse bias. Studies in social science research generally regard response rates above 60% as sufficient for reliable analysis and generalizable findings (Reisner, n.d.). Therefore, the achieved response rate of 79.7% reflects strong participation and provides a reliable basis for further statistical analysis and interpretation of the study's findings.

4.2 Reliability Test

Table 1 shows the result of the reliability test of the research instrument. The reliability test was conducted to assess the consistency and validity of the questionnaire items used in this study. Cronbach's Alpha was employed as the measure of reliability, with a value of 0.7 or higher considered acceptable for social science research (Fadzil, 2021). All the variables for pilot study exceeds 0.6 Cronbach's Alpha, indicating a high level of correlation between variables. Actual data for independent variables, perceived ease of use, recorded Cronbach's Alpha of 0.925, showing strong reliability in assessing the level of perceived ease of use of e-hailing service. Perceived usefulness scored 0.885, indicating good consistency in evaluating respondent's perception about the value of e-hailing services. Attitude achieved a Cronbach's Alpha 0.871, confirming that the measures of attitude, perceived ease of use, and perceived usefulness are highly reliable.

Table 1 Reliability test results

Construct	Number of items	Pilot test	Actual study
Perceived ease of use	4	0.682	0.925
Perceived usefulness	5	0.787	0.883
Attitude	4	0.858	0.871

4.3 Normality Test

The Kolmogorov-Smirnov test and the Shapiro-Wilk test were used to assess the data. The data analyze both independent and dependent variables to ensure more accurate results for this test. Table 2 shows the result of Kolmogorov-Smirnov test. This study employed Kolmogorov-Smirnov test. The Kolmogorov-Smirnov test for attitude resulted in a test statistic of 0.138, perceived ease of use 0.123 and perceived usefulness 0.153. All the variables have a p-value < 0.01. Since the p-value is less than the 0.05 threshold, the null hypothesis of normality is rejected. This shows that the data does not have a normal distribution.

Table 2 Normality test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Attitude	0.138	303	<0.01	0.884	303	<0.01
Perceived Ease of Use	0.123	303	<0.01	0.946	303	<0.01
Perceived Usefulness	0.153	303	<0.01	0.868	303	<0.01

4.4 Descriptive Statistics of Demographic

The demographic profile of the 303 respondents showed that the majority were female (69.6%), aged 21–25 years (57.1%) and identified as Malay (46.2%). In terms of education, most respondents held a Bachelor's degree (54.5%), while the largest group regarding employment status was unemployed (55.4%). For ride-hailing

experience, the majority reported using these services for one to three years (37.0%) and mostly use the service occasionally (45.2%).

4.5 Descriptive Analysis of Variables

Table 3 presents the summary of the descriptive statistics of the study. Based on Table 4, which shows the level of measurement in descriptive analysis, all the variables, including perceived ease of use, perceived usefulness, and attitude, show a high level of mean, indicating a positive and significant influence of perceived ease of use and perceived usefulness on respondents' attitude towards e-hailing services.

Table 3 Summary of descriptive analysis

Variables	N	M	SD	Level
Perceived ease of use	303	4.2277	.63731	High
Perceived usefulness	303	4.0917	.62075	High
Attitude	303	4.2318	.64471	High

Table 4 Level of measurement in descriptive analysis

Mean Score	Interpretation
1.00-2.33	Low
2.34-3.67	Moderate
3.68-5.00	High

4.6 Spearman's Rank Correlation Coefficient

Table 5 presents the findings of Spearman's rank correlation analysis which investigates the relationships between attitude, perceived ease of use, and perceived usefulness. The findings indicate a strong positive correlation between attitude and perceived ease of use ($r = 0.675$, $p < 0.01$), indicating that respondents who saw ride-hailing applications as easy to use showed positive attitudes towards how they were used. Additionally, a moderate positive relationship was observed between attitude and perceived usefulness ($r = 0.561$, $p < 0.01$), indicating that higher perceptions of usefulness are associated with higher favorable attitudes toward ride-hailing services. The correlation between perceived ease of use and perceived usefulness was determined to be positive ($r = 0.692$, $p < 0.01$), indicating that respondents who viewed ride-hailing services as simple to use were also more inclined to view them as useful. All correlations were statistically significant at the 0.01 level, indicating substantial relationships among the variables.

Table 5 Correlation Test Results

		Attitude	Perceived ease of use	Perceived usefulness
Attitude	Correlation Coefficient	1.000	0.675**	0.561**
	Sig. (2-tailed)	--	0.000	0.000
	N	303	303	303
Perceived ease of use	Correlation Coefficient	0.675**	1.000	0.692**
	Sig. (2-tailed)	0.000	--	0.000
	N	303	303	303
Perceived usefulness	Correlation Coefficient	0.561**	0.692**	1.000
	Sig. (2-tailed)	0.000	0.000	--
	N	303	303	303

Table 6 illustrates a summary of the decisions testing the three hypotheses developed in this research study. Based on the hypotheses testing, all the hypotheses were accepted, and all accepted hypotheses were included in the model. Thus, all research questions were answered.

Table 6 Summary of Hypothesis Finding

No	Hypotheses	Result	Accept/Reject
H1	Perceived ease of use has a positive effect on youth attitude towards e-hailing service adoption.	Significant	Accepted
H2	Perceived usefulness has a positive effect on youth attitude towards e-hailing service adoption	Significant	Accepted

5. Conclusion

This section addresses the first research objective: to identify the level of technology acceptance among youths in Batu Pahat using the Technology Acceptance Model (TAM) constructs of perceived ease of use and perceived usefulness. Descriptive analysis indicates that both constructs recorded high mean scores, showing a high level of acceptance of e-hailing services. The findings suggest that youths perceive e-hailing applications as easy to use and useful for improving travel efficiency, saving time, and providing convenient access to transportation. These results are consistent with previous studies. Ly (2025) found that convenience and ease of use are key factors influencing ride-hailing adoption in emerging markets, while Acheampong *et al.* (2020) reported that young users value the flexibility and reliability of such services in developing urban contexts. Similarly, Elnadi *et al.* (2024) showed that perceived ease of use and perceived usefulness significantly influence continued usage and satisfaction. Overall, the findings confirm that the first research objective has been achieved, demonstrating a high level of technology acceptance among youths in Batu Pahat.

The second research objective of this study is to identify the level of ride e-hailing service adoption among youths in Batu Pahat. Descriptive results from Chapter 4 indicate a high level of adoption, reflected in positive attitude scores toward e-hailing services. These findings suggest that youths in Batu Pahat generally perceive ride-hailing services favorably and show a strong willingness to use these applications for their daily transportation needs. This result is consistent with previous studies. Research among university students in Peninsular Malaysia found a strong relationship between positive attitudes and intention to use e-hailing services, highlighting the role of convenience and efficiency in youth mobility (Yan *et al.*, 2024). Similarly, studies on Malaysian Generation Z reported that attitudes and perceived usefulness significantly influence adoption, as these services align well with youths' lifestyles and travel preferences (Aiman & Rashid, 2023). Comparable patterns have been observed in other developing contexts, where younger users are more receptive to app-based transport due to flexibility and gaps in public transport systems (Shah & Hisashi, 2021; Shah *et al.*, 2024). In addition, Yap and Cats (2025) found that ride-hailing travel time is perceived more positively than public transport, further supporting the role of convenience in shaping favorable attitudes. Overall, these findings confirm that youths' positive attitudes contribute to the high level of e-hailing adoption observed in Batu Pahat.

The third research objective examined the relationship between technology acceptance and ride e-hailing service adoption among youths in Batu Pahat using the Technology Acceptance Model (TAM). TAM explains technology adoption through two main beliefs: perceived ease of use and perceived usefulness, which influence users' attitudes and decisions to adopt new technologies. According to the model, individuals are more likely to use a technology when they perceive it as easy to use and beneficial in improving efficiency and daily activities. Spearman's rank correlation analysis in Chapter 4 revealed strong positive relationships between perceived ease of use, perceived usefulness, and attitude, indicating a high level of technology acceptance among youths in Batu Pahat. These findings align with previous studies showing the importance of TAM constructs in ride-hailing adoption. For instance, Maaruf (2021) and Suhud *et al.* (2019) found that perceived ease of use and perceived usefulness significantly influence attitudes toward ride-hailing services in Bangladesh and Jakarta. Further support is provided by Lu and Wang (2020), Goel and Haldar (2020), Nguyen-Phuoc *et al.* (2021), and Yan *et al.* (2024), who emphasized the key role of perceived usefulness and ease of use in shaping attitudes and intentions toward digital transportation services. Overall, the results confirm that ease of use and usefulness strongly influence youths' acceptance and adoption of e-hailing services in Batu Pahat.

In conclusion, this study successfully achieved its objectives by identifying high levels of perceived ease of use, perceived usefulness, and positive attitudes toward e-hailing services, and by demonstrating strong relationships among these factors. The findings offer valuable insights for both future research and e-hailing service providers, highlighting key determinants of youth adoption and technology acceptance. Additionally, the study acknowledges its limitations and provides practical recommendations to guide future investigations, contributing to a deeper understanding of digital transportation adoption.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Nurul Safika Rashid, Anim Zalina Azizan; **data collection:** Nurul Safika Rashid; **analysis and interpretation of results:** Nurul Safika Rashid, Anim Zalina Azizan; **draft manuscript preparation:** Nurul Safika Rashid, Anim Zalina Azizan. All authors reviewed the results and approved the final version of the manuscript.

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