

Parental perceptions of barriers and facilitators to active transportation to school for adolescents in Brunei Darussalam

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Abstract

Background: Active transportation to school (ATS) helps reduce the burden of non-communicable diseases through improvement in physical activities. This study aimed to examine parental perceptions of barriers and facilitators to ATS amongst adolescents in Brunei Darussalam, to help inform future multi-sectoral policy.

Materials and methods: A cross-sectional national online survey was conducted amongst parents of secondary school students aged 10 to 19 years, using a self-designed questionnaire adapted from established literature and was piloted. A total of 392 eligible responses were analyzed. Descriptive statistics summarized parental perceptions using Likert ratings, whilst multiple linear regression assessed associations between sociodemographic factors and parental preferences to walking, cycling and using public transport for their children.

Results: Overall, majority of parents showed low preference for their children to walk (77.1%) or to cycle (75.2%) to school, primarily due to safety issues. Strong enabling factors included improved environmental and safety infrastructures such as safety camera installations, well-enforced school zones, and separated cycling pathways. Multiple linear regression findings showed that greater home-school distance significantly reduced preference for walking ($p < 0.001$), and parents were less likely to encourage cycling for female children ($p = 0.036$).

Conclusions: Safety concerns remain the predominant barrier to ATS for adolescents, while infrastructure enhancements and strengthened safety measures pave promising pathways to increase parental support for ATS initiatives in Brunei.

Approval of ethics committee

This study was approved by the Medical and Health Research Ethics Committee (MHREC), Ministry of Health, Brunei Darussalam (reference: MHREC/MOH/2025/12). The study was conducted in line with the Declaration of Helsinki, 2013 involving human subjects and informed consent was obtained from all eligible participant.

Keywords

- adolescents
- active transport
- school children
- Brunei Darussalam

Contribution

- A – Preparation of the research project
- B – Assembly of data
- C – Conducting of statistical analysis
- D – Interpretation of results
- E – Manuscript preparation
- F – Literature review
- G – Revising the manuscript

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Introduction

In recent years, science tells us how physical activity levels can predictably improve physical health, mental health and reduce the risk of all-cause mortality. However, in Brunei Darussalam, increasing physical activity at a population level has always been a challenge. This is especially true amongst adolescents. With the increase in reliance on technology as their source of entertainment, adolescents may feel less inclined to increase their physical activity. In fact, according to the 2019 Global School-based Student Health Survey (GSHS), only 11.5% of adolescents aged 13 to 17 years participated in at least 60 minutes of physical activity per day in Brunei Darussalam.¹ On top of that, about half of the Bruneian children aged 5 to 19 years have been found to be overweight (33.5%) or obese (18.2%), which increases their risk of non-communicable diseases (NCDs) according to Brunei National Health and Nutritional Status Survey (NHANSS) 2014.²

Research in the field of active transportation, indicates that active transportation to school (ATS) can be a viable strategy in promoting physical activity as shown in several studies.^{2,3} This in turn can help reduce the risk of NCDs in adulthood. In this paper, active transportation is defined as travel behaviour involving considerable physical activity such as walking and cycling to or from destinations, including walking and cycling to public transport facilities. This may be of particular importance for adolescents failing to meet the World Health Organization's physical activity recommendations.⁴ The stage of adolescence provides a unique opportunity to instill positive physical activity habits that can potentially manifest into life-long health benefits.⁵⁻⁹

In the case of Brunei Darussalam, evidence in regard to active transportation is rather limited, and especially so for ATS amongst adolescents. However, based on the available data, the majority of the Brunei population utilise private vehicles as their main mode of transportation.^{10,11} According to the Land Transport Department, as of 2013, there were 216,000 licensed motor vehicles with the vast majority being private cars, whilst only a minority of the population chooses walking or cycling as a mode of transportation. 82% of adults and 63% of youths do not have access to cycling, compared to almost universal access to a car.¹¹ In the same paper, the Land Transport Department acknowledged that active transport modalities such as walking and cycling are already discussed in some policies relevant to active transportation. They also expanded on their objective to increase walking and cycling network coverage, improved user safety and personal security.

However, there has been no published study on perceived barriers or enablers of ATS in Brunei Darussalam. Literature research of similar studies in neighboring countries, revealed that there are also limited published research studies. Available studies conducted in Malaysia and Philippines identified that barriers to walking to school in children are long distance to school and pedestrian facilities with poor quality.^{12,13} A paper in Thailand was targeted to university students and staff, however the barriers remain the same in addition to hot and rainy weather, as well as lack of biking pathway and secure facilities when it comes to cycling as the mode of transportation.¹⁴ Outside these regions, a systematic review of global papers found the main parental barriers to ATS were poor built environment, long distance to school, concerns regarding traffic safety and crime-related safety.¹⁵

From these findings, it is likely that the perceived barriers will not be too dissimilar to Brunei. However, Brunei's different structural environment, lack of public transportation and heavy reliance on cars warrant a study that looks at parental barriers and facilitators to ATS for their children. These findings will inform the current needs and help strategize future policies across different sectors to improve physical activities amongst adolescents.

Materials and methods

Study design and setting

This was a cross-sectional study, which utilized self-designed and self-administered online questionnaires. The target population was parents with adolescents currently studying in secondary schools in Brunei Darussalam. We focused on secondary schools because based on previous research on ATS, it was identified that parents have strong discouragement in letting their very young children to use active transportation to go to school.¹²⁻¹⁶

Sample Size and recruitment

There is limited local data from the literature to calculate the appropriate sample size. Based on prevalence calculation, a conservative target was aimed using the assumption of prevalence of 0.5, that is 50% choosing a particular response in the Likert scale for the perception of barriers or enablers, which would yield the maximum effective sample size. With a confidence

interval of 95%, and margin of error of 5%, the effective sample size was 385.¹⁷

This study recruited participants through the public platforms where links to the online survey were shared. Both father and mother could take part in this study, each completing a separate survey.

Eligibility criteria

Inclusion criteria:

- Parents with at least one child aged 10–19 years old currently studying in secondary school.
- They are currently residing in Brunei Darussalam.

Exclusion criterion:

- Did not consent to participate in the study.

Research instrument

This research used a self-designed, self-administered online questionnaire in which the questions were adapted from the previous literature on ATS to suit the purpose and demographics of this local study.^{12–16} The participants could either choose English or Malay versions. This was to ensure that participants were comfortable enough to complete the questionnaire and enhance their understanding, as the majority of Bruneians speak at least one of these two languages. Back-to-back translation was done to ensure the original meanings were retained. The original questionnaire was in English, which was then translated to Malay using the World Health Organization (WHO) guidelines on the *Process of translation and adaptation of instruments*, 2010.¹⁸

Experts in physical activity reviewed the questions to ensure they were relevant to the aims and objectives of the study. Pre-test was conducted on 10 participants to ensure that the layout of the questionnaire was user-friendly, and to the rephrase questions that were difficult to understand. The pilot stage was carried out to 30 participants of similar eligibility criteria. At this stage, internal consistency reliability was assessed using Cronbach's alpha with a value of 0.90. The main study was then conducted without any change in the original questions.

Statistical analysis

Raw data from the questionnaires was collected and compiled into a secured Microsoft Excel database and imported into R studio v 4.5.2 (Vienna, Austria) where data analysis was performed. Descriptive statistics

reported baseline characteristics of the participants and the Likert ranking of the enablers and barrier statements. For inferential statistics, the association between independent variables and Likert scale ranking of preference of active mode of transportation was assessed using linear regression. Although in its original form Likert scales are ordinal, in the analysis these were treated as approximately continuous for the linear regression analysis, and this was considered acceptable as a scale with at least 5 points is evidenced to exhibit statistical properties similar to continuous variables which permits parametric analysis.¹⁹ The assumptions of linearity were assessed using residual diagnostic plot whilst normality residuals were assessed using Q–Q plots. Variance inflation factors (VIF) were also used to assess the multicollinearity, where all three regression plots had VIF predictors of <5. Model goodness-of-fit was evaluated using R^2 and overall F-test, and these are reported in the regression tables. Independent variables with $p < 0.25$ were included into the multiple linear regression, and a $p < 0.05$ was considered statistically significant.

Results

A total of 473 participants were recruited into the study but 81 were excluded due to ineligibility. A complete set of 392 responses was obtained. Table 1 shows the baseline characteristics of the participants. Residents of Brunei-Muara district, mother and government employees accounted for most of the responses. The majority of children commute to school using private vehicles (90.3%), and travel at a distance of more than 2 km from home to school (82%).

Table 1. Characteristics of the participants completing the questionnaires (n = 392)

Characteristics	Count	Percentage (%)
Age of parents or guardians		
up to 39	93	23.7
40–49	230	58.7
50 and more	69	17.6
Who answered the questionnaire?		
Father	95	24.2
Mother	261	66.6
Guardian	36	9.2
District		
Brunei-Muara	332	84.5

Characteristics	Count	Percentage (%)
Tutong	42	10.7
Belait	13	3.3
Temburong	5	1.3
Current occupation		
Government employee	299	76.3
Private sector	28	7.1
Self-employed	14	3.6
Unemployed	51	13.0
How many private vehicles do you own?		
None	2	0.5
One	48	12.2
Two	120	30.6
Three	110	28.1
Four or more	112	28.6
Which year?		
Year 7	67	17.1
Year 8	68	17.3
Year 9	76	19.4
Year 10	88	22.4
Year 11	93	23.7
How old is your child?		
10–12 years	38	9.7
13–14 years	135	34.4
15–16 years	168	42.9
17–18 years	45	11.5
19–20 years	6	1.5
Gender of child?		
Male	201	51.3
Female	191	48.7
How do they normally commute to school?		
Private vehicles	354	90.3
Public transport	19	4.8
School transport	15	3.8
Walking	3	0.8
Other (hostel)	1	0.3
Distance from home to school		
<1 km	22	5.6
1 to 2 km	49	12.5
2 to 10 km	188	48.0
>10 km	133	34.0

Table 2 outlines the parental preference of different modes of ATS. Public transport was classified as a form of active transport in this study, provided that participants walked or cycled to reach the public transport station. Across all three modes (walking, cycling and taking public transport), parents in Brunei have a negative

preference towards ATS, and the strongest one being walking (5.6% agree or strongly agree). Public transport, however, scored the highest in terms of mode of preference for ATS (33.6% agree or strongly agree). In Brunei, public transport is only restricted to public buses, as there are currently no public trains or trams.

Table 2. Preference on different modes of active transport to school and confidence (n = 101)

Items	Mean (SD)	Agree or strongly agree (%)	Neutral (%)	Disagree or strongly disagree (%)
I prefer my child to regularly commute to school by walking.	1.95 (0.92)	22 (5.6)	68 (17.3)	302 (77.1)
I prefer my child to regularly commute to school by cycling.	2.03 (0.93)	30 (7.7)	67 (17.1)	295 (75.2)
I prefer my child to regularly commute to school by taking public transport.	2.97 (1.18)	131 (33.4)	119 (30.4)	142 (36.2)
If there is a good active transport system in Brunei, I would have confidence in myself in allowing my child to actively commute (walk or cycle) to school	3.98 (1.10)	280 (71.4)	72 (18.4)	40 (10.2)

Statements on enablers to ATS were asked in the survey, and Table 3 depicts the ratings given by the responders. Majority agree or strongly agree that they would encourage their children to actively commute to school if there is installation of security cameras near schools, if there are traffic police, and if the school zones are well enforced. In addition, parents most likely would encourage their child to cycle if the cycling paths are separated from high-speed traffic.

The barriers to ATS are listed in Table 4 and concern with child's security and the heavy load that their child has to carry to school are the main factors identified.

Regression analysis was conducted for each of the mode of ATS. The tables on regression analysis only included factors with $p < 0.25$ on univariate analysis. As shown in Table 5, parents with children who live further away from school are less likely to prefer their child to walk to school (for 2 to 10 kilometers $p < 0.001$, and for >10 kilometers, $p < 0.001$).

Table 3. Ratings on enablers to active transportation (n = 392)

Items	Mean (SD)	Agree or strongly agree (%)	Neutral (%)	Disagree or strongly disagree (%)
Enablers to active transportation in general				
'I would encourage my children to actively commute (walk or cycle) to school if the...'				
1. The school is not far from home	3.49 (1.28)	218 (55.6)	92 (23.5)	82 (20.9)
2. Sidewalks are well maintained and clean	3.74 (1.26)	250 (63.8)	78 (19.9)	64 (16.3)
3. Sidewalks are wide enough for two persons walking together	3.77 (1.25)	251 (64.0)	82 (20.9)	59 (15.1)
4. Sidewalks are separated from traffic by grass or trees	3.67 (1.27)	236 (60.2)	93 (23.7)	63 (16.1)
5. Sidewalks are not blocked by trash cans, power poles or cars	3.79 (1.26)	250 (63.8)	84 (21.4)	58 (14.8)
6. Sidewalks are shaded by roofs	3.79 (1.21)	243 (62.0)	101 (25.8)	48 (12.2)
7. The streets are well lit	3.95 (1.21)	281 (71.7)	67 (17.1)	44 (11.2)
8. School zones are well enforced	4.07 (1.17)	293 (74.7)	62 (15.8)	37 (9.4)
9. There are nice things to see	3.29 (1.16)	156 (39.8)	162 (41.3)	74 (18.9)
10. It is quiet (without much noise from cars, aero planes, factories)	3.16 (1.15)	128 (32.7)	180 (45.9)	84 (21.4)
11. There is installation of security cameras at streets and walkways near schools	4.26 (1.11)	316 (80.6)	45 (11.5)	31 (7.9)
12. There are traffic police at streets and walkways near schools	4.10 (1.16)	294 (75.0)	61 (15.6)	37 (9.4)
13. There is mandatory/regular road safety education for children and drivers	4.06 (1.16)	289 (73.7)	66 (16.8)	37 (9.4)
If there is a good and safe active transport system in Brunei Darussalam, 'I would encourage my child to actively commute (walk or cycle) to school for...'				
1. Improvement to his/her health or fitness	4.09 (1.07)	292 (74.5)	73 (18.6)	27 (6.9)
2. Enjoyment gained from walking and/or cycling	3.86 (1.14)	258 (65.8)	92 (23.5)	42 (10.7)
3. The potential to save money	3.58 (1.14)	206 (52.6)	132 (33.7)	54 (13.8)
4. Avoidance of the need to find parking	3.59 (1.15)	210 (53.6)	125 (31.9)	57 (14.5)
5. Personal contribution to reducing air pollution	3.66 (1.12)	215 (54.8)	128 (32.7)	49 (12.5)
Enablers for cycling specifically to school				
'I would encourage my children to actively commute (walk or cycle) to school if the...'				
1. There is provision of adequately designed cycling paths	3.92 (1.15)	278 (70.9)	69 (17.6)	45 (11.5)
2. Cycling paths are separated from high-speed traffic	4.12 (1.13)	302 (77.0)	53 (13.5)	37 (9.4)
3. There are adequate changing/shower facilities at school	3.73 (1.19)	236 (60.2)	100 (25.5)	56 (14.3)
4. There are secure bicycle parking facilities at school	4.06 (1.10)	295 (75.3)	62 (15.8)	35 (8.9)

Items	Mean (SD)	Agree or strongly agree (%)	Neutral (%)	Disagree or strongly disagree (%)
5. There is a bicycle repair service at school	3.58 (1.13)	195 (49.7)	145 (37.0)	52 (13.3)
Enablers for using public transport specifically to school				
'I would encourage my children to commute using public transport to school if the...'				
1. Distance of bus stop from home is not far	3.79 (1.14)	250 (63.8)	96 (24.5)	46 (11.7)
2. Duration of the bus trip to school is short	3.83 (1.13)	254 (64.8)	93 (23.7)	45 (11.5)

Table 4. Ratings on barriers to active transportation (n = 392)

Items	Mean (SD)	Agree or strongly agree (%)	Neutral (%)	Disagree or strongly disagree (%)
Barriers to active transportation to school in general				
'I am discouraging my children from actively commuting (walk or cycle) to school because...'				
My child might get lost on the way to or from school	3.49 (1.28)	218 (55.6)	92 (23.5)	82 (20.9)
My child might be taken or hurt by a stranger	3.74 (1.26)	250 (63.8)	78 (19.9)	64 (16.3)
My child might be involved in a road traffic accident	3.77 (1.25)	251 (64.0)	82 (20.9)	59 (15.1)
My child has too heavy a load to carry	3.67 (1.27)	236 (60.2)	93 (23.7)	63 (16.1)
The weather is hot and rainy	3.79 (1.26)	250 (63.8)	84 (21.4)	58 (14.8)
Barriers to using public transport specifically to school				
'I am discouraging my children from using public transport to school because...'				
Child's safety waiting for the bus	3.78 (1.17)	234 (59.7)	106 (27.0)	52 (13.3)
Child's safety in the bus	3.67 (1.18)	217 (55.4)	117 (29.8)	58 (14.8)

Table 5. Multiple linear regression analysis for walking

Items	Estimate	SE	t-statistic	p-value
Intercept	2.778	0.198	14.1	<0.001
Who answered the survey (reference = mother)				
Father	0.124	0.105	-1.19	0.235
Guardian	-0.012	0.157	-0.07	0.941
Gender of child (reference = male)				
Female	-0.166	0.089	-1.87	0.063
Distance from home to school (reference ≤1 kilometre)				
1 to 2 km	-0.380	0.226	-1.68	0.0938
2 to 10 km	-0.770	0.199	-3.86	<0.001*
>10 km	-0.900	0.204	-4.40	<0.001*

Where: R^2 : 0.08712; adjusted R^2 : 0.007289; F-statistic: 6.124 ($p \leq 0.001$).

Note: * $p < 0.05$.

Supplementary Table 1a (Appendix) shows the regression analysis for cycling. Parents with female children are less likely to prefer their child to cycle to school compared to those with male children ($p = 0.036$).

Supplementary Table 2a (Appendix) indicates the regression analysis to parental preference for their children to use public transport to school. Parents who worked in private sectors are less likely to prefer their child to go to school via public transportation ($p = 0.003$). In addition, parents with children from Tutong district are more likely to prefer to their child to go to school via public transportation ($p = 0.002$).

Discussion

The results of our study demonstrate that our respondents were mostly mothers in the 40–49 age range. Most are from Brunei-Muara district, and this is expected as the majority of Brunei population reside in this district. 20 87.3% of the respondents own at least 2 private vehicles and 82% of them stay more than 2 kilometers away from their children's school. Bruneian population ranks the highest in Southeast Asia in terms of private vehicle ownership at 805 registered vehicles per 1000 people according to the Organization of Motor Vehicle Manufacturer (OICA).²¹ Brunei Darussalam lacks structured and extensive public transport system and given the majority lives >2 kilometers away from their children's school, many opt for private vehicles. Stemming from the lack of public transportation, these vehicles are also used for other potential reasons including convenience to do shopping and going to work. This in turn leads to them feeling less inclined to promote ATS amongst their children given that they have a far more convenient and comfortable mode of transport that the vast majority of the population already uses.¹⁶ 77.1% of the respondents disagree to encouraging their children to walk to school. The regression analysis also showed that those who live >2 kilometers away from the school are more likely to disagree ($p < 0.001$). A study from Malaysia complements this finding, where it was highlighted that longer distance from home to school is an important factor that discourages the use of active transport modality, though this was from the children's perspectives.¹² We also explored cycling as a mode of ATS where 75.2% disagree to letting their child to regularly commute to school by cycling. This can be explained by the fact that longer travel distances often increase parental safety concerns and reduce the feasibility of walking or cycling, particularly in environments with limited pedestrian or cycling infrastructure.^{15,22}

Interestingly, safety aspect ranked highly as a factor that is important in parental decision of ATS for their children, where strong enablers include installation of security cameras and availability of traffic police at streets near schools. However, an important barrier is fear of children being taken or hurt by strangers. These show that children's safety is the top priority for parents, and building a safe environment through a bold policy is an important consideration to promote active transportation ATS. Looking at cycling specifically, we found that the biggest enabler was having cycling paths that are separated from high-speed traffic – again emphasizing on the safety aspect. In addition, it is identified that

having a secure bicycle facility at school is an important factor if we want to encourage cycling.^{22,23}

Most parents also agreed that they would allow their children to walk or cycle to school to improve health. This indicates that parents have awareness of the importance of ATS to their children's health, but gaps remained in their behaviors which are explained by the enablers and barriers explained earlier, especially with regards to safety. These factors need to be context-specifically addressed at the environmental level, 24 and it is encouraging to see that if there is a good and safe active transportation system in Brunei, majority of the respondents (71.4%) would be confident in allowing their children to actively commute to school.

Moreover, the gender of the child appears to be another influential factor to ATS, but this was only significant in cycling as the mode of transportation. Parents are less likely to encourage their children to cycle if the child is female ($p = 0.036$), which mirrors the findings from previous studies suggesting that girls tend to face greater parental protection and perceived vulnerability.^{15,16} Concerns related to personal safety, cultural expectations, and gender norms may contribute to this disparity.

Parents employed in the private sectors are significantly less likely to prefer public transport for their children ($p = 0.003$). This may be explained by differing socioeconomic constraints. Interestingly, the regression analysis also shows that parents from the Tutong district are more likely to encourage the use of public transportation ($p = 0.002$). This could be attributed to a more concentrated distribution of facilities in Tutong district, relatively more established bus routes or stronger community transport networks compared to other districts, facilitating safer and more convenient access to schools.

Strength and limitations of the study

To date and to our knowledge, this is the first published study on parental perceptions to ATS for adolescents in Brunei Darussalam. A major strength of this study lies in its inclusion of participants from all four districts of Brunei Darussalam namely Brunei-Muara, Tutong, Belait and Temburong districts. This enhances the generalizability of the findings, reducing the likelihood of regional bias.

However, one key limitation would be sampling bias and limited representativeness. Despite the wide geographical inclusion, recruitment via public platforms may have favored more educated and urban participants particularly government employees who made

up 76.3% of the sample size. This likely underrepresented parents from a lower socioeconomic or rural backgrounds, limiting external validity. In addition, all responses were self-reported, which also introduced recall and social desirability biases. Finally, the study's cross-sectional nature prevents the establishment of cause-and-effect relationships. While associations could be identified, the study cannot additionally determine whether certain perceptions can directly influence the actual adoption of ATS.

Further recommendations

Our findings show that promoting ATS requires a comprehensive, multi-sectoral approach involving infrastructure, safety, community, and policy integration. Infrastructure development should prioritize on expanding safe pedestrian and cycling networks, particularly along school routes. These pathways must include physical separation from the traffic, with adequate shade and lighting for comfort and safety. Schools should also provide secure bicycle storage and changing facilities to support students who walk or cycle. Comprehensive network of security cameras should be installed, and traffic police should be deployed in school zones to manage vehicle flow and enhance security. Road safety education for students, parents, and drivers can help improve awareness and build responsible behavior. Additionally, speed reduction measures such as bumps and clear signage should be implemented and enforced in school vicinities to create safer travel environments.

At the policy level, urban and transport integration is vital. ATS initiatives should align with national land transport and urban development plans to reduce car dependency and congestion. Encouraging public-private partnerships can help co-fund and maintain ATS infrastructure, ensuring long-term success and broader reach. School and community initiatives can further encourage participation such as organizing 'Walk-to-School' or 'Cycle-to-School' days to promote awareness and engagement, especially through partnerships with district office. Integrating ATS into the existing health promoting school's framework ensures continuity and sustainability of these initiatives within educational programs.

Finally, data and monitoring are key to tracking progress and impact. Periodic follow-up studies will help evaluate behavioral changes, identify challenges, and guide evidence-based improvements. This includes assessing the perceptions of barriers and facilitators of ATS from the perspectives of adolescents themselves. Through coordinated efforts across sectors,

ATS can contribute to healthier, safer, and more sustainable communities – and any intervention should be assessed for its effectiveness as well.

Conclusions

This study provides the first insights into parental perceptions of barriers and facilitators to ATS among adolescents in Brunei Darussalam. The findings reveal that while parents recognize the potential health benefits of ATS, safety concerns remain the primary deterrent. The implications of this study extend beyond individual behavior change. It emphasizes the need for multisectoral collaboration between health, education, transport, and urban planning agencies to create environments that support safe, accessible, and sustainable ATS.

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Appendix

Table 1a. Multiple linear regression analysis for cycling

Items	Estimate	SE	t-statistic	p-value
Intercept	2.400	0.209	11.5	<0.001
Who answered the survey (reference = mother)				
Father	-0.120	0.109	-1.10	0.272
Guardian	0.076	0.162	0.47	0.641
Gender of child (reference = male)				
Female	-0.195	0.093	-2.11	0.036*
Distance from home to school (reference ≤1 kilometre)				
1 to 2 km	0.005	0.236	0.02	0.983
2 to 10 km	0.172	0.207	-0.83	0.406
>10 km	0.383	0.213	-1.80	0.073
Occupation (reference = government employee)				
Private sector	-0.308	0.178	-1.73	0.085
Self-employed	0.256	0.251	1.02	0.309
Unemployed	0.235	0.138	-1.70	0.090

Where: $R^2 = 0.059$ adjusted $R^2 = 0.03683$; F-statistic = 2.661 ($p = 0.005$).

Note: * $p < 0.05$.

Table 2a. Multiple linear regression analysis for public transportation

Items	Estimate	SE	t-statistic	p-value
Intercept	2.637	0.222	11.9	<0.001
Parents age (reference ≤39 years old)				
40–49	0.032	0.144	0.22	0.828
50 and more	-0.275	0.188	-1.46	0.144
Who answered the survey (reference = mother)				
Father	0.160	0.141	1.13	0.258
Guardian	0.314	0.208	1.51	0.131
Age of the child (reference = 10–12 years)				
13–14 years	0.323	0.209	1.55	0.123
15–16 years	0.225	0.206	1.10	0.274
17–18 years	0.099	0.251	0.39	0.694
19–20 years	-0.027	0.506	-0.05	0.958
Occupation (reference = government employee)				
Private sector	-0.675	0.225	-3.00	0.003*
Self-employed	0.158	0.313	0.51	0.613
Unemployed	0.049	0.174	0.28	0.780
District (reference = Brunei Muara)				
Belait	0.259	0.324	0.80	0.425
Temburong	0.907	0.520	1.74	0.082
Tutong	0.600	0.188	3.20	0.002*

Where: $R^2 = 0.08325$; adjusted $R^2 = 0.04911$; F-statistic = 2.439 ($p = 0.003$).

Note: * $p < 0.05$.