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SOCIOECONOMIC INFLUENCES AND PEDESTRIAN INFRASTRUCTURE IN PROMOTING ACTIVE TRAVEL TO SCHOOL AMONG PRIMARY SCHOOL CHILDREN

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Abstract

Walking is considered a physical activity, as it is well-established as a health-enhancing behaviour for children. Opting for active school travel like walking may help increase children's physical activity levels. However, participation in active school travel remains low in many countries. The lack of physical activity among children is a significant global health issue that can lead to an increased risk of non-communicable diseases and poor mental health. A questionnaire survey was conducted among primary school children aged 7 to 12 to study this issue further and gather their perspectives on active school travel. This study investigates the relationship between socioeconomic factors, such as household income, parental education level, and car ownership, and children's decision to engage in active travel to school. Furthermore, the study aims to assess the current state of pedestrian facilities and infrastructure near schools. In addition to the questionnaire survey, the researcher conducted on-site observations to evaluate the availability and condition of pedestrian facilities and infrastructure. The observations also included assessing traffic conditions and potential safety hazards for children who use active transportation to get to school. It is important to note that simply improving pedestrian facilities and infrastructure near schools may not be sufficient to change parental perceptions of traffic safety in the surrounding area.

Keywords: Active Travel, Active School Travel, Physical Activity, Walking

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INTRODUCTION

Active School Transportation, briefly known as AST, is defined as walking, cycling, or using other active modes to get to and from school, which is opposed to driving or taking motorised transportation to school (Rothman, Hagel, Howard, Cloutier, Macpherson, Aguirre, & Winters, 2021). Walking is categorised under physical activity as it is well-established as a health-enhancing behaviour for children and adolescents (Uddin, Mandic, & Khan, 2019). Choosing active school travel, such as walking and biking, is conducive to increasing children's physical activity levels (Conference, 2020). The World Health Organisation (WHO) recommends that children and adolescents aged 5 to 7 years do a minimum of 60 minutes of moderate to vigorous-intensity physical activity (MVPA) daily. Only approximately 20% of children and young people in Sweden meet this recommendation, with a concerning downward trend. The decline in physical activity among children has become a public health problem of enormous proportions, and it has been likened to a global inactivity pandemic back in the early 2010s.

Furthermore, there has been a notable decline in children's freedom over the past five decades. In recent decades, most parents have found it challenging to grant their children the independence to walk to and from school on their own. One of the related studies discovered that Active School Commuting (ASC; walking or cycling to or from school) would re-enlighten physical activity by incorporating ASC into adolescents' daily routines (Uddin et al., 2019).

LITERATURE REVIEW

Based on convincing evidence, children who use active transportation are more likely to be physically active than those who rely on passive modes of transport (Lu, Sun, Gou, Liu, & Zhang, 2019; Uddin et al., 2019). Consequently, how children commute to or from school may tremendously impact physical activity rates and health outcomes (Tewahade, Goldstein, Haynie, Iannotti, & Simons Morton, 2019). However, Active School Travel (AST) participation is low in many countries worldwide (Tewahade et al., 2019; Uddin et al., 2019). Children's physical inactivity is a prevalent global health problem that contributes to a higher risk of non-communicable diseases and low mental health status (Hawley, Witten, Hosking, Mackie, & Smith, 2019). In the past 30 years, there has been a substantial decline in physical activity and an increase in the obesity rate among children (Bolkhanian & Reyers, n.d.). One of the reasons for the decrease in physical activity is that the children often prefer to do less physically engaging activities, such as chauffeuring to school. Besides, based on the research undertaken by Faulkner and friends, it was stated that AST can be an essential source of physical activity among schoolchildren, and it has been associated with

higher overall physical activity levels and healthier body weights (Faulkner, Buliung, Flora, & Fusco, 2009).

In encouraging children to practice active school travel, pedestrian catchment areas need to be identified to ensure that the infrastructure provided is following the needs of pedestrians in terms of connectivity, comfort and safety. Therefore, based on the Public Perception Survey on Walking Distances for Daily Activities and the Healthy Walkable City Implementation Guidelines Survey that has been conducted, the average walking distance for an individual is 300 to 400 metres within a time range of 5 to 10 minutes, depending on their age and physical ability (PLANMalaysia, 2017). Table 1 shows the average 5-minute walking distance by age group.

Table 1: Average 5-minute Walking Distance by Age Group.

Category	Age	Estimated Distance (meters)	Estimated Time (minutes)
Children	3 to 6 years	100m	Average time: 5 to 10 minutes
	7 to 12 years	400m	
Adults	13 to 59 years	400m	
Senior Citizens	60 and above	180m	
Disabled	Depending on the ability and capabilities of the group		

Source: PLANMalaysia (2017)

Referring to Table 1, the estimated distance that needs to be considered by the provider for the children used is between 100m and 400m. This range ensures children safely and comfortably walk to school without excessive fatigue and risk.

In terms of walking distance between home and primary school, PLANMalaysia (2017) has suggested that the ideal distance is within 800 meters, equivalent to a journey of 10 minutes. As walking is an excellent way for children to accumulate daily physical activity, schools should be developed according to the population and catchment area.

Promoting AST can be a promising strategy to increase children's daily physical activity and contribute to their health and development. Nowadays, children and young people must have the opportunity to grow up in an environment that allows them to move freely, accept challenges, gradually expand their range of action, and cultivate their independence. Encouraging active travel among children effectively boosts their daily physical activity levels. It fosters future generations to become active road users, thus enhancing our chances of achieving the climate goals outlined in Agenda 2030.

Recent empirical and experimental research shows that Active School Travel behaviour is complex, with multiple factors interacting at different levels and varying determinants across contexts (Hawley et al., 2019). To unravel this complexity, he says a better understanding of context-specific influences across

socioecological domains is needed. Based on Rahul Raoniar, according to McMillan's framework, parents decide on behalf of the child which mode their children should use (Rahul Raoniar, Trinayan Das, Arunabha Banerjee, 2019). In many previous studies on similar topics, a questionnaire survey was conducted among the parents to understand the decision-making process of mode choice. For this topic of study, the questionnaire survey was distributed among primary school children aged 7 to 12 years old to get their views and perceptions regarding active school travel. This study explores the association between socioeconomic factors, including household income, parents' education level, car ownership, and children's decision to take active school travel. It will also identify the existing condition of pedestrian facilities and infrastructure surrounding the school area.

RESEARCH METHODOLOGY

For the questionnaire survey, it was proposed that the study be carried out in six primary schools in Shah Alam City (Refer to Figure 1). Besides considering the researcher's ease of access to the sample population, the selection of schools was also guided by some visible characteristics of interest, such as areas with similar socioeconomic factors, land use, and convenient location. A school with these visible relevant characteristics was proposed to participate in the study. Only one school was taken to represent each small planning block. To meet the research ethics requirement, the Research Ethics Committee (REC) at UiTM has approved the instrument and protocol used for this study after submitting the application form, questionnaire survey form, parental informed consent form, child assent form, and other information.

The second method of data collection used for this study was a site observational study, where the researcher carried out observations at all schools that participated in the survey. The main objective of site observations is to assess the availability and existing condition of pedestrian facilities and infrastructures near the primary school area. Besides, it evaluated traffic conditions, including vehicle volume, speeds, and behaviours. The third reason for this method was to identify potential safety hazards for children who use active transport to school. Combining these two methods during data collection gives a more comprehensive understanding of the topic of study, thus developing targeted recommendations to enhance safety and accessibility.

Limitations

This study used cross-sectional data, which limits the ability to infer causal relationships between socioeconomic factors and children's active school travel. Perhaps for future research, a longitudinal study design would be more appropriate to examine how socioeconomic changes impact children's walking behaviour over time. Besides, this study focused only on physical activity during

the school commute. However, it did not consider the overall physical activity level of the children throughout the day or on non-school days. This is because a more comprehensive evaluation of physical activity would provide a deeper understanding of the contribution of active school travel. Not only that, but this study was also conducted in a specific geographic context, which is in Shah Alam City. The findings may not be directly generalisable to the Malaysian context.

Research Sample

The researcher prepared a list of schools according to the small planning block under Shah Alam City Council. There were five small planning blocks under this local authority area. The selection of primary schools was done primarily through convenience sampling. The total population of primary school children in Shah Alam is 66,508, based on the statistics released by the Ministry of Education (updated on 30th June 2022). Considering the total population is known, the sample size for this study is 381, according to Krejicie and Morgan's method of determining a sample size (1970). Based on the table for determining sample size from a given population, it stated that for a population size of 50,000, the sample size is 381. However, the researcher added 19 more questionnaires (a total of 400) in case any issues occurred during the questionnaire distribution.

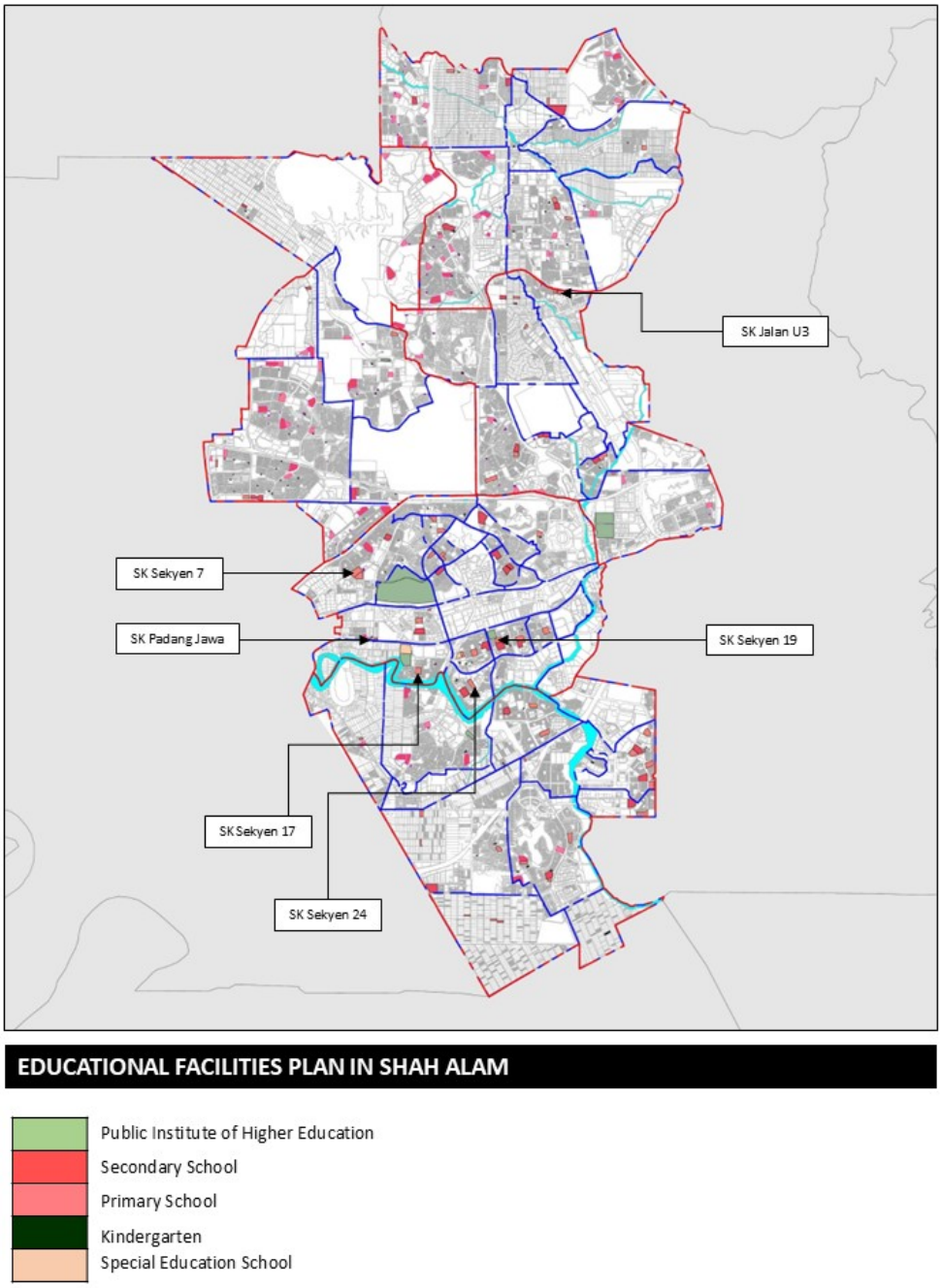

Figure 1. The location of six schools involved in the survey

Data Collection Procedure

Data collection was conducted during March and April of the year 2023. The questionnaires (N=400) were distributed to primary schoolchildren aged 7 to 12 who walked to or from school any day of the week. This age range was selected to participate in this study because students at this age level already dare to walk to schools alone or accompanied by friends, parents, or guardians. The respondents also consist of students who walk to school for both morning and afternoon sessions. Those students who were using a vehicle every day were excluded from participating in the study. The survey included five sections, namely student and parent personal information, details of the student's walk to school, pedestrian infrastructure and facilities, and perception of safety aspects while walking to school.

When the students were assembled and ready to participate in the study, the researcher explained its purpose and relevance and then distributed the questionnaire. The respondents were requested to return the questionnaire three days after the questionnaire was distributed. The consent letter from the researcher to parents or guardians was attached to the questionnaire, explaining the objectives and relevance of the study, assuring the respondents of anonymity, and giving them the option of not participating in the study if they wish. Overall survey response was 100% (N=400).

ANALYSIS AND DISCUSSION

The first analysis focused on the relationship between age level and gender in terms of active travel to school. Table 1 shows that the number of male students (n=204) who walk to or from school is more than that of female students (n=196). The analysis revealed some interesting patterns where, across most age levels, more boys walked to school than girls. They were only 7 and 11 years old, and the number of female students was higher than that of male students. However, it can be seen that the gender gap varied by age level. Overall, it can be concluded that both genders have the same tendency to walk to or from school due to the differences between the number of males and females not being too significant.

Table 2: The Relationship between Age Classification and Gender.

Age	Number of Students		Total
	Male	Female	
7 years	4	6	10
8 years	16	10	26
9 years	23	18	41
10 years	51	35	86
11 years	46	78	124
12 years	64	49	113
Total	**204**	**196**	**400**

Source: Author's Calculation

Based on Table 1, it can be discovered that the gender disparity widened in the 8 to 10 and 12 years old, where the numbers between male and female students are pretty extensive. This age level is critical when children start gaining more autonomy and independence. However, social norms and safety concerns may limit a female student's ability to walk to school. It was due to puberty and concerns by the parents about the girls' safety in public spaces, which could also contribute to the restriction of girls from participating in school active travel at that level of age.

Some studies on this topic highlight that in a case study of Rasht, Iran, high school girls are less likely to walk than younger girls and boys (Hatamzadeh, Habibian, & Khodaii, 2017). This result suggests that gender roles and societal expectations may influence these behaviours. Furthermore, the findings show that while both genders face barriers to walking, the factors affecting their decisions to walk differ, and girls commonly encounter more significant obstacles.

Looking at Table 1, the findings highlight several aspects, such as gender socialisation, safety concerns, and independence, that shape children's active travel behaviour across all age levels. Thus, based on the findings, more targeted interventions to encourage walking to school may need to be tailored to address the specific barriers faced, especially by female students of different ages. Among initiatives that can be proposed is to engage parents in the form of discussions regarding the benefits of active school travel and ways that can be taken to ensure the girl's safety as an effort to narrow the gender gap as well as encourage more children to participate in active school travel.

Table 3: The Relationship between Walking Frequency and Mode of Transportation to School

Frequency of Walking to school in a week	**Mode of Transportation to School**								**Total**
	Walking		**Cycling**		**Parent's Vehicle**		**Public Transport**		
Gender	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	
1-2 times	33	23	0	0	24	15	4	5	104
3-4 times	18	14	2	1	4	10	3	0	52
5 times/everyday	153	159	5	3	18	37	3	7	385
Subtotal	204	196	7	4	46	62	10	12	
Total	**400**		**11**		**108**		**22**		

Source: Author's Calculation

Table 2 presents the crosstabulation results between children's mode of transportation and the frequency of walking to school in a week, separated by gender. For this question, respondents may choose more than one option, as the students may have a mixed mode of transportation to school. Due to this, multiple-answer questions have led to the number of students cycling, riding a parent's vehicle, and using public transport.

Based on Table 2 above, the analysis revealed an apparent relationship between the frequency of walking to school and the primary mode of transportation to school taken by the students. The results show that among schoolchildren who walked to school for five days per week, 312 (153 male and 159 female) out of 400 students used active transportation (walking) as their primary mode. In contrast, 8 (5 male and 3 female) and 65 (18 male and 37 female) cycled and used motorised vehicles. Of schoolchildren who walked to school 3 to 4 days per week, 32 (18 male and 14 female) out of 400 students walked to or from school, while 3 (2 male and 1 female) and 14 (4 male and 10 female) students cycled and used motorised vehicles, respectively. Among those who walked to school 1 to 2 days per week, only 56 students used active transportation (walking), and the remaining 48 used motorised vehicles.

The results suggest that as the frequency of walking to school decreases, the proportion of children using another mode of transportation increases. Here, it can be concluded that those who walked to school more often have a greater tendency to use active modes of transportation than those who walked less frequently. In contrast, for those students who walked to school only 1-2 days per week, the proportion of using active transport to school also dropped. It can be noticed that the remaining students with low walking frequency primarily relied on motorised vehicles such as cars, motorcycles, and public transport like school buses to get to and from school. This situation can be related to the findings of other studies, which highlight that as the distance to school increases, the frequency of walking decreases. At the same time, the proportion of children using passive modes of transportation, such as cars and buses, is increasing (Larsen, Gilliland, Hess, Tucker, Irwin, & He, 2009).

To summarise, this result suggests that the more often children walk to school, the more likely this group is to adopt active transportation as their habitual mode of travel. On the other hand, relying on the motorised mode for school travel does not encourage active travel to school, primarily if school and home are located within a reasonable distance.

Table 4: The Relationship between Socioeconomic Factors and Walking Frequency of Children

	Walking Frequency to School in a Week			
	1-2 times	**3-4 times**	**5 (everyday)**	**Total**
Household Income				
No Income	6	2	28	36
B40	43	28	224	295
M40	4	2	49	55
T20	3	0	11	14
Parental Education				
No Formal Education	1	0	5	6
Primary School	1	2	17	20

Secondary School	30	18	130	178
Tertiary Level	16	8	124	148
Postgraduate Level	2	2	11	15
Not Related	6	2	25	33
Car Ownership				
Yes	51	24	281	356
No	5	8	31	44

Source: Author's Calculation

The result in Table 3 revealed several key insights on the relationship between socioeconomic factors and the walking frequency of children in a week. The data presented a strong association between household socioeconomic status and the walking frequency to school in a week. Regarding household income, it was discovered that children from lower-income households were significantly more likely to walk to school five days per week. The result contrasts with the higher-income group, which recorded a decline in walking frequency. The pattern result was recorded to be the same for the walking frequency of 1 to 2 times a week for both lower and higher-income groups.

However, the mixed findings of Chi-Square tests indicate uncertainty about the relationship between household income and school walking frequency. The Pearson Chi-Square test (24.394) shows no significant association between these two variables, meaning that household income does not differ significantly in the weekly walking frequency to school. The Likelihood Ratio test also indicates no significant association with a p-value of 0.077.

Table 3 shows a similar pattern for parents' education level whereby, among schoolchildren whose parents had tertiary level as the highest education level, they recorded a higher number of students walking to school five days a week compared to those whose parents have postgraduate level qualifications. These results suggest that the less educated parents place a higher value on active transportation. Thus, responsible authorities may implement awareness programmes in many educational centres to promote the walking culture among individuals for future planning.

The results of the Chi-Square for these two variables also indicate uncertainty. The Pearson Chi-Square test (8.630) shows no significant association between these two variables, meaning that parental education does not differ significantly in the weekly walking frequency to school. The Likelihood Ratio test also displays no significant association with a p-value of 0.487.

Apart from the above, car ownership was also tested to determine whether it influences the walking frequency of schoolchildren. Interestingly, the highest number of children from households that owned a car walked to school five days per week, and children with no vehicles also recorded the highest number of people walking to school every day. This result indicated that the

availability of motorised transport does not discourage children from walking, even for those living near the school area.

Uncertainty is discovered when testing the relationship between car ownership and walking frequency. There is no discernible difference in the frequency of these two variables, as indicated by the results of the Pearson Chi-Square test (7.013). With a p-value of 0.062, the Likelihood Ratio test likewise shows no meaningful connection and is insignificant.

In conclusion, the survey findings presented in the table above highlight the significance of socioeconomic disparities in children's active transportation to school in Shah Alam City. Even though the results obtained contrast when the Chi-Square test was used, these factors must be considered. It is suggested that the responsible authorities address these inequities by targeting infrastructure improvements and educational campaigns. Both recommendations will be crucial to promoting walking and improving the health and safety of all primary schoolchildren.

The second data collection method is a site observational study focusing on the availability and condition of the pedestrian infrastructure, traffic volume, speed, and potential safety hazards in the site area. The following part will summarise key findings from the site observation related to those aspects.

Based on the observation of the researcher, the majority of the roads in front of the school area lacked dedicated sidewalks or footpaths, which forced pedestrians to walk on the road shoulder on the grass. It is the responsibility of responsible authorities to ensure that pedestrian facilities are provided to facilitate schoolchildren's use of the facilities safely. Besides, where sidewalks were present, it can be observed that many were in poor condition, such as having cracks, uneven surfaces, and obstructions such as utility poles and parked vehicles on the sidewalk area. On top of that, the crosswalks were limited without continuity and often located at major intersections, which required children to walk long distances to reach safe crossing points. Regarding supporting facilities, pedestrian signals and signage were inadequate, with many crosswalks lacking clear markings and signage that alerts drivers to pedestrians' presence. The following photos show the existing condition of the site area in terms of pedestrian infrastructure and facilities aspects.

Figure 2. The signboard installed away from the main road

Figure 3. The traffic light is not working

Figure 4. There are no clear markings on the speed hump

Figure 5. Pedestrian paths are placed with large trash cans

Figure 6. Cracks and uneven surfaces pedestrian path

For the second aspect, traffic conditions, it was noticed that the traffic volumes were high during school arrival and dismissal times. This situation happened due to the mix of cars, buses, and motorcycles on the roads simultaneously, which contributed to the crowdedness. The main road in front of the school area is two ways, which caused severe congestion in front of the school. Also, vehicle speeds often exceed the posted speed limit of 30km/hr, especially on wider roads with no traffic calming measures implemented. Besides, double parking and illegal stopping by parents' vehicles that drop off and pick up their children created congestion and reduced pedestrian visibility.

Figure 7. The speed limit in front of school area

Figure 8. The situation in front of school area during peak hours

Apart from the above aspects, safety hazards are also among the crucial elements considered in this study. During site observation, there was a lack of separation between pedestrians and vehicles, with no physical barriers or buffers on many roads near the school area. The overgrown vegetation and parked cars along the shoulder of the road obstruct visibility at intersections and crosswalks. On top of that, the inadequate lighting along the streets and pedestrian crossings, especially during early morning and evening hours when children are commuting to and from school, became one of the main problems for pedestrians in terms of safety. It was aggravated by drainage issues, which led to water pooling on the road shoulder and sidewalks, especially during rainy periods.

To sum up, all these findings discovered from the site observational study have highlighted the significant challenges and safety risks faced by children walking to school in the study area. To conclude, the lack of adequate pedestrian infrastructure, high traffic volumes, speeds, and various safety hazards create an environment that is inconducive to active transportation and puts children at risk of traffic crashes or other incidents involving pedestrians.

CONCLUSION

Based on the findings in the previous sections, it can be concluded that improving the pedestrian facilities and infrastructure provision in the school area is not enough to improve the parental perception of traffic safety in the neighbourhood school area. Despite that, this study may provide an analytical framework to examine how socioeconomic factors and traffic safety may relate to children's behaviour among schoolchildren across different areas. For future research, it is suggested that the researcher focus on people who use passive modes of transportation, as a result assisting in clarifying the transportation needs and preferences, which at the same time may encourage active school travel habits among school children. Most importantly, it will lead to a fairer distribution of resources where pedestrians can fully utilise the installed pedestrian facilities and infrastructures.

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REFERENCES
Bolkhanian, N., & Reyers, M. (n.d.). The walking school bus routing problem. *66–91.*

Faulkner, G. E. J., Buliung, R. N., Flora, P. K., & Fusco, C. (2009). Active school transport, physical activity levels and body weight of children and youth: A systematic review. *Preventive Medicine*, *48*(1), 3–8. https://doi.org/10.1016/j.ypmed.2008.10.017

Hatamzadeh, Y., Habibian, M., & Khodaii, A. (2017). Walking behaviour across genders in school trips, a case study of Rasht, Iran. *Transportation Research Part D: Transport and Environment*, *48*, 1-10.

Hawley, G., Witten, K., Hosking, J., Mackie, H., & Smith, M. (2019). The journey to learn: Perspectives on active school travel from exemplar schools in New Zealand. *Journal of Transport and Health*, *14*(August), 100600. https://doi.org/10.1016/j.jth.2019.100600

International Conference on Transportation and Development 2020. (2020). *International Conference on Transportation and Development 2020 309* (Vol. 1990, Issue 2001, pp. 309–318). Retrieved from http://www.asce-ictd.org/

Larsen, K., Gilliland, J., Hess, P., Tucker, P., Irwin, J., & He, M. (2009). Active commuting to school: How far is too far? *International Journal of Behavioral Nutrition and Physical Activity*, *6*(1), 1-9.

Lu, Y., Sun, G., Gou, Z., Liu, Y., & Zhang, X. (2019). A dose-response effect between built environment characteristics and transport walking for youths. *Journal of Transport and Health*, *14*(January). https://doi.org/10.1016/j.jth.2019.100616

PLANMalaysia. (2017). *Garis panduan pelaksanaan bandar sihat mesra pejalan kaki (Healthy Walkable City)*. Kementerian Kesejahteraan Bandar, Perumahan dan Kerajaan Tempatan. https://mytownnet.planmalaysia.gov.my/ver2/gp/GPP_WALKABLE_CITY.pdf

PLANMalaysia. (2022). *Garis panduan perancangan kemudahan masyarakat*. Kementerian Kesejahteraan Bandar Perumahan dan Kerajaan Tempatan. https://mytownnet.planmalaysia.gov.my/ver2/gp/GPP%20KEMUDAHAN%20MASYARAKAT%20(GP004-A.2022).pdf

Raoniar, R., Das, T., Banerjee, A., & M., A. K. (2019). The Parents' Role in School Mode Choice for their Children: A Case Study in Guwahati. *Journal of the Eastern Asia Society for Transportation Studies*, *13*, 775–794. https://doi.org/10.11175/easts.13.775

Rothman, L., Hagel, B., Howard, A., Cloutier, M. S., Macpherson, A., Aguirre, A. N., … Winters, M. (2021). Active school transportation and the built environment across Canadian cities: Findings from the child active transportation safety and the environment (CHASE) study. *Preventive Medicine*, *146*, 106470. https://doi.org/10.1016/j.ypmed.2021.106470

Tewahade, S., Li, K., Goldstein, R. B., Haynie, D., Iannotti, R. J., & Simons-Morton, B. (2019). Association between the built environment and active transportation among U.S. adolescents. *Journal of Transport and Health*, *15*(August), 100629. https://doi.org/10.1016/j.jth.2019.100629

Uddin, R., Mandic, S., & Khan, A. (2019). Active commuting to and from school among 106,605 adolescents in 27 Asia-Pacific countries. *Journal of Transport and Health*, *15*(August), 100637. https://doi.org/10.1016/j.jth.2019.100637

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