

Why Do Most Children Not Walk or Cycle to and from School?

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ABSTRACT

Background: Physical activity plays a crucial role in children's health and well-being. Active school commuting (ASC), one of the strategies to enhance physical activity among children, has declined globally. However, no data is available for Indonesian children. None of the determinants of children's ASC has been examined in Indonesian studies. **Objectives:** This study aimed to 1) measure the ASC rate and 2) analyze the association between individual, social, and physical environmental factors and the ASC rate among primary school children in three urban areas in Indonesia (South Jakarta, Central Jakarta, and South Tangerang). **Methods:** This is a cross-sectional study using an online survey completed by mothers as representatives of their children. The survey was completed by 441 parents from 9 primary schools in South Jakarta, Central Jakarta, and South Tangerang. **Results:** 1) Only 28.3% of children engage in ASC (walking or cycling), 2) individual factor ('do not dare to go to school alone'), social factors ('having a friend for going to school' and 'afraid of street crime'), and environmental factors (inadequacy of public transport, broken roads, and school distance) are significantly associated with ASC. **Conclusion:** less than one-third of primary school children in South Jakarta, Central Jakarta, and South Tangerang walk or bike to go to and back from school. Perceived individual, social, and environmental factors might hinder active school commuting among children. Future interventions need to attenuate negative perceptions toward ASC from individual, social, and environmental perspectives.

Keywords: Active commuting, Active travel, Children, School.

INTRODUCTION

The beneficial roles of physical activity in improving children's health and well-being in their age and later life have been recognized (Gao et al., 2018; Janssen & LeBlanc, 2010), including for obesity prevention (Wyszynska et al., 2020), fitness enhancement cognitive performance (Bidzan-Bluma & Lipowska, 2018), mental health (Biddle et al., 2019), and immunity (Shao et al., 2021). A review of cross-sectional and longitudinal studies found that children who have more physical activity, particularly vigorous intensity, have lower total body fat and abdominal fat both at this age and during older age. With one-third of school-age children in Indonesia overweight and obese, the scaling up of school-based physical activity strategies, such as active school commuting (ASC) is a fundamental public health concern.

Worldwide data reported that in 2016, 81% of children had insufficient physical activity. In lower-middle-income

countries, this prevalence was higher (83.9%) (Guthold et al., 2020). Indonesia as one of the lower-middle-income countries has an increase in inactivity behavior from 26,1% in 2013 to 33,5% in 2018 as reported by a national survey (Health Research and Development, 2013, 2018). ASC, introduced in the early 2000s, allows students to integrate physical activity into their daily schedules (Hills & Cambourne, 2002), as they typically make 360-400 trips per year (Craw, 2018). Likewise, the trend of active school commuting has also declined globally (Lam et al., 2023). ASC was found to have decreased from 84,4% in 2003 to 78,3% in 2017 in Germany (Reimers et al., 2021), as well as in Victoria, Australia which also declined from 33.6% in 2009-10 to 32.3% in 2012-13 (Adepoyibi et al., 2022). Spanish girls have also been reported to have a remarkable decline of ASC from 61% (2001-2002) to 46% (2006-2007) (Chillon et al., 2013).

A broad range of psychosocial factors including personal/perceptual, social, and environmental affect ASC

among children (Savolainen et al., 2024). In Jordan, student who have a better perception about health were more likely to be more active (Alkhawaldeh et al., 2021). In China, parental physical activity positively correlated with children and teenager's physical activity (Lu et al., 2017). In England, school hour setting and physical environment contributed to the long-term physical activity behavior among school children (Mantjes et al., 2012). This study found that children maintained more moderate to vigorous physical activity with a prolonged morning break and a safer physical environment (cycling infrastructure, crossing guard) (Mantjes et al., 2012). Self-efficacy also has a positive correlation with children and adolescent physical activity. In 2008, research found a conceptual framework of walking to school behavior in Austin, Texas, USA and revealed several factors including personal factors (sociodemographic, attitudes, barrier), social factors (school and peer influence), and physical environment (walkability, safety) associated with the walking behavior (Zhu et al., 2008).

Unfortunately, this data is limited to Asian countries such as Indonesia. To date, information that reveals the ASC level and factors that may contribute to it among primary school children in Indonesia, particularly in urban areas, has not been provided. In Indonesia, children in urban regions are less active than children in rural areas (Health Research and Development, 2018). South Jakarta, Central Jakarta, and South Tangerang are typical urban areas in Indonesia where the children population tends to have high inactivity. In Jakarta, for example, data revealed that there was an elevation of insufficiency in physical activity from 44,2% in 2013 to 47,8% in 2018 (Health Research and Development, 2013, 2018). There are over a thousand primary schools in Jakarta and the surrounding areas, and most of them have inadequate facilities and don't encourage students to walk or ride bikes. Given the obstacles, including social, personal, and environmental factors that may affect ASC, it is important to examine these factors toward ASC among primary school children.

In Indonesia, ASC among children and adolescents has been examined in

civil engineering and urban planning studies (Argarima & Naipospos, 2023; Budiman et al., 2020; Yumita et al., 2020). However, they mainly focused in investigating physical/built environment factors, and no studies inform behavioral and social factors affected ASC with a health science perspective. Therefore, information about ASC to and from school as well as its association with individual, social and environmental factors, should be addressed to provide useful information for local stakeholders and the future health promotion program. This study aimed to 1) measure the active school commuting rate and 2) analyse the association between individual, social and physical environmental factors, and ASC levels among primary school children in South Jakarta, Central Jakarta, and South Tangerang.

METHODS

Study Design

This study is a cross-sectional study using the survey to examine parents' perception of their child's ASC behavior, as well as individual, social, and physical environmental factors that might contribute to it. This survey was conducted in urban areas that are inhabited by populations with a wide range of socioeconomic status, including South Jakarta, Central Jakarta, and South Tangerang. Ethics approval has been received from The Medical and Health Research Ethics Committee Muhammadiyah University of Prof. Dr. Hamka (KEPKK UHAMKA) No.03/22.06/01763. Informed consent was delivered and signed by parents as they were willing to participate before completing the survey.

Study Participants

The participants are parents of students in grades 3-6 from nine primary schools (three schools from each location) who have a maximum of three kilometers walking distance and five kilometers cycling distance (based on Google Maps walking and cycling distance) and voluntarily completed a questionnaire distributed through Google Form. The initial explanation of the questionnaire has outlined the inclusion criteria, which encompass those residing in South Jakarta, Central Jakarta, and South Tangerang.

Surveys

All parents completed an online questionnaire consisting of questions related to family demographic characteristics (e.g., working status, highest level of education), ASC pattern (mode, frequency, distance) during the last week, and factors (individual, social, and environmental barriers and facilitators) that might influence their children's ASC to and from schools.

Statistical Analysis

Descriptive statistics of categorical variables are presented as percentages, while continuous variables are presented as mean and standard deviation. Normality assumptions were made using the Kolmogorov-Smirnov test. Chi-square and Fisher's exact test were employed to examine the association between each indicator of individual, social, and

environmental factors (yes/no) as the independent variables and the active school commuting (yes/no) as the dependent variable. The analysis was performed by using SPSS Statistic v. 23.0 (IBM SPSS Statistic for Windows, Version 23.0. Armonk, NY, USA).

RESULTS AND DISCUSSION

Participants' characteristics

A total of 441 students' mothers took part in this study. Table 1 demonstrates the family characteristics of each participant. The average age of children is 9.5 years (3rd- 4th-grade age). More than half of the mothers (61.7%) are unemployed. Over 50% of them attained low to middle education (completed middle and high education degrees).

Table 1. The Family Characteristics.

Variables	Data
Children's age (years; mean \pm SD)	9.5 \pm 0.53
Parent's working status (%)	
Unemployed	61.7
Employed	38.3
Parents' educational level (%)	
Low (Unschool/Primary school)	6.4
Middle (Junior/Senior high school)	51.0
High (Bachelor/Master/Doctoral degree)	42.6

ASC Level

Table 2 shows that most children prefer to be transported to and from school by their parents (77.3%), with the private vehicle being the most popular mode of transportation (81.6%). Although the school-home distance is relatively short (averaging less than 3 km), only less than one-third of the children (28.3%) engage in active school commuting. To the author's knowledge, this is the first study measuring ASC rates among primary school children in Jakarta and South Tangerang, Indonesia. Previously, the ASC rate among children was mostly studied in high-income nations such as Australia, Switzerland, and the United Kingdom (Lam et al., 2023). While the global data have shown a worldwide decline of ASC school among children age 6-12 years old (Lam et al., 2023) No trend data are available in Indonesia.

This study finds that the percentage of ASC among children in Jakarta and South Tangerang, Indonesia, is

low (28.3%). This percentage is only slightly higher than their counterparts in developed, industrial countries, such as Australia (27%), Portugal (23%), and the US (13%). This study found that ASC among Jakarta and South Tangerang children is significantly lower compared to those found in developed European countries, including Great Britain (48%), the Netherlands (86%), Denmark (63%), and Russia (59%). According to the Global Matrix 3.0 which examines active travel among children and adolescents across 49 countries, it is found that the global average grade was a C, indicating that the country successfully manages active travel with about half of children and adolescents (Gonzalez et al., 2020). It is concluded that the prevalence of ASC among primary school children in DKI Jakarta and South Tangerang is significantly lower compared to children worldwide.

A systematic review has summarized that ASC positively contributes to children's physical activity

level during their active school days, including longer duration of recommended moderate-intensity physical activity and higher daily steps (Lam et al., 2023). This increased physical activity level due to ASC may contribute partially to the children's health and well-being, such as lower

adiposity (e.g., body mass index, body fat mass), higher fitness level, fewer depressive symptoms and better psychological well-being (Lam et al., 2023). However, the association between ASC and children's health and well-being is still inconsistent (Lam et al., 2023).

Table 2. Children's ASC Habit.

Variables	Data
School distance (km; mean, SD)	2.42 ± 2.91
Trip preference (%)	
Delivered and picked up	77.3
Delivered or picked up (one of them)	8.5
Go to school and go home alone	14.2
Transportation mode (%)	
Walking	17.0
Cycling	0.7
Private vehicle	81.6
Public transport	0.7
Walking/cycling (trip/week)	1.06 ± 1.91
Active commuting to/from school (%)	71.7
Never	11.3
Sometimes (1-4 trips/week)	17.0
Daily (≥5 trips/week)	

Individual barriers to children's ASC

Figure 1 indicates that the majority of parents believe their children 'do not dare to go to school alone' (60.3%). About a quarter of parents (28.4%) perceived that their children are 'too lazy to move' as the reason for not walking or cycling to and from school. Other barriers, but not significant, include laziness, disability, and illness. Table 3 reveals that among those barriers, 'do not dare to go to school alone' is the only barrier that is significantly associated with active school commuting among children (P -value <0.005).

The perceived safety of travel and neighborhood has been found as a mediating factor for the parental decision to allow their children to go to school actively by walking or cycling (Wangzom et al., 2023). In this study, although the average home-school distance is relatively short (less than 2.5 km), more than half of the students do not dare to go to school alone. A qualitative study involving parents of children aged 7-12 revealed that parents' perception of risk, such as getting injuries while walking or cycling to school, may hinder children's ability to utilise

active school commuting (Lindqvist et al., 2023).

A study among primary school children in Granada, Spain, found that children may have individual motivational barriers and social support barriers higher than their parents (Aranda-Balboa et al., 2021). While their parents are more concerned about child safety (e.g., home-school distance, traffic safety, crime-related safety), the children have more individual barriers, such as laziness, low motivation, and fear of going to school alone (Aranda-Balboa et al., 2021). These individual barriers are significantly associated with lower ASC (Aranda-Balboa et al., 2021). A study among primary school children in Texas, the United States, found that children's self-efficacy, such as emotional states and social modeling, affected ASC (Lu et al., 2015). Interestingly, parents' self-efficacy toward ASC had a stronger influence on children's active school commuting behavior. Individual health status, enjoyment, knowledge of the road, and discomfort may also influence children's ASC. The impact of parental safety concerns on children's ASC may decrease as children

age. Future interventions need to attenuate the perceived safety of both children and parents, as well as improve

self-efficacy toward ASC among both populations.

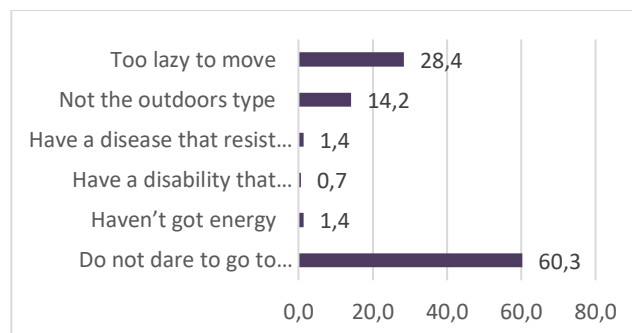


Figure 1. Individual factors for children's ASC (%).

Table 3. Individual factors associated with ASC.

Individual factors	ASC		P-value
	No (%)	Yes (%)	
Do not dare to go to school alone			
Yes	90.6	9.4	0.000**
No	42.9	57.1	
Haven't got energy			
Yes	50	50	0.491*
No	71.7	28.3	
Have a disability that resists movement			
Yes	0	100	0.279*
No	72.7	27.3	
Have a disease that resists movement			
Yes	50	50	0.488*
No	71.9	28.1	
Not the outdoors type			
Yes	70	30	1.000
No	71.9	28.1	
Too lazy to move			
Yes	92.5	7.5	0.460
No	97	3	

*Fisher exact test

**Statistically significant

Social barriers to children's ASC

Figure 2 shows that most of the participants perceived that their children 'having many friends in the neighborhood' (78%), 'having friends for going to school together' (78%), 'knowing many people in the neighborhood' (70.9%), and 'living in a close-knit neighborhood' (64.5%) as facilitator for ASC. However, they are afraid of street crime (75.9%). It indicates that the parents and children are socializing yet expressing concern about

their child's safety during school commutes. Table 4 shows that 'having friends for going to school' and 'being afraid of street crime' are the significant factors for ASC among children (P -value<0.005). Contextual factors such as parent's safety concern have been revealed as a consistent factor for ASC among school children aged 6-12 years old (Lam et al., 2023). According to McMillan's framework of the Elementary-Aged Child's Travel Behavior, neighborhood safety, traffic safety, and household

transportation options are the mediated factors created by the physical/built environment (McMillan, 2016). These mediating factors, along with the moderating factors (social/cultural norms, parental attitudes, sociodemographic) may influence parental decision-making that allow or do not allow the children to have an active travel to go to and back from their school (McMillan, 2016).

Parental concerns may positively be influenced by the physical environment if it provides adequate facilities (e.g., walkability features, bike facilities). A study among secondary school students in Blitar, Indonesia, found that students' bike ownership may be positively associated with their ASC (Budiman et al., 2020). Conversely, parental decisions may also be negatively influenced by high car ownership, street crime, and unsafe roads. A study among secondary school students in Central Jakarta found that parents' car ownership is negatively associated with

ASC (Argarima & Naipospos, 2023). In Australia, despite the close distance between house and school, parents decide to transport their children to and from school by car due to its speed, safety, and convenience, aligning with their family's schedule.

Moreover, parents' demographics, such as education level and work status, may also affect ASC among children. In this study, more than half of the mothers of the students are housewives with low to middle education levels. A finding from a study among primary school students in the United States suggested that mothers' worries about traffic conditions in the area can discourage children from engaging in ASC (Sener et al., 2019). Nevertheless, a flexible parents' work environment, particularly for mothers, is positively associated with ASC among children (Sener et al., 2019).

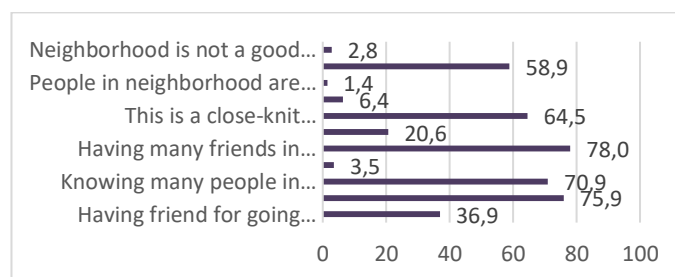


Figure 2. Social factors for children's ASC (%).

Environmental barriers to children's ASC

This research shows that most parents perceived that their neighborhoods are comfortable and safe for walking (65.2%) and cycling (58.2%), and have many alternative routes (53.9%) that may support their children in actively going to school by walking or biking. However, more than half of parents indicate that the roads in their neighborhood have no adequate pedestrian/footpath (57.4%) and traffic light for crossing (51.7%). In addition, one-third (33.3%) of the parents indicate that public transportation in their city is inadequate. Then, it shows that inadequacy of public transport, broken roads, and school distance are the physical environmental factors significantly associated with ASC among children (P -value <0.005). Traditionally, physical environment has been considered as a primary factor for ASC (Lam et al., 2023). In Indonesia, the physically active built

environment has been associated with ASC, such as distance from home to school (Argarima & Naipospos, 2023), and inadequacy or low quality of public transport (Yumita et al., 2020). As the basic factors of ASC, built environment and urban planning may influence home-school distance and parents' perceived safety (McMillan, 2016). Again, perceived neighborhood safety, travel safety, and distance to school have been found theoretically as mediating factors of parental decisions on their children's ASC. It is suggested that schools should be situated in areas with high population density to enable a larger number of children to commute to school by walking and cycling (Wangzom et al., 2023).

School zonation is an example of a promising strategy that may reduce distance to school and improve parental perceived neighborhood safety to promote students having more walking and cycling

to school, as found in Surakarta (Lestari & Dewanti, 2021) and Central Jakarta (Argarima & Naipospos, 2023), Indonesia. It is also suggested to design interventions to promote children's ASC by including modifications to the physical environment (e.g., pedestrian infrastructure close to schools) and developing secure pathways for students to commute to school to alleviate parental concerns over road safety (Hume et al., 2009). The current results support the policymakers to tailor effective interventions and policies for children about ASC.

Efforts to promote active transportation for children should emphasize the societal advantages, such as the chance to interact with peers, through educational initiatives. Furthermore, the implementation of school-based intervention to promote walking for students who live near the school or cycling for students residing farther from school, and establishing designated drop-off spots along a secure walking path to school could effectively enhance the utilization of ASC among children (Dalton et al., 2011). Given that ASC can account for 25% of children's overall daily moderate-to-vigorous physical activity, it is suggested that schools promote physical activity either before or after school, as well as during school hours through physical education classes and active recess (World Health Organization, 2021).

CONCLUSION

The prevalence of ASC among primary school children in several urban areas in Indonesia is 28.3%, much lower than those found among children around the world. Various psychosocial factors (individual, social, and environmental factors) are associated with children's active commuting. These findings have significant implications for policymakers in terms of locating schools within neighborhoods and ensuring they are within a reasonable walking distance for the majority of students. In addition, the result of this study demonstrated the importance of reducing the negative perceptions of children and their parents toward travel safety to encourage ASC. It is important to create solutions tailored to individual obstacles and involve both children and their parents.

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