Review

Understanding Travel Behavior and Sustainability of Current Transportation System for Older Adults in Malaysia: A Scoping Review

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Abstract: Rapid transportation development may be welcomed by many, but older adults might find it difficult to keep up with their transportation uses and remain active. This study reviewed published articles on the travel behavior of older adults in Malaysia and associated transportation determinants to explore how sustainable the transportation system is for this vulnerable cohort. The authors searched four databases: PubMed, Scopus, ProQuest, and EBSCOhost. Inclusion criteria were older respondents, living in a community in Malaysia, addressing any travel behavior characteristics, and being written in English. Review papers, letters, book citations, comments, editorials, and experimental and animal studies are excluded from this study. A total of seven studies were included in this review extending from 2007 to 2020. The result showed that the transportation use of older adults has shifted from relying on public transport to driving their own vehicles to move around. According to the findings of this study, besides personal and health factors, the transport use of older adults is affected mainly by cost, public transport availability, road traffic and safety, the complexity of the transportation system, distance to public transit, availability of parking space, as well as road conditions and signage. It is concluded that an effective strategy to improve the transportation system is needed to prevent the unmet travel needs of older adults in Malaysia.

Keywords: elderly study; mobility; transportation; scoping review

1. Introduction

Over the past few decades, transportation infrastructure has expanded rapidly to accommodate Malaysia's growing demographic and economic demands. There were multiple transportation modes provided, new networks and lines are added from time to time, and the services are upgraded as needed. This has led to improved connectivity for most citizens.

However, the evolving transportation landscape might be too challenging for older adults [1]. Living in a car-dependent nation, the traffic, hazards, and pollution can hamper their planned excursions [2]. The transportation system in Malaysia is more complex and busier now than ever with the greater number of transit commuters, vehicles on the

roads, junctions, intersections, flyovers, roundabouts, and ongoing constructions (Figure 1). Additionally, the present transportation system's lack of age-friendly features has an even more detrimental impact on their mobility [3]. Urban sprawl and limited sources of income further hinder their transport use [4]. The deteriorating physiological functions [5] as well as poor health and wellbeing [3] can all affect their mobility and transportation use.

Figure 1. Conditions of the transportation system in Malaysia (**A**): High number of vehicles on the road most of the time. (**B**): Multiple lanes and junctions that can be confusing for older road users. (**C**): Consistent road constructions which obstruct the flow of traffic. (**D**): Lack of bicycle lanes by the road. (**E**): Long wait time for public transport. (**F**): Overcrowded on public transport.

Sustainable Development Goal (SDG) 11 gives special attention to older adults, among others, regarding the accessibility to a safe and sustainable transport system. It has been acknowledged as the major component of sustainable development and the foundation of several other SDGs, predominantly those related to food security, health, economic growth, infrastructure, energy, and, last but not least, cities and human settlement. This agenda anticipated engagement with and protection of older persons in society by 2030, with the distinct aim of leaving no one behind.

Thus, is the rapidly developing transportation system in Malaysia capable of sustaining the transport use and mobility of older adults? In 2022, older adults constitute 11.1% of the total Malaysian population [6], an increase from only 3.3% in 1970 [7]. About 42.5% of them live in urban areas [8]. Female older adults constitute 52.9% [8]. Around 66.0% of the older adults were married, while the remainder were either widowed, never married, separated, or divorced [8]. Only 6.7% of them have post-secondary education, while 48.8% and 24.3% have primary and secondary education, respectively [8]. They were predominantly retirees, with only 26.4% still employed [8]. The majority (64.1%) earned a monthly income of less than RM 1000 (USD 224) [8] with just 41.2% of them owning private vehicles [9].

A push toward sustainable mobility and transportation uses as well as active aging in this rapidly aging population could present a challenge for the government. As many of them prefer to age in place, they might be having difficulty maneuvering their daily routine on their own while living independently with limited child assistance. Older adults have long battled to remain physically and socially active in their community [10]. The unmet

travel needs of older adults might further lead to social exclusion and poor self-care if it is not addressed effectively [11].

The demographic shift might indeed be a cause of concern for them. This review will look at the travel behavior of older adults and the associated transportation determinants. The emphasis will be on comprehending the decision-making process of how they traveled, the means of transport chosen, and impediments encountered while commuting. It will help nations prepare for an aging population, and benefit older adults by maximizing their mobility, health, and wellbeing.

2. Materials and Methods

The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) was adhered to while conducting the review, as shown in Figure 2. Four electronic databases, namely Scopus, PubMed, EBSCOhost, and ProQuest, were systematically searched for prospective papers. Observational studies, including qualitative studies focusing on older adults' travel behavior and transportation determinants, were reviewed in this article. Grey literature, mainly from the articles' citations, was reviewed as well. All potential articles were reviewed regardless of the publication year.
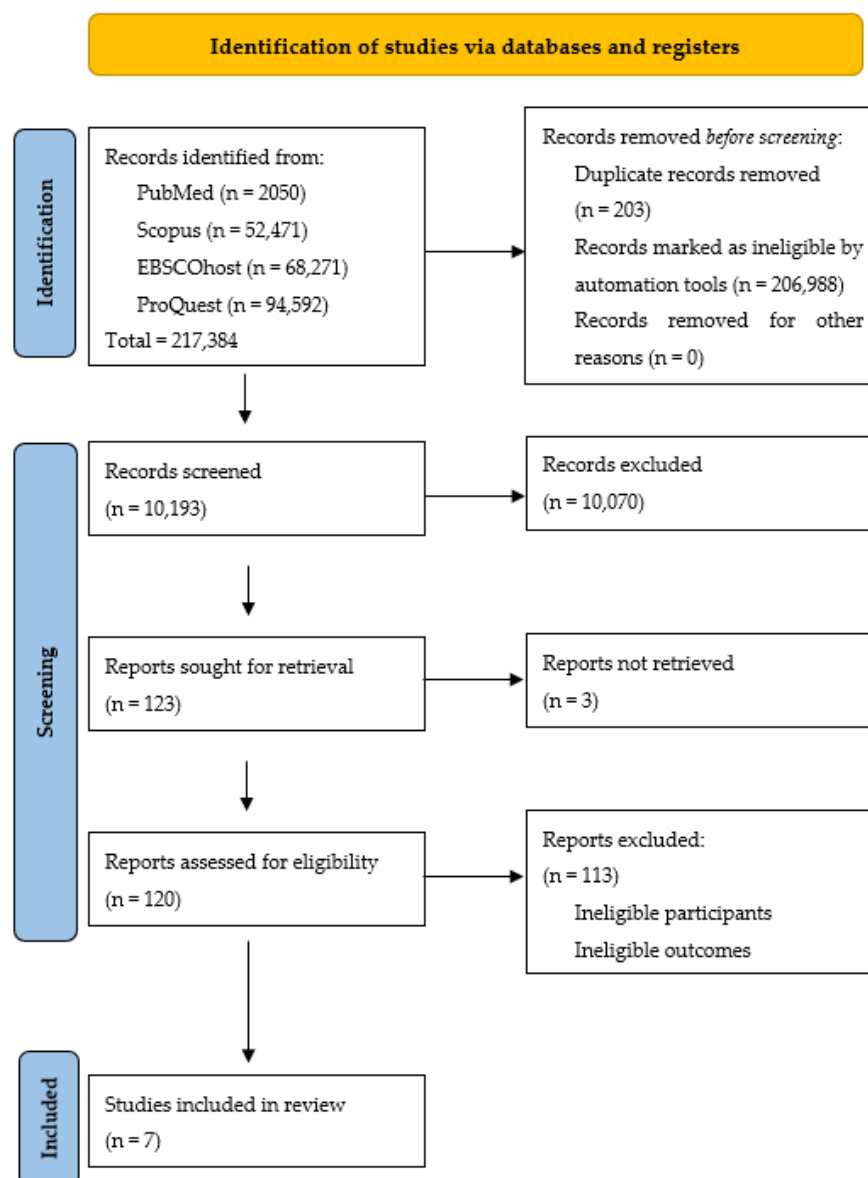

Figure 2. PRISMA flowchart diagram.

The search concentrated on four concepts: (1) older adult population; (2) travel behavior; (3) transportation determinants; (4) Malaysian study. The related terms of each concept were determined and included in the search string, as shown in Table 1. Asterisk (*) was used to retrieve multiple related words. Using the "OR" and "AND" features, the terms from each concept were combined to conduct the literature search.

Table 1. Search string.

Concept	Search Term
Population	"older adult *" OR older OR elder * OR senior * OR geriatric * OR aged OR aging OR aging OR "old age" OR "old people"
Travel behavior	AND "travel behave *" OR travel OR trip OR transport * OR commut * OR driv * OR rid * OR cycl * OR car OR motorcycle * OR "public transport *" OR bus OR train OR taxi OR "e-hailing"
Transport determinant	AND "transport * determinant *" OR determinant * OR factor * OR cause * OR influence *
Area of study	AND Malaysia

2.1. Inclusion and Exclusion Criteria

Table 2 shows the inclusion and exclusion criteria of this study. Studies involving older Malaysians aged more than 55 years old, living in the community, as well as reporting at least one aspect of the travel behaviors or transport determinants of older adults were included in the review.

Table 2. Inclusion and Exclusion Criteria.

Criteria	Included	Excluded
Population	Malaysian older adults aged greater than 55 living in a community	Those aged below 55 years old, non-Malaysian origin, and institutionalized older adults
Outcome	Older adults' travel behavior and transport determinant	Articles of unrelated themes
Design	Community-based research, cross-sectional studies, secondary data, and qualitative study	Duplicates, book citations, commentaries, editorials, review articles, and non-English articles

2.2. Study Screening and Selection

Based on the inclusion and exclusion criteria, titles and abstracts were assessed. If the inclusion or exclusion criteria could not be determined from the title and abstract, the full-text research publications were retrieved and reviewed. The study criteria that were sought are study design, study location, sample size, study objective, and significant results. Whenever analyzed, significant transport factors were determined using the 95% confidence interval and odds ratio/adjusted odds ratio.

2.3. Data Extraction

Following the screening of papers, duplicate publications were identified and eliminated by comparing author names, study titles, and sample sizes. Study results mentioning travel behavior and determinants of transport usage were included in the review. A methodological assessment for each selected research article was carried out, followed by data extraction. The data from the chosen studies were retrieved based on (1) study overview or research characteristics; (2) results of the study; (3) relevancy to the issue addressed.

2.4. Presentation of Data

Table 3 shows the summary of the data retrieved. The travel behavior and transport determinants of older adults were characterized using the same frequencies, percentages, and measures of association as were utilized in the research.

Table 3. Main findings.

References (*n* = 7)	Study Design	Sample Size, Target Population and Study Area	Outcome Measured	Indicative Findings
		Travel frequency		
Ang et al. (2020) [12]	Qualitative study	22 older adults aged 60 and above in Selangor and Kedah	Driving regulation	Older car drivers made fewer trips and avoided driving in challenging situations as a driving strategy to ensure continuous driving into advanced age
Ang et al. (2019) [1]	Cross-sectional study	637 older adults aged 60 and above in Selangor and Kedah	Driving cessation	Most older car and motorcycle drivers traveled everyday (46.8% and 59.4%, respectively), followed by almost every day, occasionally and rarely
Mohd et al. (2019) [9]	Cross-sectional study	455 older adults aged 60 and above in Malacca and George Town	Travelbehavior	Average number of trips decreased with age. There was a disparity in the number of trips between older adults in Malacca and George Town
		Travel destination		
Kamaruddin (2008) [13]	Cross-sectional study	1356 older adults aged 65 years and older in Kuala Lumpur, Petaling Jaya, Penang, Ipoh, Johor Bahru, and Kuantan.	Travel characteristics and mode of transportation	Both urban and rural older adults traveled the most for social visits. Then, it was for shopping trips and medical check-ups for urban older adults. However, those from rural areas went for medical check-ups more frequently than they went shopping
Musa and Sim (2010) [14]	Cross-sectional study	1356 older adults aged >55 in Kuala Lumpur, Ipoh, Petaling Jaya, and Penang.	Leisure travel behavior	Most holiday trips, domestic and foreign, were made to spent time with family and friends (55.3%), relaxation, to treat oneself, and for religious reasons. They chose big cities, beaches, and rustic villages for domestic trips. They favored big cities, religious sites, and historical places when traveling abroad

Table 3. *Cont.*

References (*n* = 7)	Study Design	Sample Size, Target Population and Study Area	Outcome Measured	Indicative Findings
Mohd et al. (2019) [9]	Cross-sectional study	455 older adults aged 60 and above in Malacca and George Town.	Travel behavior	Most trips of older adults were for personal reasons, followed by shopping, and recreational purposes
Travel distance				
Ang et al. (2019) [1]	Cross-sectional study	637 older adults aged 60 and above in Selangor and Kedah.	Driving cessation	Most of the older car and motorcycle drivers (86.2% and 82.0% respectively) drove short distances rather than long distances
Mohd et al. (2019) [9]	Cross-sectional study	455 older adults aged 60 and above in Malacca and George Town.	Travel behavior	Distance traveled decreases with age
Ang et al. (2020) [12]	Qualitative study	22 older adults aged 60 and above in Selangor and Kedah.	Driving regulations	Older drivers changed their driving patterns by traveling locally to sustain their driving capabilities into advanced age
Mode of transportation				
Nurdden et al. (2007) [15]	Cross-sectional study	1200 general population including elderly aged >55 in Kuala Lumpur city center.	Preference for public transport versus driving over three proposed policies	Compared to younger people, the likelihood of older adults choosing public transport increases by 93% when travel cost and time are reduced, 96.7% when distance to public transit is reduced, and 98% when frequency and services improved
Kamaruddin (2008) [13]	Cross-sectional study	1356 older adults aged 65 years and older in Kuala Lumpur, Petaling Jaya, Penang, Ipoh, Johor Bahru, and Kuantan.	Travel characteristics and mode of transportation	Both rural and urban older adults preferred to ride the bus, followed by car, taxi, and train. Reliability, staff attitude, confusing signage and affordability are the main difficulties encountered by older adults when using public transport
Musa and Sim (2010) [14]	Cross-sectional study	1356 older adults aged >55 in Kuala Lumpur, Ipoh, Petaling Jaya, and Penang.	Leisure travel behavior	Cost, distance, safety, comfort, and convenience of the facility were factors affecting older adults' decision to embark on a leisure trip
Mohammed et al. (2015) [16]	Cross-sectional study	400 general population including older adults aged >63 in Petaling Jaya.	Travel behavior	Older adults are more likely to drive than to take a bus or train to move around. Car ownership, trip duration and distance to transit were significantly associated with the modal choice

Table 3. *Cont.*

References (*n* = 7)	Study Design	Sample Size, Target Population and Study Area	Outcome Measured	Indicative Findings
Mohd et al. (2019) [9]	Cross-sectional study	455 older adults aged 60 and above in Malacca and George Town	Travel behavior	Older adults prefer to drive rather than take public transport. Reliability and accessibility of public transport were found to be the main barrier to its use
Ang et al. (2019) [1]	Cross-sectional study	637 older adults aged 60 and above in Selangor and Kedah	Driving cessation	Most of the older adults had moderate accessibility to public transport near their residence ($p < 0.001$). However, they prefer to ride motorcycles since they are convenient, economical, and easy to maneuver
Ang et al. (2020) [12]	Qualitative study	22 older adults aged 60 and above in Selangor and Kedah	Driving regulation	Older adults tended to forego driving in favor of taking public transport when dealing with a distant destination, road congestion, and insufficiency of parking spaces. However, when using public transport, they encountered challenges in reaching destinations, long wait times, limited accessibility, and an unfamiliar system

3. Results

3.1. Study Inclusion

Four databases were searched, yielding a total of 217,384 entries. After automation removal and duplicates were deleted, 10,193 records remained. Based on their titles and abstracts, 10,070 of the remaining records were deemed ineligible. Three articles could not be retrieved. After reviewing the full texts, 113 of the 120 articles were excluded because they did not meet the criteria of the review's eligibility. Thus, seven articles were ultimately included in the review.

3.2. Characteristics of the Included Studies

Seven peer-reviewed studies were analyzed and interpreted. Table 3 summarizes the general features of the included studies as well as their study findings. Six included articles are cross-sectional in design, and one study is a qualitative study. All research was conducted based on one-on-one interviews, with two in combination with online and mailbox surveys. Five studies were conducted in a multi-center setting, and the other two were in a single-center setting. In terms of the study population, two investigations were undertaken among the general population, while five other studies were conducted on the older population specifically.

3.3. The Study Outcome

3.3.1. Travel Frequency

Most of the older car drivers in Malaysia travel every day (46.8%), followed by almost every day (36.5%), occasionally (15.4%), and rarely (1.3%). For older motorcycle drivers, most of them also traveled every day (59.4%), followed by almost every day (29.7%), and occasionally (10.9%) [1].

Through journal diaries, it was found that the number of trips of the older adults decreased with age [9]. The young-old made an average of 1.29 excursions per day, falling to 1.05 among the middle-old, and 0.99 for the old-old group of older adults. However, the number of journeys varied by location, with an average of 1.224 trips made by older adults in George Town compared to only 0.956 trips made by those in Malacca. Owning a private vehicle was found to increase the number of trips made.

Trouble with driving was significantly associated with driving cessation among older adults (OR: 1.08; 95% CI: 1.03–1.14; p = 0.0028) [1]. Those who chose to continue driving would adopt certain self-regulatory driving practices to cope with driving difficulty [1]. They would change their driving patterns by restricting their driving time for their own safety. As they refused to stop driving altogether, owing to a decline in driving ability, they would cut down on the number of trips they took, drive more slowly, and avoid driving in hazardous conditions such as at night, in the rain, or during rush hour.

3.3.2. Travel Destination

The majority of young-old groups of older adults in Malaysia made a personal trip as their first and second trip (26.8%), followed by a recreational trip as their third trip (40.8%) [9]. For middle-old adults, the first trip was also for personal reasons (28.7%), with shopping as the second trip (25%), followed by the third trip for recreational purposes (40.9%). The old-old group of older adults traveled for personal reasons (23.4%) on their first trip, then shopping (25%) for the second trip, and either shopping (21.1%), recreation (21.1%), or other reasons (21.1%) were given for third trips. Older adults from different cities showed little discrepancy, except for the old-old age group where Malaccans made more trips for medical reasons than those from George Town.

There was a slight difference in travel purposes between older adults living in rural and urban areas. In one study, older adults living in an urban setting were found to travel for social visits the most (49.2%), followed by shopping trips (47.8%), and medical check-ups (40.6%) [13]. For rural older adults, the most common purpose for them to travel was also to visit family and relatives (58.0%), followed by medical check-ups (50.0%), and shopping (41.6%). Other trip purposes frequently mentioned by rural and urban older adults included banking (30.5%), religious activities (27.2%), working (8.1%), sports participation (6.5%), and charity events (4.1%).

For leisure, older adults cited a preference for making such trips to spend time with friends and family (60.5%), for relaxation (42.8%), giving themselves a treat (20.4%), for religious reasons (18.4%), and as a learning experience (10.0%). Their favorite domestic sites to visit included big cities (46.9%), beaches (43.5%), and rustic villages (34.1%). Meanwhile, they favored big cities (31.6%), religious sites (24.9%), and historical places when traveling abroad (14.2%) [14].

3.3.3. Travel Distance

The majority of older car drivers traveled short distances (86.2%), as compared to just 13.8% who traveled long distances. Similarly, the majority of older motorcycle drivers (82.0%) traveled short distances, while only 18.0% traveled long distances [1]. About 48.26% of older adults traveled between one to five kilometers per day [9]. Traveling for long distances becomes less common with age. About 19% of the young-old group of older adults traveled more than 10 km per day, the number falling to 10.56% among middle-old, and 8.51% among the old-old age group.

The reduction in traveling distance with age was a part of a coping mechanism for older adults facing a decline in driving ability. They imposed driving limitations on themselves, such as making shorter trips and driving locally, as a self-regulatory practice and driving strategy to sustain mobility and to prevent complete cessation of driving as they grow old [12].

3.3.4. Mode of Transportation

Transportation Determinants of Older Adults

In a study of leisure trips made by older adults, it was found that most of them chose to travel in tour groups (44.2%) [14]. However, cost (61.7%), distance (35.1%), safety (31.5%), comfort, and convenience of facilities (22.3%) were reported to be the major factors in travel decision-making.

Transportation Determinants of Older Drivers

The number of trips taken by older adults significantly increased with ownership of a vehicle [9]. A predicted travel frequency of 1.396 trips as compared to 0.776 trips has been reported among those without a private vehicle and 1.216 trips for those who depend on others for transportation. No disparity was found across age groups and cities. However, car ownership decreased the odds of taking the bus (OR: -0.954; $p = 0.002$) and train (OR: -0.875; $p = 0.007$), and further promoted car use [16].

Older adults preferred to drive a car rather than ride a motorcycle ($p < 0.001$) [1]. They cited driving a car as safer than riding a motorcycle. On the other hand, those who favored riding a motorcycle cited it to be more convenient, economical, and easier to maneuver, especially in heavy traffic. Additionally, this study also revealed that, compared to car drivers, more motorcycle riders had ceased riding as they aged (OR: 4.78; $p < 0.001$). It was statistically associated with the level of difficulty ($p = 0.0028$) and avoidance of facing challenging situations ($p = 0.0035$) while riding.

A qualitative study was also conducted where older drivers' self-regulatory practices were studied [12]. Among the challenges for them to continue driving were petrol price affordability, safety concerns, poorly maintained road signage, road conditions, complex road networks, unfamiliar places, and a lack of parking spaces. They would reduce the number and distance of the trips, drive at a slower pace, and avoid driving in challenging situations such as at night, in the rain, and during peak hours.

Transportation Determinants of Older Public Transport Commuters

As early as 2007, age was found to be significantly associated with modal choice behavior among the local older adults [15]. When travel costs and time were reduced, the odds of older adults using public transport increased by 93.8% ($p = 0.036$) compared to younger commuters. Older adults also were more likely to use public transport as opposed to driving when the distance to the public transport facility was reduced, compared to younger people (OR: 0.967; $p = 0.003$). Moreover, an improvement in public transport frequency and services would increase the odds of older adults using public transport by 98.0% ($p = 0.047$) compared to younger commuters. Additionally, the odds of older adults switching to public transport also increased by 36.0% ($p = 0.001$) when the minimum driving age increased to 23 years old.

A study conducted in 2008 reported high usage of public transport among older adults [13]. Older adults from the urban area chose to ride public transport, mainly buses (40.6%), and taxis (32.7%), rather than drive private vehicles, mainly their own cars (43.7%), to reach their destination. Similarly, older adults from rural areas predominantly rode public transport, including buses (50.4%) and taxis (33.0%), rather than using their own mode of transport (37.0%). However, a few difficulties were conveyed concerning public transport usage. Urban older adults encountered issues of reliability (29.8%), safety (22.3%), the attitude of the staff (21.0%), confusing signage (19.9%), and affordability (19.8%) when using public transport. The issues of availability (19.4%), accessibility (17.0%), and long

journey times (16.4%) were not as concerning for them. For older adults living in rural areas, issues of reliability (34.3%), affordability (29.2%), safety (24.6%), the attitude of the staff (24.1%), long journey times (21.0%), and confusing signage (19.7%) were the major difficulties they faced when using public transport. The issues of accessibility (17.0%) and availability (14.4%) were not considered major difficulties faced by them. Trains are less preferred by older commuters due to the difficulties of boarding or alighting at terminals, and the inconvenience and hassle during travel.

In 2015, another study was conducted to analyze the determinant of choice of transportation modes [16]. At this time, an increase in age was found to increase the likelihood of choosing to drive over taking a bus ($p = 0.014$) or a train ($p = 0.005$). The larger distance between one's residence and transport station reduced the odds of using public transport over owning a car (aOR = -0.875; $p = 0.007$). It also statistically increased the likelihood of driving rather than using public transport (aOR = 0.748; $p < 0.002$).

Similarly, another study conducted in 2018 also reported that older adults prefer to drive their private vehicles than ride public transport [9]. However, they found discrepancies when comparing the modal choice of older adults living in different cities. Only 3.92% of older adults in Malacca used public transport. Most who live in Malacca preferred to be chauffeured as passengers in a private vehicle (49%). In contrast, a greater percentage of older adults in George Town (20.47%) traveled using public transportation. Thirty percent of them chose to drive their own vehicle. Only 20% of older adults in George Town depended on others for transport. A small percentage of those who live in George Town cycled to travel, while none from Malacca did so. The percentage of older adults from George Town who used public transport was five times that of older adults in Malacca. Better facilities in George Town than in Malacca was found to be a substantial factor in determining the use of public transport among older adults there.

When it comes to the accessibility of public transport near their residence, there was a statistically significant disparity between older car and motorcycle drivers/riders ($p < 0.001$) [1]. More older car drivers had excellent (6.7%) and good (33.5%) accessibility to public transport near their homes than older motorcycle riders (1.9% and 21.2%, respectively). Accordingly, more older motorcycle riders faced moderate (45.9%) and poor (31.0%) accessibility to public transport near the home than older car drivers (36.3% and 23.5%).

It has also been reported that older adults used public transport as a mobility coping strategy. When the traffic was bad, they had to travel to distant destinations, or there was a lack of parking space, their mode of transportation gradually changed to compensate for their deteriorating abilities and discomfort in dealing with challenging situations [12]. However, they expressed having encountered difficulties in reaching their destination when traveling by public transport, including long wait times, limited accessibility, and a lack of familiarity with the transit system.

4. Discussion

This study identified evidence on the travel behavior of older adults in Malaysia and their transportation determinants. Their number and distance of excursions decreased with age [1,9,12]. They traveled every day [1], albeit only once a day [9] and only for short distances [1,9,12]. The majority of their trips were for everyday necessities and self-care, such as grocery shopping, medical appointments, and visiting family and friends [9,13].

There was a shift in travel mode preferred by older adults, from taking public transport in earlier studies [13,15] to driving private vehicles in many recent studies [9,16]. Many were also discovered to interchange modes of transport, while some depended on others for private transportation [12]. There were disparities in transportation modes used between study areas, mainly due to differences in the establishment of public transport in those locations [9].

In comparison to older adults from other countries, namely Australia [2], Netherland [17], Japan [5], Singapore [18], Korea [19], and Thailand [20] (Figure 3), more older Malaysians were found to be driving than their counterparts. There were also a smaller

percentage of them who traveled by public transport than older adults from other Asian countries, but relatively the same as the Dutch and Australian older adults. Active traveling through cycling and walking among Malaysian older adults were also found to be less than those from other countries.
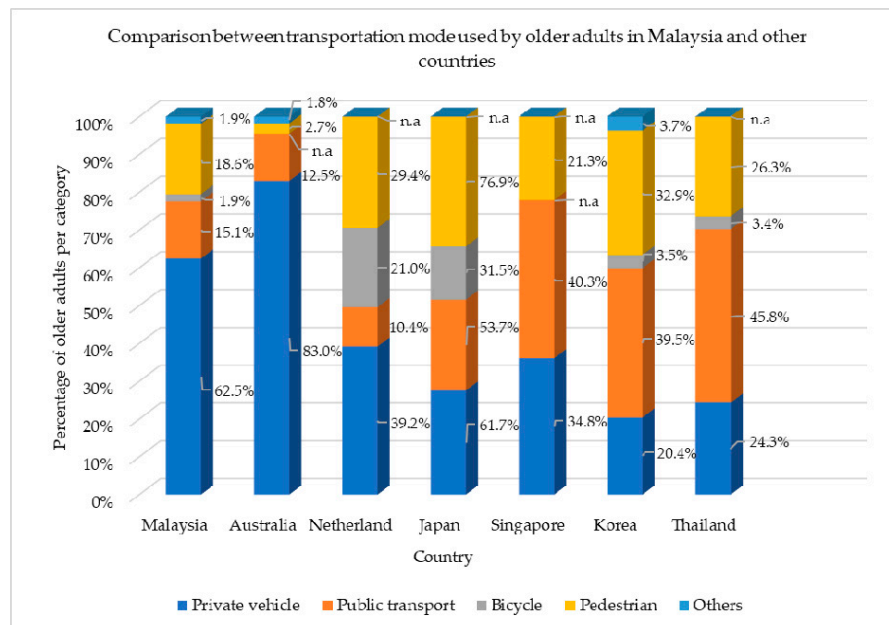

Figure 3. Comparison between transportation modes used by older adults in Malaysia and other countries. Unavailable data for certain transportation modes in some countries were labeled n.a.

A few transportation determinants were reported to have an impact on their transport selections. However, the study was unable to locate any local research that examined transportation characteristics that influence older adults' travel time, duration, destination, route, and other aspects of travel behavior.

The most recurring hurdle reported by older adults was the high cost of transportation [12,13,15]. The expenses of commuting by private or public transport were perceived as prohibitive due to the older adults' limited income after retirement. In a similar study, more Malaysians preferred to ride a motorcycle than a bus for its affordability, with a 95.4% increase in the likelihood of them leaving behind motorcycles for the bus if the ticket price was cheaper [21]. This was also a concern in countries like China [22] and South Korea [4]. In countries like the United Kingdom and Hong Kong, free passes and a minimal cost rate for older adults have been shown to be effective in boosting mobility and transport use [23,24]. There is a transportation concession fare for older adults in Malaysia as well. While its aim is to promote the use of public transport among older adults, it was restricted to only a few bus and train services [25]. Further research is needed to determine the travel needs, awareness, and use of such financial assistance by older adults.

Another major difficulty for older adults in Malaysia was coping with insufficient public transport services [9,15]. The shortcomings of public transportation infrastructure served as a backdrop for their everyday travel experiences. The miles they had to go to reach the transit [15,16], the insufficiency of services' frequency [15], and the long duration of traveling [13] were all limiting their public transport use. It was also one of the causes of the high rate of private automobile ownership in Malaysia [16]. In a similar study in Malaysia, it was reported that 24% and 49% of respondents had no transport alternative other than a motorcycle and bus, respectively [21]. The study also found that the likelihood of motorcyclists choosing to ride the bus increases by 85.4% if the trip duration by bus is reduced [21]. A comparable situation has been seen in a few other nations such as Japan [5] and Australia [26], albeit mostly in rural regions. These accessibility and reliability

difficulties should be addressed in accord with promoting active aging and more sustainable transport use among older adults [27].

The next most common stumbling block encountered by older commuters was the issue of safety [1,12,13]. Those who drive expressed their worry for their own safety and that of other commuters while on the road [1,12]. A past study has shown a significant relationship between age and extended response time to unanticipated hazards, as well as the number of times being honked at when driving slowly, among the local older drivers ($p < 0.05$) [28]. Safety was documented earlier, especially for older adults, as a latent factor affecting commuters' choice of transportation mode [29]. This cost of safety will limit their independence and self-reliance, which is important to enabling them to age in place [11]. Being able to travel without worry encourages them to choose sustainable public transportation, which further helps them to enjoy their mobility for a long period of time [2].

They also had to deal with the inferior of services available [13,15]. The transportation system, including the signage on the road [13], was perceived as novel, complex, and perplexing [12,13], and considered to be a source of stress for older adults. The issue of the poor attitude of the staff was also raised [13], as well as insufficient parking spaces [12], and poor road conditions [12]. With the majority of older adults preferring private transportation for its convenience and comfort [1], service providers must enhance their services to meet demand and ensure ease of transport utilization while still delivering a pleasant ride. This would attract the general population to use public transport as well, as comfort and travel flexibility were reported to be essential factors in their modal choice too [29]. Moreover, poor availability of parking facilities has also been reported as a source of dissatisfaction among the general public [29]. Initiatives taken by European countries in incorporating age-friendly elements into their community transportation should be replicated in order to make it easier, not only for older adults, but for the whole population, to get to their destinations, hence encouraging mobility and positive wellbeing [30].

Evidence from a household survey further demonstrated the need for better mobility amenities in order to encourage community mobility. According to the report, 17.0% of older adults in Malaysia were incapable of performing activities of daily living (ADL) and 42.9% had functional limitations in instrumental activities of daily living (IADL), including being dependent on others for mobility, commuting, shopping, health care and financial activities [31]. Furthermore, older adults in Malaysia were also reported to have lower quality of life than the general cohort, with 28.6% suffering from poor quality of life [31]. Developing a comprehensive strategic plan to offer accessible and affordable transportation as well as a safe environment, specifically to cater to the needs of older adults will benefit not just them, but also the whole society.

Nevertheless, some shortcomings of this study should be mentioned here. First, the number of publications included was small, due to the paucity of research on the topic. Aside from that, several studies were excluded as the age ranges of older adults were under 55 years old (as per the 'old' definition). There was also a concern with data interpretation, since some outcomes of included studies presented descriptive instead of analytical data. Nonetheless, these were included here owing to their pertinence, the scarcity of relevant local research on the topic, and the gravity of the issues.

5. Conclusions

To promote sustainable mobility and active aging for older adults, it is crucial to understand their travel behaviors and transportation use. This allows for the identification of traits that shape their daily routines, and subsequently their health and wellbeing. Their ability to travel independently and maintain an active lifestyle is essential for their access to food, self-care items, health care, and other necessities.

Older adults in Malaysia travel less as they age. The way they commute has changed as well. More were found to use and integrate private vehicles into their daily commute. This finding suggests that since one's ability to drive declines with age, careful development

planning is required to ensure road safety, besides initiatives to encourage the use of public transportation. Older adults need to be better informed and have better transportation options so as to ensure sustainable transportation use and mobility in later life.

Most importantly, this study provided insight into what prevents older adults from using transportation. The most important variables influencing their usage of transport are the transportation costs, followed by its availability, safety, comfort, and convenience. Attention should be given to the issues of affordability and service availability that persist despite charge reductions and periodic increases in the number of public transportation services. Moreover, it may be possible to improve the safety, comfort, and convenience of older adults' transportation use by adopting age-friendly transportation systems. This study might help local governments in planning more focused and effective interventions to cater to the transportation needs of older adults.

More research should be directed toward designing efficient interventions and policies for sustainable age-friendly transportation systems, to minimize the barriers that hinder older commuters from using various modes of transport.

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