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Perceived Stress and Attitude towards Safe Driving among the Elderly in Malaysia

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Abstract
The global increase in adults aged 60 and above has led to more elderly drivers, whose age-related physical, cognitive, and psychological changes may affect driving safety. This study examined safe-driving attitudes, perceived stress, and their relationship among elderly Malaysian drivers using validated PSS-10 and ASD-46 scales. Most participants showed low road-traffic-accident (RTA) risk and low to moderate stress levels. Fisher's Exact Test found no significant association between perceived stress and RTA risk. Although the findings support the need for interventions promoting safe driving among older Malaysians, the small sample size limits generalizability and warrants larger future studies.

Keywords: ASDS-46; perceived stress; drivers' attitude; elderly drivers

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1.0 Introduction

Driving is a vital daily activity that relies on integrated visual, motor, and cognitive abilities. The increasing reliance on transportation has contributed to the growth in vehicle use and the rising incidence of Road Traffic Accidents (RTAs) (Masuri, Dahlan, Danis, & Isa, 2017). RTAs pose major public health and economic challenges, diminishing the quality of life and creating financial strain on governments and communities (Masuri et al., 2015). Globally, RTAs account for approximately 1.35 million deaths annually, exceeding mortality from HIV/AIDS, tuberculosis, and diarrheal diseases, and ranking as the eighth leading cause of death. Malaysia reflects this urgent concern, recording over 500,000 accidents and more than 7,000 fatalities in 2016 (Che-Him et al., 2018). RTAs arise from complex interactions among road, vehicle, and human factors (Adanu, Emmanuel, & Jones, 2017), with human behaviour consistently identified as the most significant contributor (Gicquel et al., 2017). Risky driving behaviours, including speeding, fatigue, mobile phone use, and aggression, remain prevalent in Malaysia (Jusoh, 2013). Attitudinal aspects are similarly critical in safe driving performance (Lau, 2015). This study examines the relationship between perceived stress and safe-driving attitudes among elderly Malaysian drivers, a group that is rapidly expanding in number. Individuals aged 60 and above represent a growing demographic, with global projections indicating that the number of older adults will reach 2 billion by 2050. Malaysia demonstrates parallel trends, with the elderly population rising to over 10%

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by 2019 and expected to exceed 6 million by 2040 (DOSM, 2017; DOSM, 2019). Although many older adults continue to drive safely, age-related declines in physical, sensory, and cognitive functions may impact driving ability (Nazlin & Siti Zawiah, 2016). Stress, defined as emotional or physiological strain (Tendon, 2017), may further influence driving safety in later life, contributing to fatigue, depression, and reduced independence. In this context, occupational therapists (OTs) play an essential role in supporting safe driving and community mobility. OTs address functional limitations through assessment, training, environmental modification, and rehabilitation to promote independence and reduce the risk of accidents (Masuri et al., 2016). As part of professional development, this study is conducted to support OTs current clinical practice in Malaysia. A cross-sectional study was conducted to investigate the relationship between perceived stress and attitudes toward safe driving among elderly drivers. Objectives of this study are to i) investigate the prevalence of RTAs among the elderly, ii) identify the traffic offenses that are commonly commit by the respondents, and iii) investigate the association of perceived stress and level of risk among elderly.

1.1 Problem Statement

Human error is the main contributor to road traffic accidents, placing elderly drivers who are increasingly active on the roads at greater risk. As the population aged 60 and above grows, understanding factors influencing their driving safety is crucial. Driving supports independence and social participation in older adults, who are expected to remain healthy for longer (Mizenko, Tefft, Arnold, & Grabowski, 2015). The rising number of licensed elderly drivers underscores the need for targeted road safety interventions (Albert, Lotan, Weiss, & Shiftan, 2018). Ageing affects physical, cognitive, and emotional functioning; difficulties in emotion regulation can increase stress, anxiety, and depression, potentially compromising driving performance. While research has examined driving attitudes broadly, few studies have examined how perceived stress relates to safe driving among elderly drivers, particularly in Malaysia. Addressing this gap, the present study investigates perceived stress, safe driving attitudes, and their relationship among Malaysian elderly drivers, providing evidence to guide public health strategies, road safety initiatives, and policy development.

1.2 Significance of the Study

This study provides crucial insights into RTAs involving elderly drivers as Malaysia approaches aging-nation status by 2030. Understanding elderly drivers' stress levels and attitudes toward safe driving can help authorities design strategies to reduce RTAs. Emotional factors significantly influence driving, and many older adults stop driving due to stress or reduced abilities. However, driving cessation is linked to depression, reduced social participation, and isolation (Tendon, 2017), contrary to OT goals of supporting community engagement. The findings will support OTs in educating, assessing, and modifying driving-related interventions to promote safe mobility among older adults. Additionally, the study can enhance public awareness of elderly drivers' limitations, encouraging more supportive road interactions. Malaysia's e-hailing sector also enables capable older adults to remain economically active. According to Daryl Chong of the Malaysia E-Hailing Driver Association, the oldest registered driver is 73, and continued driving helps maintain mental activity while generating income (The Star, 2019). Given these trends, research on safe driving attitudes among elderly Malaysians is both timely and necessary to guide policy development and promote safe, meaningful mobility.

2.0 Literature Review

RTAs refer to incidents on public roads involving at least one moving vehicle that result in injury or death (OECD, 2019). Globally, RTAs account for about 1.17 million deaths each year, with 70% occurring in developing countries, and between 23 and 34 million non-fatal injuries annually (Kamarudin et al., 2018). RTAs have become a leading cause of death worldwide, comparable to chronic diseases such as stroke and heart disease (Kamarudin et al., 2018). Trends from high- and middle-income countries reflect further concern: in the United States, RTA-related injuries surged from 530,000 in 2011 to 2.7 million in 2017, with fatalities increasing by 5,000. India recorded 137,423 deaths and 469,900 injuries in 2013, averaging over 15 deaths per hour; projections suggest more than 250,000 annual accidents by 2025 (Singh, 2017). Malaysia similarly reports a high RTA burden, ranking third in ASEAN for RTA mortality after Thailand and Vietnam (The Star, 2019). Over 7,000 deaths and more than 500,000 accidents were recorded in 2016 (Che-Him et al., 2018), with Selangor and Johor consistently showing the highest case numbers due to larger vehicle populations (Kamarudin et al., 2018). Motorcyclists accounted for the largest share of fatalities in 2017 (n = 4,348), followed by car occupants (n = 1,269), mirroring the nationwide increase in vehicle registrations (Lau, 2015).

2.1 RTAs among the Elderly

The global population aged 60 years and above is projected to rise from 600 million in 2000 to nearly 2 billion by 2050 (Rarghazilla, 2016). Malaysia is experiencing a similar demographic shift, with older adults expected to outnumber those under 15 years by 2050 (Tengku Aizan, 2015). As longevity increases, more older adults continue to drive, maintaining mobility and independence (Rarghazilla, 2016). Although older adults are involved in fewer accidents than younger drivers, their injuries are often more severe. In Slovenia, elderly drivers were involved in only 5% of car-driver accidents, with fatal outcomes at 0.4% (Bilban, 2002). Conversely, findings from Iran reported 1,357 elderly casualties, with individuals aged 75 and above showing significantly higher fatality risks, particularly as pedestrians, being seven times more likely to die compared to younger adults (Sadeghi-Bazargani et al., 2018). In Malaysia, elderly (60–74 years) and very elderly (75+) drivers demonstrate substantial vulnerability, with 43.7% of RTA cases resulting in death, and head injuries being the most common (Ang et al., 2017). Age-related declines, including slower visual processing, impaired motion detection, increased glare sensitivity, and reduced motor coordination, further elevate crash risk (Nazlin & Siti Zawiah, 2016).

2.2 Attitudes toward Safe Driving Among the Elderly

Driver attitudes play a significant role in RTA risk. Negative attitudes, such as speeding or traffic violations, are associated with higher injury rates. Age-related reductions in confidence and psychomotor skills also influence performance behind the wheel (Allen et al., 2019). Factors shaping older adults' driving behaviors include previous accident experience, confidence, age, driving exposure, and psychomotor abilities (Foon et al., 2009). In the United States, nearly 7,000 older adults died in RTAs in 2016, with reported risky behaviors such as light drinking before driving (26%), heavy drinking (2%), running red lights (10%), and near-crashes (20%) (Allen et al., 2019). Malaysian findings indicate more positive trends, with over half of older drivers reporting safe driving practices, high experience (56.6%), and confidence (54.8%), contributing to overall safer habits (Foon et al., 2009).

2.3 Perceived Stress and RTAs

Stress is a psychological and physiological response to perceived threats, affecting cognition, behavior, and physical function (Tandon, 2017). Perceived stress reflects an individual's appraisal of their capacity to manage stressors. Older adults often face elevated stress due to chronic health problems, financial constraints, social isolation, and dependency. Higher age, female gender, lower socioeconomic status, and poorer health contribute to elevated stress levels. Stress during driving increases errors, traffic violations, and overall crash risk (Guo et al., 2013). Emotional states also play a role: anger reduces control, anxiety may either limit or impair performance, and sadness or depression slows reaction time (Pêcher et al., 2009).

2.4 Health Status and RTAs

Health status is closely tied to driving ability. Chronic illnesses such as hypertension, heart disease, and arthritis affect essential capacities like attention, vision, and motor coordination (MacLeod et al., 2014). Poor health increases crash risk and may reduce fitness to drive (Alonso et al., 2017). Older individuals often recognise that health issues and medication use impair driving ability, with severe conditions prompting cessation (Selwyn, 2014).

3.0 Methodology

A cross-sectional study was conducted to investigate the relationship between perceived stress and attitudes toward safe driving among elderly drivers. Cross-sectional designs, also called one-shot studies, are commonly used to estimate the prevalence of behaviours, attitudes, and psychosocial characteristics within a defined population (Polit & Beck, 2017). This design was chosen for its practicality, cost-effectiveness, and suitability in identifying associations at a single time point. It was considered appropriate for assessing perceived stress and safe driving attitudes among older adults who remain active drivers.

3.1 Study Location

Data were collected in Johor and Selangor, selected due to high RTA rates. Selangor reported 83,607 RTAs (29.7%) and Johor 41,161 RTAs (14.6%), with both states recording among the highest traffic-related fatalities in Malaysia. These settings provided a relevant context for examining driving safety in older adults.

3.2 Sample Size and Sampling

The required sample size of 382 participants was determined using the Raosoft Online Sample Size Calculator, based on elderly population estimates from the Department of Statistics Malaysia (2019): approximately 410,000 in Johor and 443,000 in Selangor. Purposive sampling recruited participants who met the inclusion criteria.

3.3 Inclusion and Exclusion Criteria

Participants were Malaysian citizens aged 60 or older, possessing a valid driving licence, actively driving, and able to understand Bahasa Melayu. Those residing in institutional settings were excluded.

3.4 Research Instruments

Two validated questionnaires were used in this study.

- Attitude toward Safe Driving Scale (ASDS-46): 46 items across two sections, rated on a five-point Likert scale from 1 ("sangat tidak setuju") to 5 ("sangat setuju"), with unanswered items coded as "tidak pasti."
- Malay Version of the Perceived Stress Scale (PSS-10): 10 items (six negatively and four positively worded), rated from 0 ("tidak pernah") to 4 ("sangat kerap"), with higher scores indicating greater perceived stress.

3.5 Data Collection

A self-administered survey approach was employed. Participants received a packet including a consent form, study introduction, demographic form, ASDS-46, and PSS-10. Questionnaires were completed on the same day and returned to the researcher. Participation was voluntary, with confidentiality assured. Ethical approval was obtained from the Faculty of Health Sciences, and permission to use ASDS-46 and PSS-10 was secured. Written informed consent was obtained. Data were anonymised and treated confidentially.

3.6 Data Analysis

IBM SPSS Statistics Version 25 was used for data entry and analysis. Descriptive statistics summarised demographic characteristics, perceived stress, and safe driving risk levels. Chi-square tests examined associations between stress and driving attitudes, and independent-sample t-tests compared ASDS-46 scores across health groups.

4.0 Findings

Only 71 respondents were willing to take part in this study and had returned the questionnaire. Most of the respondent was aged between 60 and 69 years old, which represents 74.6 % (n=53). Table 1 shows the respondent demographic data.

Table 1: Demographic data

Characteristic (N=71)	Frequency (Percentage)
Age range	
60 – 69 years old	53 (74.6)
70 – 79 years old	18 (25.4)
Gender	
Male	68 (95.8)
Female	3 (4.2)
Race	
Malay	69 (97.2)
Non-Malay	2 (2.8)
Area of living	
Urban	15 (21.1)
Rural	56 (78.9)
Occupation status	
Worker	34 (47.9)
Others	37 (52.1)
Marital Status	
Married	68 (95.8)
Others	3 (4.2)
Level of education	
Foundation	4 (5.6)
Diploma	5 (7.0)
Degree	2 (2.8)
Master	3 (4.2)
Others	57 (80.3)

The demographic profile shows that most respondents were male (95.8%, n = 68) and Malay (97.2%, n = 69). A majority lived in rural areas (78.9%, n = 56). Nearly half were still working (47.9%, n = 34), while most were married (95.8%, n = 68). In terms of education, 80.3% (n = 57) reported “other” levels, with smaller proportions holding foundation (5.6%, n = 4), diploma (7.0%, n = 5), degree (2.8%, n = 2), or master’s qualifications (4.2%, n = 3). Driving history indicated that most participants had long-term driving experience, with 43.7% (n = 31) licensed for 31–40 years and 32.2% (n = 23) for more than 41 years. Annual driving distance varied, with over half (52.1%, n = 37) driving 1,001–5,000 km per year. Respondents mainly drove for work (49.3%, n = 35), followed by other purposes (29.6%, n = 21) and recreation (21.1%, n = 15). Most had not been involved in (93.0%, n = 66) or witnessed (93.0%, n = 66) an RTA in the past year. Personality types were predominantly “other” (52.1%, n = 37), with 40% (n = 29) classified as Type B. Health issues were reported by 63.4% (n = 45), particularly chronic conditions such as diabetes, hypertension, and cataracts.

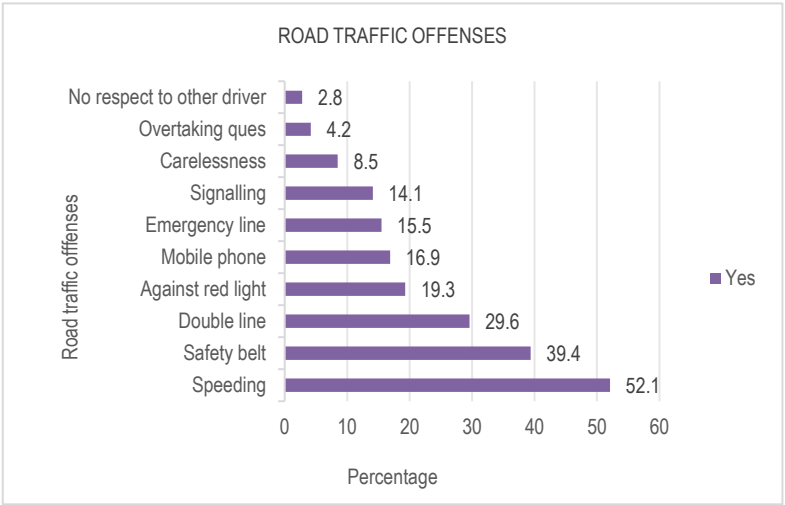

Fig. 1: Road traffic offenses that respondents committed

Figure 1 illustrates the traffic offences committed by respondents, with the Y-axis listing offence types and the X-axis showing the percentage who answered "Yes." All respondents reported committing at least one offence. Speeding was most common, with 52.1% (n = 37) admitting to it. Non-compliance with seat belt use was the second-highest offence, reported by 39% (n = 28), although 60.6% (n = 43) consistently wore seat belts. Crossing a double line was acknowledged by 29.6% (n = 21). Additionally, 19.3% (n = 14) ran a red light, and 16.9% (n = 12) used a mobile phone while driving. Using the emergency lane was reported by 15.5% (n = 11), while 14.1% (n = 10) failed to signal when changing lanes or entering a junction. Careless manoeuvring (8.5%, n = 6), queue-jumping (4.2%, n = 3), and lack of respect toward other drivers (2.8%, n = 2) were less frequently reported.

4.1 Risk level of each domain in ASDS-46

The score of each domain in ASDS-46 can be divided into three categories: high risk, neither high nor low (NHNL), and low risk. NHNL interpretation was used when the value falls exactly at the mean (Masuri, Dahlan, Isa, and Hashim, 2020). The frequency and percentage of risk levels are shown in Table 2.

Table 2. Frequency and percentage of risk level in each domain of ASDS-46

ASDS-46 Domain	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6
Low Risk	64 (90.1)	64 (90.1)	60 (84.5)	64 (90.1)	49 (69.0)	59 (83.1)
NHNL	1 (1.4)	2 (2.8)	6 (8.5)	4 (5.6)	8 (11.3)	8 (11.3)
High risk	6 (8.5)	5 (7.0)	5 (7.0)	3 (4.2)	14 (19.7)	4 (5.6)

4.2 Association between perceived stress level and risk level of ASDS-46

This analysis examined whether perceived stress levels were associated with the risk of RTAs. The variables included the Malay version of the PSS-10 (low and moderate stress levels) and the ASDS-46 risk categories (low, NHNL, and high). A Chi-Square test of independence was initially conducted; however, 66.7% of cells had expected counts below 5, violating the test's assumptions. Therefore, Fisher's Exact Test was applied. Results showed no statistically significant association between stress level and RTA risk (Fisher's Exact Test, N = 71; p = 1.000). Sig. and probability (p) values were used to interpret the relationship between the data and the hypothesis, consistent with Schervish's (1996) guidance. As the p-value exceeded 0.05, the analysis concludes that perceived stress, as measured by the Malay PSS-10, is not significantly associated with ASDS-46 risk levels.

Table 3 Chi-Square Test between perceived stress level and risk level of ASDS-46

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.072[a]	2	.965	1.000		
Likelihood Ratio	.071	2	.965	1.000		
Fisher's Exact Test	.444			1.000		
Linear-by-Linear Association	.030[b]	1	.862	1.000	.586	.294
N of Valid Cases	71					

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .82. b. The standardized statistic is .174.

5.0 Discussion

Older adults experience multiple stressors related to economic, biological, and physical changes, yet many continue driving to maintain independence and social participation. Driving under stress increases the likelihood of errors, violations, and accidents, which may eventually lead to driving cessation. Nevertheless, many elderly drivers successfully manage stress and recognise their own limitations, contributing to safer driving behaviours. The study highlights important implications for enhancing elderly driver safety in Malaysia. Its findings support improved awareness, strengthened assessment methods, and the development of targeted interventions by government agencies and healthcare professionals, particularly OTs. OTs can collaborate with ergonomists and psychologists to design assessments, stress-management programs, and driving modifications addressing age-related limitations. Authorities may also apply these insights to guide public education, enforcement strategies, and safety measures for older e-hailing drivers, including emotional and cognitive screening and adopting identifiers such as Japan's "Elderly Driver" sticker. Study limitations include the lengthy nature of assessment tools, a small sample size, and participants' reluctance due to time and privacy concerns.

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Paper Contribution to the Related Field of Study

This study meaningfully advances global and Malaysian efforts to improve driving safety and rehabilitation for older adults. Internationally, evidence indicates that age-related driving performance is shaped by multifactorial influences, including physical, cognitive, sensory, psychological, and environmental demands (Nazlin & Siti Zawiah, 2018). The findings emphasize the need for holistic

assessments and individualized interventions consistent with best practices in geriatric driving rehabilitation. In Malaysia, the study provides essential local data on elderly drivers' attitudes, stress levels, and safety challenges, which remain insufficiently documented. These insights assist OTs in conducting culturally relevant evaluations, planning tailored rehabilitation strategies, and addressing functional limitations while promoting safe mobility. The results also guide policymakers, transport authorities, and public health agencies in designing targeted education programs, screening protocols, and community supports. Ultimately, this research strengthens evidence-based driving rehabilitation to help Malaysian older adults maintain independence, reduce crash risk, and age safely within their communities.

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