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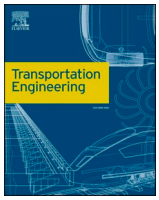

Exploratory study on self-awareness and self-preparedness of Malaysian rail passengers for emergency evacuations

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ABSTRACT

This study explores the self-awareness and self-preparedness among Malaysian rail passengers during potential emergency evacuations. A questionnaire survey was carried out at a major rail transit terminal in Kuala Lumpur, and 329 complete responses were collected. The results showed that the majority of survey respondents were unaware of the evacuation information and tools, despite the fact that 48% of them claimed to be familiar with the rail transit terminal. Males were found to be more prepared than females, and older passengers have less awareness and readiness than younger passengers. These findings highlight the importance of enhancing the visibility and clarity of the evacuation information displayed inside public buildings. Other critical concerns are the emphasis on gender mainstreaming in evacuation strategies and the involvement of elderly people in emergency response and educational programs. Outcomes of this study could be useful for emergency response teams to develop appropriate evacuation strategies to enhance safety at public transit hubs.

1. Introduction

Rail transit systems are considered as one of the best transport means for urban areas to ease traffic congestion, enhance safety and thereby improve the quality of life. There are 178 cities from 56 different countries worldwide, including Malaysia, that have developed rail transit systems [5]. In Malaysia, as of the current date, rail transports consist of the heavy rails (for intercity passenger, goods transport, and urban public transport), rapid transits (i.e., light rail and mass rapid transits), a city monorail (only in Kuala Lumpur), an airport rail link (i.e., the Kuala Lumpur Express Rail Link) and a funicular railway line (i.e., a cable car in Penang) [12, 20]. In particular, current statistics in Kuala Lumpur explain that the transit ridership is increasing due to growing population and housing density combined with mixed-use developments in the city [21]. With the continued increase of rail passenger volume, more attention should be given to the safety of the passengers, particularly during an emergency [7].

There have been substantial considerations on enhancing the evacuation tools, systems, and procedures to effectively respond to emergencies occurring, particularly in rail transit stations [4, 9, 14, 17, 18]. However, there are still gaps in understanding the passengers' behavioral characteristics during an emergency evacuation, particularly in rail transit terminals. In specific, a passenger's self-awareness and self-preparedness during an emergency are essential aspects to consider in developing effective evacuation strategies and plans.

Being aware of the emergency procedures and prepared for emergency evacuations are just as important as having a life insurance. Suppose passengers are aware of any emergency circumstance and prepared for desirable actions. In that case, they will be less of a burden for the emergency response teams to react to a sudden event. Awareness and preparedness can be enhanced through proper training schemes, and these could be the key to reduce the loss of life and personal injuries. Yoon et al. [19] stated that passengers who did not know evacuation procedures and tools were slower to evacuate than those who had an adequate level of awareness. Hence, passengers should be aware of what dangers they are likely to face in a rail transit station to some extent. In addition, knowledge of the emergency exits, evacuation plans, emergency red buttons, assembly areas, and evacuation routes can help a person avoids unsafe conditions and remain alert in public spaces [15].

Self-preparedness can be considered a preparative measure individuals take to make themselves ready to face any abnormal situations and emergencies. Self-preparedness among passengers can minimize the impact of an incident on themselves and the fatalities and property damage during an emergency. Self-preparedness refers to the set of

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actions taken individually as precautionary measures in the face of potential disasters. These actions include 'know-how' and 'know-who' actions such as know how to read the evacuation plan, know how to use an emergency red button, know how to get to the assembly area quickly, and know whom to get help from in case of emergencies [15].

In the past, natural as well as human-made disasters have caused mass evacuations in major train stations [3, 7, 16]. These studies and news reports highlight that it is vital to provide information on evacuation procedures and guide people to safe locations during emergencies. However, the evacuation process could be delayed if the passengers do not have any knowledge on the emergency evacuation procedures and are not prepared to face a potential emergency situation. Delays in the evacuation process could influence the chances of survival. Furthermore, access to the evacuation route only is not enough, but self-preparedness and self-awareness also play an essential role since how people react to specific warnings could differ among the passengers. According to Mohammad-pajooh [13] analysis, almost 44% of the victims were reluctant to evacuate from the emergency due to different warning perceptions, risk perceptions, and state of readiness.

From the perspective of emergency officials, the most crucial task after the warning alarm is moving or directing passengers and building occupants to a safe place to minimize injuries, fatalities, and economic losses. The passenger's awareness of emergency procedures and self-preparedness to act upon emergencies could assist emergency response teams during emergency evacuations. Considering such advantages, it is necessary to conduct comparative studies to evaluate self-awareness and self-preparedness among the passengers for evacuation in order to improve the overall safety level at rail transit stations.

No systematic studies have been conducted on the passenger's self-awareness and self-preparedness for emergency evacuation, particularly at public transport hubs like train stations [8, 15, 19]. Moreover, the socioeconomic, population, and cultural differences could result in different evacuation characteristics [10]. Cultural differences, in particular, may have a significant impact on evacuees' behaviors and responses during an emergency [1, 11]. Understanding commuters' awareness towards evacuation strategies and their preparedness to face potential emergency evacuation could be critical for enhancing the effectiveness of evacuation tools, procedures, and strategies at public buildings. This study will provide valuable insights towards enhancing the knowledge of human behavior and responses during emergency evacuations, evacuation modeling, and improving the effectiveness of evacuation tools and strategies.

This paper is organized as follows: Section 2 summarizes the details on questionnaire design, data collection procedures, and data analysis methods. This is followed by Section 3 that discusses the results obtained. Finally, the discussion, conclusions and limitations of this study are presented.

2. Methodology

2.1. Questionnaire design

A questionnaire survey was designed to assess Malaysian rail passengers' self-awareness of evacuation information and procedures, as well as their self-preparedness in the event of an emergency evacuation. Fourteen statements were designed, as listed in Table 1 to capture passengers' knowledge on safety procedures and their readiness during a potential emergency evacuation situation in a rail transit terminal. These statements included the awareness of evacuation plans, emergency red buttons, assembly areas, emergency exit signs, location of the evacuation route, and location of another exit. Further, their readiness to handle an emergency and with whom they need to seek help in case of emergencies were also assessed.

Out of the 14 statements, six statements evaluated passengers' self-awareness on emergency evacuation and procedure in the train station, and the remaining eight statements evaluated passengers' self-preparedness to face an emergency evacuation situation. A 5-point Likert scale (1 for "strongly disagree" to 5 for "strongly agree) was used to record the responses for the statements. Besides, a statement about familiarity was also included to understand the passengers' familiarity with the station. In addition, questions on demographics were included to note passengers' gender and age groups.

Table 1
Statement of passengers' self-awareness and self-preparedness.

Code	Statement of measurements	Corresponding measurement
S1	I am aware of the location of evacuation plans.	Self-Awareness
S2	I know where the emergency red button is located.	
S3	I know exactly the location of the assembly area.	
S4	I have seen an emergency exit sign.	
S5	I am aware of the location of evacuation route.	
S6	I know the location of another exit.	
S7	I know how to read the evacuation plans.	Self-Preparedness
S8	I know how to use the red button during emergency.	
S9	I know how to get to the assembly area quickly.	
S10	It is easy to get to emergency exit.	
S11	It is easy to get access to evacuation route.	
S12	It is more efficient to use another exit during emergency.	
S13	I know who to get help from in case of emergencies.	
S14	I know how to handle emergency situations.	

2.2. Data collection

As for the data collection, Stesen Sentral Kuala Lumpur (SSKL), which is a major rail transit terminal (RTT) located in Kuala Lumpur, was selected as the survey site due to its connectivity to urban and suburban residential, commercial, and industrial areas. Therefore, responses from a broader range of commuters, including teenagers, adults, and the senior population, could be expected. Responses were collected through a face-to-face survey and an online survey. The face-to-face survey was conducted at the RTT on 9th and 10th November 2018. Three researchers were positioned at the RTT for two days, i.e., on a weekday and a weekend. The survey was conducted from 3 PM to 5 PM and from 8 PM to 10 PM on November 09, 2018 (Friday) and continued from 9 AM until 12 PM on November 10, 2018 (Saturday). The survey was conducted in accordance with the guidelines by the Universiti Sains Malaysia. In addition, this study was completely voluntary and non-coercive, and no personally identifiable details, e.g., name, address, were collected. Before the respondent answers the questionnaire, the potential respondent was approached courteously and consent from the respondent was obtained first.

In addition to the face-to-face survey, an online survey was also conducted in January 2019 in which the questionnaire was distributed via email, and social media platforms (i.e., Facebook, Instagram, and Twitter) and WhatsApp. The same questions were used in both the face-to-face and online surveys. The online questionnaire was designed using Google form. Target respondents were those who live in Selangor and Kuala Lumpur areas and who had or have experience using the facilities at the selected RTT. Respondents with no experience using facilities in the selected RTT would click the "NO" button in the Google form and will be terminated from participating in the survey.

2.3. Data analysis

Descriptive statistics and boxplots were used to explore and compare the distributions of the responses. To examine the differences in self-preparedness and self-awareness by gender and the association between age and the scores for the statements, non-parametric tests, e.g.,

Mann Whitney U and Spearman Rank Correlation, were used respectively. Non-parametric tests do not require the assumption of Normality, can be used for ordinal data, and easier to interpret. In quantifying the demographic, i.e., age and gender, influences on awareness and preparedness, ordinal logistic regression models were developed. In addition, to identify the underlying factors among awareness and preparedness statements, exploratory factor analysis (EFA) was conducted.

3. Results

The primary purpose of this study is to evaluate passengers' self-awareness and self-preparedness for emergency evacuation at the rail transit terminal. This type of exploratory study will determine the level of passengers' self-awareness on emergency procedures and self-preparedness to face an emergency.

3.1. Demographics of respondent

In total, 342 responses were collected from both face-to-face and online surveys. However, there were some incomplete questionnaires, and after excluding such incomplete responses, a total of 329 complete responses were achieved for the final analysis. From the 329 respondents, 48.9% were males, and the rest (51.1%) were females. Regarding age distribution, 6.4% of the respondents were below 16, followed by 24.3%, 22.5%, 24.0%, 12.2% and 10.6% respectively for age group 2 (16–25), 3 (26–35), 4 (36–45), 5 (46–55) and 6 (above 55). The higher number of respondents is from age group 2 (16–25), 3 (26–35), and 4 (36–45), which could be due to the purpose of the trip made (e.g., for work, leisure, travel, and college) since the Stesen Sentral Kuala Lumpur (SSKL) is a hub where all the major train lines are originating and entering. Besides, the hub is also interconnected to a shopping mall, NU Sentral, and the transit provided access to a range of facilities, including office buildings, universities, and restaurants. Around 48.0% (158 responses) of the respondents declared that they were familiar with the station, while 32.2% (106 responses) were unfamiliar with the station. The rest of the respondents, i.e., 19.8% (65 responses), were unsure if they were familiar or unfamiliar with the station. Characteristics of the survey respondents, including their demographics and purpose of travel, are summarized in Table 2.

3.2. Level of passengers' self-awareness and self-preparedness

The percentage of the scores obtained for each measurement statement and boxplots of scores are shown in Figs. 1 and 2, respectively.

Table 2
Summary of the survey responses.

Items	Category	Frequency	Percent (%)
Gender	Male	161	48.9
	Female	168	51.1
Age	≤ 15	21	6.4
	16 – 25	80	24.3
	26 – 35	74	22.5
	36 – 45	79	24.0
	46 – 55	40	12.2
	≥ 56	35	10.6
Purpose of the trip	Work	98	29.8
	College	41	39.8
	Leisure	131	13.7
	Business	14	12.5
	Travel	45	4.3
Familiarity with the building	Familiar	158	48.0
	Neither familiar nor unfamiliar	65	19.8
	Unfamiliar	106	32.2

From these figures, it can be identified that, in general, passengers do not have an adequate sense of awareness on emergency evacuation compared to preparedness to deal with an emergency evacuation.

The top six measurements with a mean score above 3 were 'I have seen an emergency exit sign' followed by 'I know how to read the evacuation plans', 'I know how to use the red button during emergency', 'It is easy to get to emergency exit', 'I know who to get help from in case of emergencies', and 'I know how to handle emergency situations'. From these top 6 measurements, five measurements capture passengers' self-preparedness, and only one measurement captures passengers' self-awareness. This result shows that the passengers are more likely to be prepared to deal with emergency situations than to be aware of the evacuation tools and information, i.e., evacuation plan, emergency red button, assembly area, and evacuation route.

3.3. Effect of gender on self-preparedness and awareness

The differences in self-preparedness and self-awareness by gender were examined using the Mann Whitney U test. The results for each statement are summarized in Table 3.

From the result, it can be observed that there is a significant difference between males and females in all responses except, "know the location of another exit" in self-awareness measurement, and "more efficient to use another exit during an emergency" and "know whom to get help from in case of emergencies" in self-preparedness measurement.

3.4. Effect of age on self-preparedness and awareness

As mentioned earlier, six age groups were considered in this study, and the association between age and the scores for the statements were studied using the Spearman correlation. The outcomes, i.e., the Spearman correlation coefficients and their significance, are summarised in Table 4. It can be observed that the correlations between age and the scores for the statements (except S7, S12, and S14) are significant.

It is interesting to note that the correlations are negative for all cases, which means, with age the preparedness for emergencies and awareness of evacuation procedures are decreased. However, it should be noted that while these correlations are significant, they are weak. Nevertheless, the associations between age groups and awareness and preparedness on emergency evacuation procedures can be identified from these values.

3.5. Factor analysis

To identify underlying meaningful patterns in the data, an exploratory factor analysis (EFA) was performed on all 14 statements in the questionnaire. A 3-factor solution was obtained based on eigenvalue criteria (eigenvalues > 1), and those three factors explained 68.14% of the total variance. For factor loadings, only values more than 0.5 were considered. Table 5 summarizes the outcomes of EFA.

Cronbach's alpha was good (> 0.8) for the first two factors and acceptable (> 0.7) for the third factor. This means that the statements in each of these three categories are internally consistent and closely related as separate categories. Further, the sampling adequacy was excellent (Kaiser-Meyer-Olkin measure $= 0.911$) indicating that the data is suitable for EFA, and Bartlett's test of sphericity was significant (0.000). As can be understood from Table 5, the 14 statements on self-awareness and self-preparedness could be reliably categorized into three factors. The first factor accounts for 51.33% of the total variance, the second factor accounts for 9% of the total variance, and the third factor accounts for 7.8% of the total variance.

3.6. Ordinal logistic regression

Fourteen ordinal logistic regression models were developed to better explain the age and gender influences on passengers' self-awareness and

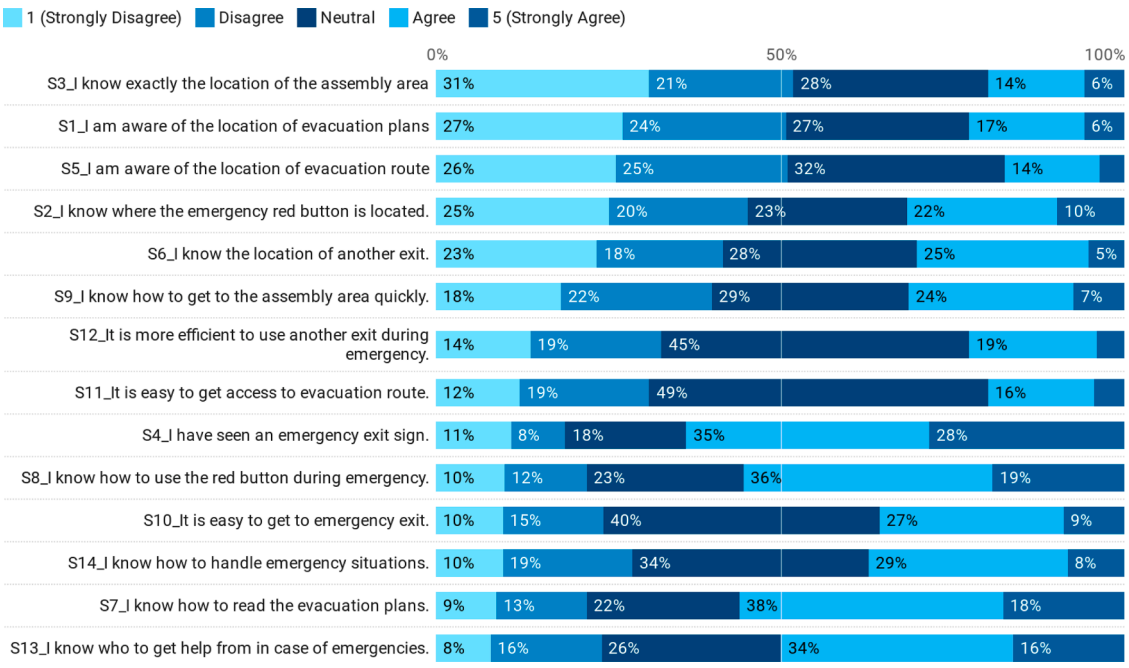

Fig. 1. Distribution of responses for the awareness and preparedness statements.

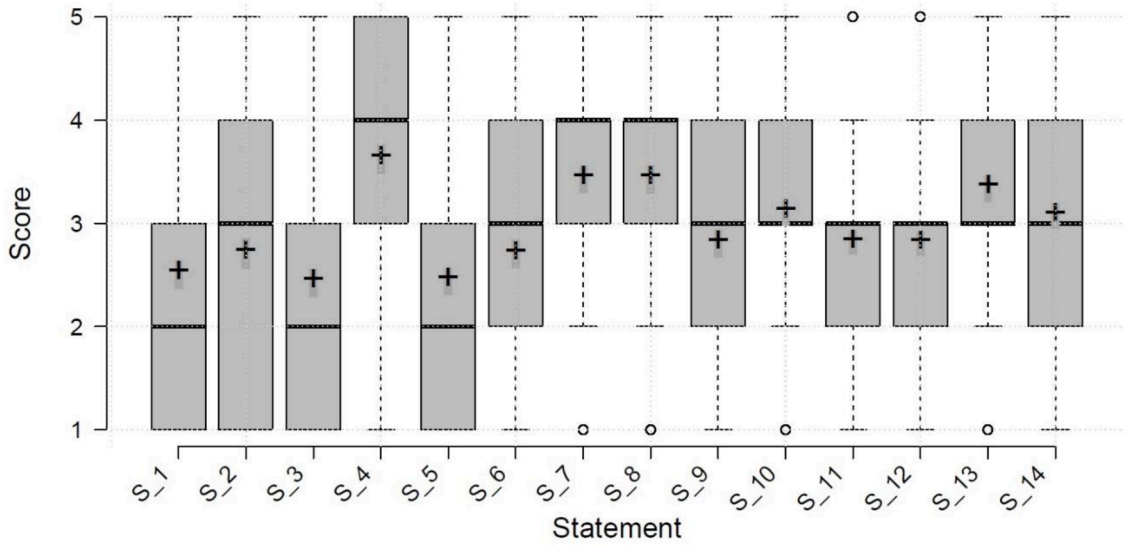

Fig. 2. Boxplot for the scores of awareness and preparedness statements (whiskers are based on Tukey definition, where whiskers are extended to data points that are less than 1.5 x IQR away from 1st and 3rd quartile, "+" represents the mean score).

self-preparedness to deal with emergency evacuations. Outcomes of the ordinal regression analyses are summarized in Table 6. As shown in Table 6, in one model, i.e., 'S-12: it is more efficient to use another exit during emergency', the effect of both age and gender was not statistically significant. In two models, only the gender effect was significant, whereas, in five models, the age effect was significant. In six models, both gender and age influences were significant.

Explicitly, differences in gender were established in eight models: (1) 'I know how to read evacuation plan', (2) 'I know how to handle emergency evacuation', (3) 'I am aware of the location of evacuation plan', (4) 'I am aware of the location of evacuation route', (5) 'I know how to use red button during emergency', (6) 'I know how to get to the assembly area quickly', (7) 'It is easy to get to emergency exit', and (8) 'It is easy to get access to evacuation route'. In all cases mentioned, males are more aware and prepared for emergencies compared to females. Besides that, age differences were found in almost all models except two models: (1) 'I know how to read the evacuation plan', and (2) 'I know how to handle the emergency situation'. From this finding, it can be concluded that the level of awareness and preparedness among younger passengers is better than older passengers.

4. Discussion and conclusions

Understanding of information and procedures related to emergency evacuations may enhance passengers' survival chances in cases of an emergency in public buildings, e.g., rail transit terminals. However, the outcomes of this study revealed that a majority of rail passengers do not possess a satisfactory level of self-awareness on the evacuation tools and information to deal with an emergency. Although 48.0% of the respondents declared that they were familiar with the rail transit terminal,

Table 3
Differences in awareness and preparedness based on gender.

Statement	Male (mean score ± SD)	Female (mean score ± SD)	Mann Whitney U test (z-score, *p*-value)
S1	2.7 ± 1.3	2.3 ± 1.1	2.968, 0.0029 **
S2	2.9 ± 1.3	2.5 ± 1.3	2.250, 0.0244*
S3	2.6 ± 1.3	2.3 ± 1.1	2.274, 0.0232 *
S4	3.8 ± 1.2	3.5 ± 1.3	2.338, 0.0193 *
S5	2.6 ± 1.2	2.3 ± 1.1	2.369, 0.0178 *
S6	2.8 ± 1.2	2.6 ± 1.2	1.722, 0.0854
S7	3.6 ± 1.2	3.3 ± 1.2	2.228, 0.0257 *
S8	3.6 ± 1.2	3.2 ± 1.2	3.224, 0.0013 **
S9	3.0 ± 1.2	2.6 ± 1.2	2.354, 0.0188 *
S10	3.3 ± 1.1	2.9 ± 1.0	2.878, 0.0040 **
S11	3.0 ± 1.0	2.7 ± 0.9	2.178, 0.0293 *
S12	2.8 ± 1.0	2.8 ± 1.0	0.188, 0.8493
S13	3.5 ± 1.1	3.2 ± 1.2	1.505, 0.1310
S14	3.2 ± 1.1	2.9 ± 1.1	2.635, 0.0085 **

* Significant at 0.05 level, ** Significant at 0.01 level.

Table 4
The difference in awareness and preparedness based on age.

Statement	Spearman correlation r_s and *p*-value
S1	−0.193, 0.0004 **
S2	−0.219, 0.0001 **
S3	−0.229, 0.0000 **
S4	−0.304, 0.0000 **
S5	−0.164, 0.0029 **
S6	−0.156, 0.0046 **
S7	−0.036, 0.5202
S8	−0.251, 0.0000 **
S9	−0.208, 0.0002 **
S10	−0.169, 0.0020 **
S11	−0.131, 0.0177 *
S12	−0.022, 0.6957
S13	−0.219, 0.0000 **
S14	−0.019, 0.7373

* Significant at 0.05 level, ** Significant at 0.01 level.

Table 5
Factor analysis of self-awareness and self-preparedness.

Statement	Factor 1	2	3
S1 - I am aware of the location of evacuation plans	0.848		
S2 - I know where the emergency red button is located	0.808		
S5 - I am aware of the location of evacuation route	0.763		
S3 - I know exactly the location of the assembly area	0.734		
S8 - I know how to use the red button during emergency		0.792	
S14 - I know how to handle emergency situations		0.737	
S13 - I know who to get help from in case of emergencies		0.737	
S7 - I know how to read the evacuation plans		0.726	
S10 - It is easy to get to emergency exit		0.552	
S4 - I have seen an emergency exit sign		0.551	
S9 - I know how to get to the assembly area quickly		0.506	
S12 - It is more efficient to use another exit during emergency			0.829
S11 - It is easy to get access to evacuation route			0.661
S6 - I know the location of another exit			0.640
% variance explained	51.3262	9.003	7.812
Cronbach alpha	0.892	0.882	0.741
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.911		
Bartlett's Test of Sphericity	0.000		

a substantial percentage of the survey respondents still lacked the knowledge on the location of evacuation tools and information, i.e., assembly areas (52.0%), evacuation route (51.0%), evacuation plan (50.8%), emergency red button (45.3%), and other emergency exits (41.6%).

Concerning passengers' rating on the self-preparedness, most of the respondents could read the evacuation plan (55.9%), know how to use the emergency red button (55.3%), and know from whom to seek help in case of an emergency (49.8%). On the other hand, despite that 35.5% of responses agreed that it is easy to get to the emergency exit, 37.1% of responses agreed that they know how to handle an emergency situation, and 63.3% of responses have noticed the exit signs in the rail station; still, there was a significant proportion of the respondents who did not know how to reach the assembly area quickly (40.1%), to get access to the evacuation route (31.0%) and to use another exit during the emergency (32.8%). These outcomes are logical since knowledge on the evacuation route and other emergency exits had low ratings.

Our finding showed that, compared to females, male respondents were more aware of emergency tools and information, and better prepared for emergencies. This finding is supported by the finding of Shiwakoti et al. [15], who reported that male passengers responded to a higher level of wayfinding awareness and better perceptions of the wayfinding tools in a train station. Our finding also supports the previous theory of different risk perceptions among males and females, which states that males are more likely to take risks, whereas, females are more likely to avoid risks [6].

Regarding the effect of age on self-awareness and self-preparedness, the findings are consistent with Shiwakoti et al. [15], who reported that older passengers have less awareness and readiness than younger passengers. Our finding also matched with the outcomes of Baffoe and Shiyuan [2], who reported that most of the older subway riders have little or no knowledge about emergency safety measures or safety symbols. Additionally, this finding supports previous research by Pan et al. [14], who reported that during events that typically attract large crowds, pedestrians who are younger than age 45 tend to evacuate faster.

The exploratory factor analysis has grouped the 14 measurement statements for self-awareness and self-preparedness into three factors. The first factor, which includes four statements (locations of evacuation plan, emergency red button, evacuation route, and assembly area), is attributed to "awareness on emergency wayfinding tools". This factor highlights the importance of locating the message signs and the clarity of them. Meanwhile, the second factor contains seven statements (including "know-how", easy to get to emergency exits, and have seen the emergency signs) is about the "knowledge on emergency evacuation procedures". Finally, the third factor, which contains three statements (efficient to use another exit during emergency, easy to get access to evacuation route, and know the location of another exit), could be attributed to the "perception on evacuation procedures". These two factors highlight the importance of proper trainings and awareness programs on emergency evacuation procedures.

The findings of this study have important implications for designing and locating evacuation tools, e.g., signs, maps, emergency buttons, etc. In particular, clarity and visibility of such tools are important to such extent that they are easily readable and understandable by passengers. Ambiguous signs and maps could significantly delay the evacuation times in case of an emergency and could cause panic. Such aspects could be critical and need to be improved by the emergency response managers to enhance the efficiency of evacuation procedures and the safety of passengers. In addition, policymakers and rail transit operators need to develop educational and safety awareness response programs involving more aged people.

This study is based on 329 valid responses, and this sample size was not very high to be a representative sample, particularly for different age groups and trip purposes. Although this is a limitation of this study, the sample sizes were adequate for statistical tests (non-parametric tests). Besides that, the "close-ended" questions adopted in this study may limit the response of passenger in the survey whereby the response may not reflect the actual stress developed during the real life emergency evacuation. To tackle such issues, it is suggested in the future to present the

Table 6
Parameter estimation of ordinal regression models.

		Estimate	Std. Error	Wald	Sig.	95% Confidence Interval Lower Bound	Upper Bound
S1	Age	−0.219	0.071	9.410	0.002**	−0.358	−0.079
	Gender = Male[a]	0.544	0.200	7.375	0.007**	0.151	0.937
S2	Age	−0.252	0.071	12.548	0.000**	−0.392	−0.113
	Gender = Male[a]	0.355	0.198	3.203	0.073	−0.034	0.744
S3	Age	−0.283	0.072	15.279	0.000**	−0.425	−0.141
	Gender = Male[a]	0.384	0.201	3.668	0.055	−0.009	0.777
S4	Age	−0.377	0.074	26.222	0.000**	−0.521	−0.233
	Gender = Male[a]	0.359	0.202	3.162	0.075	−0.037	0.755
S5	Age	−0.177	0.071	6.153	0.013*	−0.316	−0.037
	Gender = Male[a]	0.424	0.201	4.457	0.035*	0.030	0.817
S6	Age	−0.206	0.071	8.432	0.004**	−0.345	−0.067
	Gender = Male[a]	0.288	0.199	2.100	0.147	−0.102	0.678
S7	Age	−0.020	0.071	0.078	0.780	−0.159	0.119
	Gender = Male[a]	0.461	0.202	5.224	0.022*	0.066	0.856
S8	Age	−0.294	0.072	16.498	0.000**	−0.436	−0.152
	Gender = Male[a]	0.573	0.202	8.030	0.005**	0.177	0.970
S9	Age	−0.265	0.071	13.752	0.000**	−0.405	−0.125
	Gender = Male[a]	0.406	0.199	4.154	0.042*	0.016	0.797
S10	Age	−0.190	0.072	6.919	0.009**	−0.331	−0.048
	Gender = Male[a]	0.546	0.204	7.166	0.007**	0.146	0.946
S11	Age	−0.150	0.074	4.152	0.042*	−0.294	−0.006
	Gender = Male[a]	0.439	0.208	4.443	0.035*	0.031	0.847
S12	Age	−0.028	0.072	0.147	0.701	−0.169	0.113
	Gender = Male[a]	0.032	0.203	0.025	0.875	−0.367	0.430
S13	Age	−0.265	0.072	13.604	0.000**	−0.405	−0.124
	Gender = Male[a]	0.227	0.200	1.287	0.257	−0.165	0.618
S14	Age	0.017	0.071	0.055	0.815	−0.122	0.155
	Gender = Male[a]	0.555	0.202	7.563	0.006**	0.160	0.951

aThe reference category is Female, * Significance at 0.05 level, ** Significance at 0.01 level.

questionnaire with the help of virtual images to help the respondents to visualize the emergency situations. It should be noted that, in addition to the awareness and preparedness, the behavioural aspects could also largely affect the evacuation efficiency. Thus, future studies should consider the influence of such aspects on the awareness on evacuation procedures and preparedness for potential emergency evacuations. Besides, future studies should focus on the designs of different evacuation tools to enhance the visibility and clarity and the passengers' perception of such different designs. Finally, this study considered one rail transit terminal, which may limit the applicability of current findings. Evacuation behaviours and efficiency could largely depend on the architectural arrangement inside public buildings. Therefore, in the future, it is proposed to collect more data from other rail stations to increase confidence in the current findings and comparative analysis may be conducted as well.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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