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ABSTRACT

Objective: The relationship between home hazards and falls in older Malaysian people is not yet fully understood. No tools to evaluate the Malaysian home environment currently exist. Therefore, this study aimed to pilot the HOME Falls and Accidents Screening Tool (HOME FAST) to identify hazards in Malaysian homes, gather preliminary data about the experience of falls amongst a small sample of Malaysian older people, and evaluate the feasibility of using the HOME FAST in the Malaysian Elders Longitudinal Research (MELoR) study.

Design: A cross-sectional pilot study was conducted

Setting: An urban setting in Kuala Lumpur

Participants: Twenty-six older people aged 60 and over were recruited from the control group of a related research project in Malaysia, in addition to older people known to the researchers.

Primary outcome measure: The HOME FAST was applied with the baseline survey for the MELoR study via face-to-face interview and observation of the home by research staff.

Results: The majority of the participants were female, of Malay or Chinese ethnicity, and living with others in a double-storey house. Falls were reported in the previous year by 19% and 80% of falls occurred at home. Gender and fear of falling had the strongest associations with home hazards. Most hazards were detected in the bathroom area. A small number of errors were detected in the HOME FAST ratings by researchers.

Conclusion: The HOME FAST is feasible as a research and clinical tool for the Malaysian context and is appropriate for use in the MELoR study. Home hazards were prevalent in the homes of older people and further research with the larger MELoR sample is needed to confirm the validity of using the HOME FAST in Malaysia. Training in the use of the HOME FAST is needed to ensure accurate use by researchers.

Abstract word count: 295 words

ARTICLE SUMMARY

Article focus

- To investigate the feasibility of the HOME FAST (a standardised instrument to measure home hazards) for use in a large population study of older people called Malaysian Elders Longitudinal Research (MELoR).

Key messages

- The HOME FAST is a sensitive and widely-recognised tool that can be applied in a different culture and context. However, training is needed before use in a new culture and environment, and when used by administrators from varied backgrounds.
- There are a limited number of rigorous studies on home hazards and older people within Southeast Asia. Therefore, this pilot study was needed to support the use of the HOME FAST in a larger study requiring accurate assessment of home hazards experienced by older people in the community in Malaysia.
- Specific cultural and demographic characteristics of older Malaysian people may contribute to the presence of hazards in a home environment.

Strength and limitation of this study

The pilot study demonstrates the feasibility of using the HOME FAST in a larger population study in Malaysia.

INTRODUCTION

Falls are a serious issue in Malaysia. What is known about falls in Malaysia is that approximately 27% of rural community-dwelling Malaysian older people fall each year and half of them experience recurrent falls in the same year[1]. In addition, the home is where older people frequently report injuries due to falls, second only to injuries from road accidents[2, 3], and injuries at home for older people are most often related to falls[3]. The Malaysian older population is expected to rapidly increase within two decades from 7% to 14%, combined with an anticipated movement of the older population from rural to urban and sub-urban areas[4-6]. Therefore, the effective management of falls in older Malaysian people is a high priority and requires effective, evidence-based solutions. Most available falls data and home environment data relates to rural settings in Malaysia, which may not be applicable to urban areas. Therefore, one of the aims of this study was to explore the association between the home environment and falls for older Malaysian people living in an urban setting.

Three published Malaysian studies related to home hazards and falls have been conducted[1, 7, 8]. Rizawati and Mas Ayu[1], used the Safety House Checklist (SHC) and Home-Screen Scale (HSS) in their study, both of which were developed outside Malaysia. The HSS was developed for use by nurses, and the HSS and SHC are limited in the validity of their use to detect falls risk. Azhar and Md Yusof[7] did not use any standardised instruments to measure home hazards, and the authors developed their own measure. Their tool evaluated flooring conditions while other critical factors were left out, for instance the use of grab bars in the toilet and bathroom. Similar issues were identified in the Eshkoor et.al[8] study where the home hazards measurement was also oversimplified into five environmental qualities, namely lighting, ventilation, noise, cleanliness, and sanitation with simple evaluation criteria of low quality or high quality. It remains unclear from these studies how home environmental features contribute to falls risk. Several limitations were observed related to the measurement instruments used in these studies, such as i) limited

demonstration of the psychometric properties of the tools, ii) the assessments were developed solely from a literature review or were self-developed iii) some items in the assessments used were not related to falls hazards, iv) the assessments were not comprehensive and v) the assessments lacked any functional items in relation to how an older person conducts functional tasks in the home environment. These studies also failed to address the unique features of Malaysian culture which might influence the observation of hazards in home. For instance, Rizawati and Mas Ayu[1] conducted their studies in a rural province in Malacca. Malaysian rural areas are likely to be culturally diverse which will affect the physical and social environment compared to the kinds of home environments in countries where many home hazards tools have been developed.

The authors considered that the Home and Falls Accident Screening Tool (HOME FAST) was a suitable tool to thoroughly investigate home hazards and falls risk in Malaysia and to be used in the MELoR study, although it was designed in Australia. The HOME FAST is psychometrically sound[9-12], has been used in other community studies and in longitudinal studies[13, 14], can be used by self-rating[15], is sensitive to change and detecting fall risk[13], and requires a short time to administer[9, 11, 12]. These elements are lacking in previous literature about the measurement of home hazards in Malaysia. However, a pilot study was needed to understand the feasibility and practicality of using the HOME FAST by Malaysian researchers, and in Malaysian homes. Therefore, the aims of this pilot study were to identify hazards in Malaysian homes using the HOME FAST, gather preliminary data about the experience of falls amongst a small sample of Malaysian older people, and evaluate the feasibility of using the HOME FAST for a Malaysian population. This study would then provide useful information about the practicality of the HOME FAST and what may be required for its use in the larger population study.

METHOD

Design

This pilot study was conducted using a cross-sectional survey design as part of the initial baseline data collected for the Malaysian Elders Longitudinal Research (MELoR) study. Pilot studies are important to test the appropriateness of an instrument, to identify any potential logistical issues and to assess the feasibility of a full-scale study[16]. For the use of the HOME FAST, this includes whether or not the instrument contains items of relevance to hazards in Malaysian homes, and if it can identify older people at higher risk of falls. Furthermore, we needed to test if there were cultural issues, such as the use of language, the interpretation of meanings, and different everyday practices that may make the interpretation of HOME FAST items difficult for researchers to rate accurately. This required a pilot study to identify if the HOME FAST items are transferable to the Malaysian context and to gather initial information about the face validity of the tool[17, 18].

Participants

Research assistants working on the MELoR were recruited to administer the HOME FAST. The research assistants came from variety of academic backgrounds such as the built environment, biomedicine, education, economics, media art studies, engineering, psychology and occupational therapy. For the purpose of this pilot study, convenience sampling was used to recruit older people aged 60 years and over from the control group of a related research project in Malaysia[19], and additional older people were recruited who were known to the researchers. A sample size of between 24 and 36 has been identified as the optimal number for a pilot study, and this study sought to recruit a similar sample size[35]. Participants were invited by telephone or in person to take part in this study. The study received ethics approval from the Ethical Committee, High Impact Research, University of Malaya (UM.C/625/1/HIR/ASH/02). Consenting participants were provided with information explaining the objective of this study and a consent form to enable a home visit to be arranged.

Data collection

The baseline survey used for the MELoR study was applied to gather data on falls and demographic information. These data were used for analysis: demographic data, the HOME FAST items, fall history and fear of falls. Data were derived from structured interviews conducted with participants using the baseline survey. Falls in the previous year were self-reported using retrospective recall. Fear of falling was assessed by asking participants "Are you afraid of falling?"[20] and responses were recorded as "yes" or "no".

Pairs of researchers visited the participants at their homes to conduct the interviews. The interviews were conducted primarily in English as this was the language used in the original HOME FAST, and the baseline survey for the MELoR study. However explanations were provided for older people in their native language where required (usually Malay, Mandarin or Tamil).

Measurement tool for home hazards

An adapted version of the HOME FAST was used to measure home hazards for this study by reducing 25 items to 24. Items 18 and 19 from the original HOME FAST (rails on indoor steps and rails on outdoor steps) were merged into one general question about rails on indoor/outdoor steps in the home, in order to reduce the number of questions in the baseline MELoR survey. The adapted HOME FAST maintained the original format of the tool and did not include information about recommended interventions. The HOME FAST items provided a definition of each home hazard designed to address any potential confusion based on cultural and local understanding[10]. The HOME FAST focuses on seven main areas of potential hazards: floors, furniture, lighting, bathroom, storage, stairways/steps, and mobility. The HOME FAST scoring remained "Yes", "No" and "Not Applicable" for all the items. A high HOME FAST scores corresponded to high numbers of hazards. Table 1 shows the HOME FAST items used in the MELoR study data collection.

Table 1: The HOME FAST items

	HOME FAST Item	Yes	No	N/A
1	Are walkways free of cords and other clutter?			
2	Are floor coverings in good condition?			
3	Are floor surfaces non slip?			
4	Are loose mats securely fixed to the floor?			
5	Can the person get in and out of bed easily and safely?			
6	Can the person get up from their lounge chair easily?			
7	Are all the lights bright enough for the person to see clearly?			
8	Can the person switch a light on easily from their bed?			
9	Are the outside paths, steps and entrances well lit at night?			
10	Is the person able to get on and off the toilet easily and safely?			
11	Is the person able to get in and out of the bath easily and safely?			
12	Is the person able to walk in and out of the shower recess easily and safely?			
13	Is there an accessible/sturdy grab rail/s in the shower or beside the bath?			
14	Are slip resistant mats / strips used in the bath/bathroom/shower recess?			
15	Is the toilet in close proximity to the bedroom?			
16	Can the person easily reach items in the kitchen that are used regularly without climbing, bending or upsetting his or her balance?			
17	Can the person carry meals easily and safely from the kitchen to the dining area?			
18	Do the indoor steps/stairs have an accessible/sturdy grab rail extending along the full length of the steps/stairs?			
19	Can the person easily and safely go up and down the steps/stairs inside or outside the house?			
20	Are the edges of the steps/stairs (both inside and outside the house) easily identified?			
21	Can the person use the entrance door/s safely and easily?			
22	Are paths around the house in good repair, and free of clutter?			
23	Is the person currently wearing well-fitting slippers or shoes?			
24	If there are pets – can the person care for them without bending or being at risk of falling over?			

The feasibility of research assistants administering the HOME FAST was evaluated by examining any inconsistencies or errors in data collection that could be observed. Issues such as ratings given by research assistants for the "not applicable" HOME FAST items with Malaysian older people and challenges in accurately rating the HOME FAST by research assistants were explored through field notes completed during informal discussions in regular staff meetings.

Analysis

Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) Version 20. Groups were compared using non-parametric methods. The Mann-Whitney U Test, Kruskal-Wallis Test and Spearman correlations were used to explore any associations with the HOME FAST score. Inconsistencies and errors on data keyed in the HOME FAST were observed for feasibility analysis.

RESULTS

Participants

Data from 26 older people were available for analysis. The mean age of participants was 68.69 years. More women (n=15, 57.7%) than men (n=11, 42.3%) participated in the study. Most participants were Malay (n=11, 42.3%) or Chinese (n=11, 42.3%), most employed a maid (n=6, 23.1%), and most were married and lived with others (n=21, 80.8%). More than half of participants lived in a double storey house (n=16, 61.5%) compared to an apartment or single-storey house. Five participants (19.2%) reported a fall in the previous year, and all of these were women. Table 2 summarises the characteristics of the participants including self-reported fall history and fear of falling responses.

Table 2: Demographic Data (N=26)

Demographic	N (%)	Mean (95% CI)
Age		68.69 (66.08, 71.30)
Gender		
Male	11 (42.3)	
Female	15 (57.7)	
Ethnicity		
Malay	11 (42.3)	
Chinese	11 (42.3)	
Indian	3 (11.5)	
Other	1 (3.8)	
Religion		
Islam	10 (38.5)	
Christian	11 (42.3)	
Buddhist	1 (3.8)	
Hindu	3 (11.5)	
Atheist	1 (3.8)	
Marital Status		
Single/Never married	2 (7.7)	
Married	21 (80.8)	
Widowed	3 (11.5)	
Household		
Alone	5 (19.2)	
With others	21 (80.8)	
Has maid	6 (28.5)	
With spouse	16 (76.2)	
Education		
No schooling	2 (7.7)	
Primary	1 (3.8)	
Secondary	14 (53.8)	
Certificate/Skill	1 (3.8)	
College/University	8 (30.8)	
Type of House		
Single-storey house	6 (23.1)	
Double-storey house	16 (61.5)	
Apartment-like or Condominium	4 (15.4)	
Years Living in the house		25.42 (19.65, 31.19)
Has fallen in the past 12 months		
Yes	5 (19.2)	
No	21 (80.8)	
Fall in home		
Yes	4 (80)	
No	1 (20)	
Afraid of falling		
Yes	20 (76.9)	
No	6 (23.1)	

Hazards in the home

Participants had a mean of 2.35 hazards in their home (95% CI: 1.51, 3.18) as measured by the HOME FAST. The bathroom area was the most hazardous area of the homes of participants, with 42.3% (n=11) having no rail beside the shower or bath and 38.5% (n=10) with no slip resistant mats in the bath or shower. Other hazards were identified related to footwear (26.9%, n=7), floor surfaces (23.1%, n=6) care of pets (19.2%, n=5), unsecured loose mats (15.4%, n=4), lighting (11.5%, n=3), shower access (7.7%, n=2), cluttered walkways (7.7%, n=2), position of light switch (7.7%, n=2), stairways/steps edge difficult to identified (7.7%, n=2), no grab rail present (7.7%, n=2), stair use (3.8%, n=1), kitchen storage (3.8%, n=1), bath access (3.8%, n=1) and bed transfers (3.8%, n=1). However, another eight HOME FAST items (floor covering, chair access, toilet access, outside light, toilet proximity, carrying meal, use of entrance, paths condition) were not identified as hazardous items.

Associations with the HOME FAST score

A higher HOME FAST score was associated with being female and having a fear of falling. No other significant associations were found as reported in Table 3. There was no association between the HOME FAST score and years living in the house (σ=-0.087, p=0.673) or with the history of falls in the past 12 month (p=0.115).

Table 3: Associations with HOME FAST score (N=26)

	N	Median HFAST score	Interquartile Range (IQR)	P-value
Gender				
Men	11	1.00	2	0.016[a]**
Women	15	3.00	4	
Ethnicity				
Malay	11	2.00	2	0.453[b]
Chinese	11	3.00	5	
Indian	3	5.00	0	
Other	1	1.00	-	
Living Situation				

Lives alone	5	3.00	4	0.289[a]
Lives with others	21	2.00	4	
Has a maid				
Yes	6	1.50	2	0.556[a]
No	20	2.00	5	
Type of House				
Any type of house	22	2.00	4	0.971[a]
Apartment	4	2.50	3	
One floor	10	1.50	4	0.503[a]
Two floors	16	2.00	4	
Falls History				
Falls in the last 12 month	5	5.00	4	0.155[a]
No falls in the last 12 month	21	2.00	3	
Afraid of Falling				
Yes	20	2.00	4	0.033[a]**
No	6	0.50	2	

a. Mann-Whitney U Test
b. Kruskal-Wallis Test
**Significant differences detected at P <0.05

Administration of the HOME FAST in Malaysia

Items 2, 13, 14, 17 and 23 (item 24 in the original HOME FAST) do not have the capacity to be scored as "not applicable" (N/A) in the original HOME FAST, but were incorrectly indicated as N/A in this pilot study. For instance, Item 2 (floor coverings in good condition) had three N/A ratings – i.e. no floor exists, item 13 (accessible/sturdy grab rail/s in the shower or beside the bath) and item 14 (slip resistant mats / strips used in the bath/bathroom/shower recess) had four N/A ratings – i.e no bath or shower exists, and item 23 (person currently wearing well-fitting slippers or shoes) had one N/A rating – i.e the person has no feet. Item 5 (can the person get in and out of bed easily and safely) had one case of missing data, and item 12 (is the person able to walk in and out of the shower recess easily and safely) had two cases of missing data. Findings from discussions with the research assistants indicated that confusion appeared to arise about the differentiation between NO and N/A ratings for the HOME FAST. The purpose of a (N/A) rating was that the feature was not present in the home so could not be scored, whereas a NO rating indicated the presence of a hazard – e.g. the older person chose not to wear slippers or shoes. However, some raters interpreted this as not

applicable because older people did not use the feature of the home regularly. Despite this, the raters agreed that all items on the HOME FAST were important to rate in Malaysian homes.

DISCUSSION

Findings related to home hazards in Malaysian homes identified by the HOME FAST

The results from this pilot study add to the understanding of the home environment and hazards in the homes of older people in Malaysia. However, the mean score on the HOME FAST in this study was lower than the mean scores generated from Australian studies using the HOME FAST. The cut-off point on the HOME FAST for a high risk of falls associated with the number of home hazards has been stated as ≥ 8[14]. In one study in Australia, 27% of the participants scored ≥ 8. However, the highest score on the HOME FAST recorded in this study was six. It is possible that the low HOME FAST scores were due to the under-estimation of hazards present based on the ratings from the research administrators, many of whom did not have health backgrounds. Mistakes in data collection and missing data might also have contributed to this result. Therefore, this study indicated a requirement for training for the non-occupational therapy raters in scoring the HOME FAST.

This study shows a high frequency of hazards detected in parts of the home where older people in Malaysia mostly fall as reported in previous findings from Rizawati and Mas Ayu[1], which are the bathroom, stairs, living room, kitchen, and bedroom. The types of hazards present in this study are similar to those reported by Byles and colleagues in an Australian study[14] including not having a non-slip mat or slip-resistant floor, absence of a grab rail in the shower or bath area, and having difficulties identifying the edge of stairs. Hazards in the bathroom and toilet area warrant high priority for any Malaysian studies as Malaysians commonly practice self-care activities in a wet-bathroom and wet-toilet area, where water may be used by some older people to wash themselves by scooping water from pail and rinsing in the area, or by using a hose.

Preliminary findings related to the home environment and self-reported falls

The reported prevalence of falls in this study of 20% is lower than the prevalence reported globally at 28% to 35%[21], or previous prevalence data collected in Malaysia estimated at 27.3%[1]. However, the study findings are consistent with lower fall rates among Asian countries compared to other countries[1]. The low falls prevalence in this study may be related to a focus on a community population[3], being located in an urban area[2, 3], participants having a higher educational level, and the use of self-reported falls which is likely to under-report the prevalence of falls compared to prospective studies that can use falls calendars[22]. As this pilot study sample was not randomly selected, the findings cannot be representative of the general population of older people[16]. There is also the potential of volunteer bias where participants volunteering to participate may be healthier than the general population. Therefore, these findings should be interpreted with caution.

The findings from this study are consistent with international studies that confirm that falls rates are higher for older women compared to older men[23]. Women may have had a higher number of hazards given that in Malaysia women usually have a role as housewife and are more likely to be in the home environment for longer and are more likely to undertake functional tasks in the home[6], and they may also have greater role demands requiring their participation in domestic activities such as cooking and taking care of the family or looking after grandchildren which could expose them to further hazards[6, 24]. In addition, women often have more health conditions that contribute to frailty such as arthritis, low muscle strength and osteoporosis, which indirectly affects functioning[25].

An unexpected finding from this study was the association between fear of falling and home hazards. This study used as simple measure of fear of falling compared with previous studies. Fear of falling may restrict the activities of an older person resulting in a decline in physical and mental performance, reduced quality of life and increased risk of falls[26]. This may then make the older

person less involved in household chores and activities which could increase the presence of home hazards and difficulties with transfers and so on. This finding is important as many older people tend to believe that falls occur due to their own behaviour, rather than because of environmental factors, which may cause a low take up of home hazard management options[27, 28].It is possible that managing environmental falls risks may reduce fear of falls[29]. This association can be explored in more detail in the larger MELoR study.

This study found that living alone was not associated with a higher HOME FAST score. The Malaysian culture is underpinned by strong familial bonds which may be a significant factor that varies from other non-Asian fall studies. These familial bonds obligate adult children to have a responsibility to take good care of their older parents[24]. As a consequence, only 9% of older people in Malaysia live alone[1, 30] compared to 23.9% in Australia[14]. Even those Malaysian older people who do live alone stay connected with their children[6]. This may mean that adult children would take more responsibility to ensure safer home environments for their parents by making the house tidy and clean, and therefore reducing the presence of home hazards. Furthermore, one key cultural difference between Malaysia and findings from similar studies conducted in other countries was the inclusion of whether or not participants had a maid to help with household chores, which is a common practice in Malaysia. However, having a maid was not significantly associated with lower hazards, despite the potential logic of such an association.

The finding that the length of time living in the home had no positive or negative association with home hazards was an interesting outcome. A negative association would have suggested that the familiarity of the home environment may have meant that older people were able to perform their activities more safely, and that they may have successfully adapted to any potential hazards. Conversely, a positive association may have been related to no modifications being made to the home as the person aged, potentially resulting in home hazards over time as functional capacity

reduced[25], or numbers of other people living in the home changed. There is insufficient data from this pilot study to make any lasting conclusions about this, and a longitudinal study would be needed to identify changes in fall risk over time.

Although only gender and fear of falling were significantly associated with a higher number of hazards in this study, a larger study may reveal other factors associated with home hazards such as falls history, living situation, and ethnicity. Even with a small sample, the study provides some initial direction about the characteristics of older people who are likely to have higher numbers of home hazards, and be at higher risk of falls[16, 31], and therefore who should be targeted for more comprehensive fall prevention interventions.

Feasibility of the HOME FAST for use in Malaysia

All the missing data in this study were usually related to potentially sensitive issues requiring an older person to demonstrate an activity in a private area such as the bedroom and bathroom. As the HOME FAST is conducted through interview and observation, there may be difficulties with gaining permission to observe the entire house which may affect the ability to score the HOME FAST accurately. To be effectively measured, the HOME FAST items need to include an observation of how a person functions in their home environment[32]. This requires the administrator to clearly discuss the aims and benefits of conducting the HOME FAST assessment to encourage an older person to be more willing to engage in the process. Another difficulty may arise when the administrator and participant do not have enough time or the observation takes too long. Therefore, time management is important, and conducting the HOME FAST before other assessments may be advisable to allow time to make sure the observations are completed.

The hazards included in the HOME FAST may have been underestimated in this pilot study for two reasons. First, different cultural understandings in interpreting the questions may have contributed

to some confusion on how to score the HOME FAST items[17, 18]. For example, in Malaysian culture, people usually need to take off their shoes before entering a house as wearing shoes inside a house is considered inappropriate and walking barefoot indoors is common. Thus, when administering the HOME FAST the footwear item might be misinterpreted as "Yes" rather than "No" (for example wearing of socks in the house). Second, the varied backgrounds of the research staff may have limited their in-depth understanding of home hazards. Therefore, this may have affected the results as the scoring may not have been accurate based on differing interpretations of the HOME FAST items. Therefore, although the HOME FAST usually requires minimal training, more detailed guidance on how to score every item is needed in the Malaysian context. In addition, the HOME FAST may need a forced answer (closed-ended) format to help the administrator not to make any mistakes when scoring. The presence of irregularities in HOME FAST data collected in this study warrants specific training to be conducted to maximise the reliability and consistency in the use of this assessment[12, 15, 16].

Implication for Future Study

Given the findings, the HOME FAST was considered a relevant tool for the Malaysian context, despite some feasibility issues to be overcome for it to be used effectively by the research assistants. The HOME FAST contains detailed descriptions to assist raters to effectively score any presenting hazards, and these must be maintained for use in Malaysia. Conducting the interviews in English did not appear to be a problem for the older people in this pilot study. Older people in Malaysia with minimal education have some English language skills[33]. Furthermore, all the researcher participants were graduates from tertiary education, and it is compulsory in Malaysia for every person to pass an English exam before being accepted for study in tertiary education[33]. However, given the larger sample anticipated for the MELoR study, some older people may have more limited English and it may be necessary to conduct the interviews in other languages.

Low numbers of hazards reported in this pilot study indicates further investigation is needed to explore the validity and reliability of the HOME FAST in Malaysia. The difference in cultural understanding might interfere with the judgement ability of scoring the HOME FAST. The MELoR staffs come from a variety of educational backgrounds, and the majority are not from a health background. This may have an impact on the validity and reliability of the HOME FAST. Therefore, this pilot study has demonstrated the need for further study of the psychometric properties of the HOME FAST in the Malaysian context.

This pilot study was successful in investigating the uniquely Malaysian issues in the homes of older people, such as having a maid or domestic helper or living with family members, which are common situations in Malaysia. Furthermore, higher numbers of Malaysian older people living with others and different socio-economic living circumstances present challenges in interpreting home hazards in the Malaysian context. The HOME FAST not only uses observations of the physical features of the home environment, but also identifies how the person functions in their home environment. These issues could not be addressed through a small cross-sectional study. There are limitations in adopting existing tools and interventions that have been developed in other contexts and qualitative studies to facilitate a deeper understanding from the perspective of Malaysian older people and their carers are required.

The limitations of a small sample size are anticipated for pilot studies. Convenience sampling may have added some underlying bias to the results. For instance, the participants in this study might be healthier than the general population, and that may be why the hazard scoring is somewhat lower. The cross-sectional design of this study provides unclear study associations, and a larger longitudinal study such as the MELoR study will allow these associations to be tested further.

CONCLUSION

This study provides a good foundation to support the use of the HOME FAST in a larger study. The HOME FAST was practical and transferable to the Malaysian context, and with further training for the study researchers, the HOME FAST can be accurately applied and interpreted following the recommendations from this pilot study. Given the small sample size, the associations between home hazards and the nature of falls in older people need to be tested further in a larger scale prospective study. Furthermore, the validity and reliability of the HOME FAST in the Malaysian context needs to be established. As the MELoR project progresses, it is hoped that we can develop a better understanding about the role of home environment and the interaction of older people with their home environments and the risk of falls.

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Contributors

MHR, LM, ML and MPT were equally contributed on developing the concept and design, drafting the article, revising the content and final approval of the version to be published.

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The authors report no conflict of interest.

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A PILOT STUDY TO INVESTIGATE THE FEASIBILITY OF THE HOME FALLS AND ACCIDENTS SCREENING TOOL (HOME FAST) TO IDENTIFY OLDER MALAYSIAN PEOPLE AT RISK OF FALLS

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ABSTRACT

Objective: The relationship between home hazards and falls in older Malaysian people is not yet fully understood. No tools to evaluate the Malaysian home environment currently exist. Therefore, this study aimed to pilot the Home Falls and Accidents Screening Tool (HOME FAST) to identify hazards in Malaysian homes, to evaluate the feasibility of using the HOME FAST in the Malaysian Elders Longitudinal Research (MELoR) study and to gather preliminary data about the experience of falls amongst a small sample of Malaysian older people.

Design: A cross-sectional pilot study was conducted

Setting: An urban setting in Kuala Lumpur

Participants: Twenty-six older people aged 60 and over were recruited from the control group of a related research project in Malaysia, in addition to older people known to the researchers.

Primary outcome measure: The HOME FAST was applied with the baseline survey for the MELoR study via face-to-face interview and observation of the home by research staff.

Results: The majority of the participants were female, of Malay or Chinese ethnicity, and living with others in a double-storey house. Falls were reported in the previous year by 19% and 80% of falls occurred at home. Gender and fear of falling had the strongest associations with home hazards. Most hazards were detected in the bathroom area. A small number of errors were detected in the HOME FAST ratings by researchers.

Conclusion: The HOME FAST is feasible as a research and clinical tool for the Malaysian context and is appropriate for use in the MELoR study. Home hazards were prevalent in the homes of older people and further research with the larger MELoR sample is needed to confirm the validity of using the HOME FAST in Malaysia. Training in the use of the HOME FAST is needed to ensure accurate use by researchers.

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ARTICLE SUMMARY

Study strengths

- This is the first kind of study in Malaysia investigating feasibility and transferability issues of home hazards instrument in local context.
- This pilot study successfully found specific cultural and demographic characteristics of older Malaysian people that may contribute to the presence of hazards in a home environment.
- There are a limited number of rigorous studies on home hazards and older people in Malaysia and this pilot study demonstrates the benefit of using an established standardised tool.

Study limitations

- Small sample size exposed the study findings towards biases which require careful analysis and a larger-scale study are required to confirm the findings.
- The study investigates the feasibility and transferability issues but not the psychometric properties of the tool to be used in local context which require further investigation.

INTRODUCTION

Falls are a serious issue in Malaysia. What is known about falls in Malaysia is that approximately 27% of rural community-dwelling Malaysian older people fall each year and half of them experience recurrent falls in the same year[1]. In addition, the home is where older people frequently report injuries due to falls, second only to injuries from road accidents[2, 3], and injuries at home for older people are most often related to falls[3].

Three published Malaysian studies related to home hazards and falls have been conducted [1, 4, 5] however findings on the association between home hazards and falls are inconclusive. Rizawati and Mas Ayu[1] found no such association using the Safety House Checklist (SHC) and Home-Screen Scale (HSS) in their study, where both instruments were developed outside Malaysia. The HSS was developed for use by nurses, and the HSS and SHC are limited in the validity of their use to detect falls risk. Azhar and Md Yusof[4] also found no association and did not use any standardised instrument to measure home hazards, and the authors developed their own measure. Their tool evaluated flooring conditions while other critical factors were left out, for instance the use of grab bars in the toilet and bathroom. Significant associations were found in the Eshkoor et.al[5] study but the home hazards measurement was oversimplified into five environmental qualities, namely lighting, ventilation, noise, cleanliness, and sanitation with simple evaluation criteria of low quality or high quality. It remains unclear from these studies how home environmental features contribute to falls risk.

Several limitations were observed related to the measurement instruments used in these studies: i) limited demonstration of the psychometric properties of the tools, ii) the assessments were developed solely from a literature review or were self-developed, iii) some items in the assessments used were not related to falls hazards, iv) the assessments were not comprehensive, or v) the assessments lacked any functional items in relation to how an older person conducts functional tasks

in the home environment. These studies also failed to accommodate the unique features of Malaysian culture which might influence the observation of hazards in home. For instance, Rizawati and Mas Ayu[1] conducted their studies in a rural province in Malacca. Malaysian rural areas are likely to be culturally diverse which will affect the physical and social environment compared to the kinds of home environments in countries where many home hazards tools have been developed.

The authors considered that the Home and Falls Accident Screening Tool (HOME FAST) was a suitable tool to thoroughly investigate home hazards and falls risk in Malaysia as the tool has been found to be associated with falls in an international study[6]. The HOME FAST is psychometrically sound[7-11], is sensitive to change and detecting fall risk[6], and requires a short time to administer[7, 9, 10]. The tool has been developed to minimise cultural impact and allow universal application internationally[8, 12, 13]. However, a pilot study was needed to understand the feasibility and practicality of using the HOME FAST by Malaysian researchers, and in Malaysian homes. Therefore, the aims of this pilot study were to: i) identify hazards in Malaysian homes using the HOME FAST, ii) evaluate the feasibility of using the HOME FAST for a Malaysian population, and iii) gather preliminary data about the experience of falls amongst a small sample of Malaysian older people. This study would then provide useful information about the practicality of the HOME FAST and what may be required for its use in the larger population study.

METHOD

Design

This pilot study was conducted using a cross-sectional survey design as part of the initial baseline data collected for the Malaysian Elders Longitudinal Research (MELoR) study. Pilot studies are important to test the appropriateness of an instrument, to identify any potential logistical issues and to assess the feasibility of a full-scale study[14]. For the use of the HOME FAST, this includes whether or not the instrument contains items of relevance to hazards in Malaysian homes, and if it can

identify older people at higher risk of falls. Furthermore, we needed to test if there were cultural issues, such as the use of language, the interpretation of meanings, and different everyday practices that may make the interpretation of HOME FAST items difficult for researchers to rate accurately. This required a pilot study to identify if the HOME FAST items are transferable to the Malaysian context and to gather initial information about the face validity of the tool[15, 16].

Participants

Research assistants working on the MELoR were recruited to administer the HOME FAST. The research assistants came from variety of academic backgrounds such as the built environment, biomedicine, education, economics, media art studies, engineering, psychology and occupational therapy. For the purpose of this pilot study, convenience sampling was used to recruit older people aged 60 years and over from the control group of a related research project in Malaysia[17], and additional older people were recruited who were known to the researchers. A sample size of between 24 and 36 has been identified as the optimal number for a pilot study, and this study sought to recruit a similar sample size[18]. Participants were invited by telephone or in person to take part in this study. The study received ethics approval from the Ethical Committee, High Impact Research, University of Malaya (UM.C/625/1/HIR/ASH/02). Consenting participants were provided with information explaining the objective of this study and a consent form to enable a home visit to be arranged.

Data collection

The baseline survey used for the MELoR study was applied to gather data on falls and demographic information. These data were used for analysis: demographic data, the HOME FAST items, fall history and fear of falls. Data were derived from structured interviews conducted with participants using the baseline survey. Falls in the previous year were self-reported using retrospective recall.

Fear of falling was assessed by asking participants "Are you afraid of falling?"[19] and responses were recorded as "yes" or "no".

A pair of researchers visited the participants at their homes to conduct the interviews. The interviews were conducted primarily in English as this was the language used in the original HOME FAST, and the baseline survey for the MELoR study. However explanations were provided for older people in their native language where required (usually Malay, Mandarin or Tamil). Only one of the researcher rated the HOME FAST on a single occasion with each of the older participants.

Measurement tool for home hazards

An adapted version of the HOME FAST was used to measure home hazards for this study by reducing 25 items to 24. Items 18 and 19 from the original HOME FAST (rails on indoor steps and rails on outdoor steps) were merged into one general question about rails on indoor/outdoor steps in the home, in order to reduce the number of questions in the baseline MELoR survey. The adapted HOME FAST maintained the original format of the tool but did not include information about recommended interventions. The HOME FAST focuses on seven main areas of potential hazards: floors, furniture, lighting, bathroom, storage, stairways/steps, and mobility. The HOME FAST scoring remained "Yes", "No" and "Not Applicable" for all the items. A high HOME FAST scores corresponded to high numbers of hazards. Table 1 shows the HOME FAST items used in the MELoR study data collection.

Table 1: The HOME FAST items

	HOME FAST Item	Yes	No	N/A
1	Are walkways free of cords and other clutter?			
2	Are floor coverings in good condition?			
3	Are floor surfaces non slip?			
4	Are loose mats securely fixed to the floor?			

5	Can the person get in and out of bed easily and safely?			
6	Can the person get up from their lounge chair easily?			
7	Are all the lights bright enough for the person to see clearly?			
8	Can the person switch a light on easily from their bed?			
9	Are the outside paths, steps and entrances well lit at night?			
10	Is the person able to get on and off the toilet easily and safely?			
11	Is the person able to get in and out of the bath easily and safely?			
12	Is the person able to walk in and out of the shower recess easily and safely?			
13	Is there an accessible/sturdy grab rail/s in the shower or beside the bath?			
14	Are slip resistant mats / strips used in the bath/bathroom/shower recess?			
15	Is the toilet in close proximity to the bedroom?			
16	Can the person easily reach items in the kitchen that are used regularly without climbing, bending or upsetting his or her balance?			
17	Can the person carry meals easily and safely from the kitchen to the dining area?			
18	Do the indoor steps/stairs have an accessible/sturdy grab rail extending along the full length of the steps/stairs?			
19	Can the person easily and safely go up and down the steps/stairs inside or outside the house?			
20	Are the edges of the steps/stairs (both inside and outside the house) easily identified?			
21	Can the person use the entrance door/s safely and easily?			
22	Are paths around the house in good repair, and free of clutter?			
23	Is the person currently wearing well-fitting slippers or shoes?			
24	If there are pets – can the person care for them without bending or being at risk of falling over?			

The feasibility of research assistants administering the HOME FAST was evaluated by examining any inconsistencies or errors in data collection that could be observed, and through discussion. Issues such as ratings given by research assistants for the "not applicable" HOME FAST items with Malaysian older people and challenges in accurately rating the HOME FAST by research assistants were explored through field notes completed during informal discussions in regular staff meetings.

Analysis

Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) Version 20. Groups were compared using non-parametric methods. The Mann-Whitney U Test, Kruskal-Wallis Test and Spearman correlations were used to explore any associations with the HOME FAST score. Inconsistencies and errors on data keyed in the HOME FAST were observed for feasibility analysis.

RESULTS

Participants

Data from 26 older people were available for analysis. The mean age of participants was 68.69 years. Five participants (19.2%) reported a fall in the previous year, and all of these were women. Twenty participants (77%) admitted they were fear of falling and majority were women (65%, n=13). Table 2 summarises the characteristics of the participants including self-reported fall history and fear of falling responses.

Table 2: Demographic Data (N=26)

Demographic	N (%)	Mean (95% CI)
Age		68.69 (66.08, 71.30)
Gender		
Male	11 (42.3)	
Female	15 (57.7)	
Ethnicity		
Malay	11 (42.3)	
Chinese	11 (42.3)	
Indian	3 (11.5)	
Other	1 (3.8)	
Religion		
Islam	10 (38.5)	
Christian	11 (42.3)	
Buddhist	1 (3.8)	
Hindu	3 (11.5)	
Atheist	1 (3.8)	
Marital Status		
Single/Never married	2 (7.7)	
Married	21 (80.8)	

Widowed	3 (11.5)	
Household		
Alone	5 (19.2)	
With others	21 (80.8)	
Has maid	6 (28.5)	
With spouse	16 (76.2)	
Education		
No schooling	2 (7.7)	
Primary	1 (3.8)	
Secondary	14 (53.8)	
Certificate/Skill	1 (3.8)	
College/University	8 (30.8)	
Type of House		
Single-storey house	6 (23.1)	
Double-storey house	16 (61.5)	
Apartment-like or Condominium	4 (15.4)	
Years Living in the house		25.42 (19.65, 31.19)
Has fallen in the past 12 months		
Yes	5 (19.2)	
No	21 (80.8)	
Fall in home		
Yes	4 (80)	
No	1 (20)	
Afraid of falling		
Yes	20 (76.9)	
No	6 (23.1)	

Hazards in the home

Participants had a mean hazards score of 2.35 in their home (95% CI: 1.51, 3.18) and the frequency of hazards detected was presented in Table 3 as measured by the HOME FAST. Eight HOME FAST items (floor covering, chair access, toilet access, outside light, toilet proximity, carrying meal, use of entrance, paths condition) were not identified any hazards.

Table 3: Hazards identified by the HOME FAST (N=26)

Hazards	N (%)
No access to grab rails in bath	11 (42.3)
no slip resistant mats in the bath or shower	10 (38.5)
Improper footwear	7 (26.9)
Slippery floor surfaces	6 (23.1)
Hazardous pets	5 (19.2)
Unsecured loose mats	4 (15.4)
Poor lighting	3 (11.5)

Difficulty with shower mobility	2 (7.7)
cluttered walkways	2 (7.7)
No access to bedside light	2 (7.7)
Difficult to identify stairways/steps edge	2 (7.7)
Inadequate stairs grab rail	2 (7.7)
Difficulty using stair	1 (3.8)
Difficulty reaching items in kitchen	1 (3.8)
Difficulty with bath mobility	1 (3.8)
Difficulty with bed transfers	1 (3.8)

Administration of the HOME FAST in Malaysia

Items 2, 13, 14, 17 and 23 (item 24 in the original HOME FAST) do not have the capacity to be scored as "not applicable" (N/A) in the original HOME FAST, but were incorrectly indicated as N/A in this pilot study. For instance, Item 2 (floor coverings in good condition) had three N/A ratings – i.e. no floor exists, item 13 (accessible/sturdy grab rail/s in the shower or beside the bath) and item 14 (slip resistant mats / strips used in the bath/bathroom/shower recess) had four N/A ratings – i.e. no bath or shower exists, and item 23 (person currently wearing well-fitting slippers or shoes) had one N/A rating – i.e. the person has no feet. Item 5 (can the person get in and out of bed easily and safely) had one case of missing data, and item 12 (is the person able to walk in and out of the shower recess easily and safely) had two cases of missing data. Findings from discussions with the research assistants indicated that confusion appeared to arise about the differentiation between NO and N/A ratings for the HOME FAST. The purpose of a (N/A) rating was that the feature was not present in the home so could not be scored, whereas a NO rating indicated the presence of a hazard – e.g. the older person chose not to wear slippers or shoes. However, some raters interpreted this as not applicable because older people did not use the feature of the home regularly. Despite this, the raters agreed that all items on the HOME FAST were important to rate in Malaysian homes.

Associations with the HOME FAST score

A higher HOME FAST score was associated with being female and having a fear of falling. No other significant associations were found as reported in Table 4.

Table 4: Associations with HOME FAST score (N=26)

	N	Median HFAST score	Interquartile Range (IQR)	P-value
Gender				
Men	11	1	2	0.016[a]**
Women	15	3	4	
Ethnicity				
Malay	11	2	2	0.453[b]
Chinese	11	3	5	
Indian	3	5	0	
Other	1	1	-	
Living Situation				
Lives alone	5	3	4	0.289[a]
Lives with others	21	2	4	
Has a maid				
Yes	6	1.5	2	0.556[a]
No	20	2	5	
Type of House				
Any type of house	22	2	4	0.971[a]
Apartment	4	2.5	3	
One floor	10	1.5	4	0.503[a]
Two floors	16	2	4	
Falls History				
Falls in the last 12 month	5	5	4	0.155[a]
No falls in the last 12 month	21	2	3	
Afraid of Falling				
Yes	20	2	4	0.033[a]**
No	6	0.5	2	

a. Mann-Whitney U Test
b. Kruskal-Wallis Test
**Significant differences detected at P <0.05

DISCUSSION

Findings related to home hazards in Malaysian homes identified by the HOME FAST

The results from this pilot study add to the understanding of the home environment and hazards in the homes of older people in Malaysia. This study shows a high frequency of hazards detected in parts of the home where older people in Malaysia mostly fall as reported in previous findings from Rizawati and Mas Ayu[1], which are the bathroom, stairs, living room, kitchen, and bedroom. The types of hazards present in this study are similar to those reported by Byles and colleagues in an Australian study[20] such as absence of a grab rail in the shower or bath area and slippery floor.

Hazards in the bathroom and toilet area warrant high priority for any Malaysian studies as Malaysians commonly practice self-care activities in a wet-bathroom and wet-toilet area, where water may be used by some older people to wash themselves by scooping water from a pail and rinsing in the area, or by using a hose.

However, the mean score on the HOME FAST in this study was lower than the mean scores generated from Australian study. The cut-off point on the HOME FAST for a high risk of falls associated with the number of home hazards has been stated as ≥ 8[20]. In the Australian study, 27% of the participants scored ≥ 8. However, the highest score on the HOME FAST recorded in this study was six. It is possible that the low HOME FAST scores were due to the under-estimation of hazards present based on the ratings from the research administrators, many of whom did not have health backgrounds. Mistakes in data collection and missing data might also have contributed to this result. Therefore, this study indicated a requirement for training for the non-occupational therapy raters in scoring the HOME FAST.

Feasibility of the HOME FAST for use in Malaysia

The use of HOME FAST was positively accepted by the researcher participants although several challenges were noted. Only a small number of missing data was available in this study and was usually related to potentially sensitive issues requiring an older person to demonstrate an activity in a private area such as the bedroom and bathroom. As the HOME FAST is conducted through interview and observation, there may be difficulties with gaining permission to observe the entire house which may affect the ability to score the HOME FAST accurately. To be effectively measured, the HOME FAST items need to include an observation of how a person functions in their home environment[21]. This requires the administrator to clearly discuss the aims and benefits of conducting the HOME FAST assessment to encourage an older person to be more willing to engage in the process.

Although the researchers administered the HOME FAST in this pilot study have little knowledge on hazards evaluation but they managed to detect several common hazards available. This indicates the HOME FAST is feasible to be used by people from variety of backgrounds. However, two points need to be taken into account to improve the HOME FAST scoring process. First, different cultural understandings in interpreting the questions may have contributed to some confusion on how to score the HOME FAST items[15, 16]. For example, in Malaysian culture, people usually need to take off their shoes before entering a house as wearing shoes inside a house is considered inappropriate and walking barefoot indoors is common. Thus, when administering the HOME FAST the footwear item might be misinterpreted as "Yes" rather than "No" (for example wearing of socks in the house). Second, the varied backgrounds of the research staff may have limited their in-depth understanding of home hazards. Therefore, this may have affected the results as the scoring may not have been accurate based on differing interpretations of the HOME FAST items.

Preliminary findings related to the home environment and self-reported falls

The findings from this study are consistent with international studies. Although the reported prevalence of falls in this study of 19% is lower than the prevalence reported globally at 28% to 35%[22] but are consistent with lower fall rates among Asian countries[1, 23] and falls rates are higher for older women compared to older men[24]. Women may have had a higher number of hazards given that in Malaysia women usually have a role as a housewife and are more likely to be in the home environment for longer and are more likely to undertake functional tasks in the home[25], and they may also have greater role demands requiring their participation in domestic activities such as cooking and taking care of the family or looking after grandchildren which could expose them to further hazards[25, 26]. In addition, women often have more health conditions that contribute to frailty such as arthritis, low muscle strength and osteoporosis, which indirectly affects functioning[27].

An unexpected finding from this study was the association between fear of falling and home hazards. This study used as simple measure of fear of falling compared with previous studies[28]. Fear of falling may restrict the activities of an older person resulting in a decline in physical and mental performance, reduced quality of life and increased risk of falls[29]. This may then make the older person less involved in household chores and activities which could increase the presence of home hazards and difficulties with transfers and so on. This finding is important as many older people tend to believe that falls occur due to their own behaviour, rather than because of environmental factors, which may cause a low take up of home hazard management options[30, 31]. It is possible that managing environmental falls risks may reduce fear of falls[32]. This association can be explored in more detail in the larger MELoR study.

Although only gender and fear of falling were significantly associated with a higher number of hazards in this study, a larger study may reveal other factors associated with home hazards such as falls history, living situation, and ethnicity. Even with a small sample, the study provides some initial direction about the characteristics of older people who are likely to have higher numbers of home hazards, and be at higher risk of falls[14, 33], and therefore who should be targeted for more comprehensive fall prevention interventions.

Implication for Future Study

This is the first study investigating the feasibility of home hazards instrument in Malaysia context. Given the findings, the HOME FAST was considered a relevant tool for the Malaysian context, despite some feasibility issues to be overcome for it to be used effectively by the research assistants. The HOME FAST contains detailed descriptions to assist raters to effectively score any presenting hazards, and these must be maintained for use in Malaysia. In addition, the HOME FAST may need a forced answer (closed-ended) format to help the administrator not to make any mistakes when

scoring. Conducting the interviews in English did not appear to be a problem for the researchers in this pilot study. All the researcher participants were graduates from tertiary education, and it is compulsory in Malaysia for every person to pass an English exam before being accepted for study in tertiary education[34].

Low numbers of hazards reported in this pilot study indicates further investigation is needed to explore the validity and reliability of the HOME FAST in Malaysia. The difference in cultural understanding and educational backgrounds of the research staff might interfere with the ability to score the HOME FAST. The presence of irregularities in HOME FAST data collected in this study warrants specific training to be conducted to maximise the reliability and consistency in the use of this assessment[10, 11, 14]. Therefore, this pilot study has demonstrated the need for further study of the psychometric properties of the HOME FAST in the Malaysian context.

The limitations of a small sample size are anticipated for pilot studies. Convenience sampling may have added some underlying bias to the results. For instance, the participants in this study might be healthier than the general population, and that may be why the hazard scoring is somewhat lower. The cross-sectional design of this study provides unclear study associations, and a larger longitudinal study such as the MELoR study will allow these associations to be tested further.

CONCLUSION

This study provides a good foundation to support the use of the HOME FAST in a larger study. The HOME FAST was practical and transferable to the Malaysian context, and with further training for the study researchers, the HOME FAST can be accurately applied and interpreted following the recommendations from this pilot study. As the MELoR project progresses, it is hoped that we can develop a better understanding about the role of home environment and the interaction of older people with their home environments and the risk of falls.

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Contributors

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Competing Interest

The authors report no conflict of interest.

Participant Consent

Signed inform consent were obtained

Ethical Approval

This study was approved by High Impact Research, the University of Malaya (UM.C/625/1/HIR/ASH/02)

Provenance and Peer Review

Not commissioned, externally peer reviewed.

Data Sharing

There are no additional data available.

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