

**Table 1: Identified fall risks, actions taken and human factors and ergonomics knowledge areas applied on fall preventive interventions**

Framework Category	Observation / Contributory Factor	Associated Fall Risk Identified by the Team in Retrospective Falls Analysis and Fall Visits	Action Taken	Human Factors & Ergonomics Knowledge Area Applied
Assessment	<b>1) Patient history</b>			
	Staff did not realise that patients had history of recent falls	Necessary fall preventive measures were not activated as they were assessed as low fall risk instead of high fall risk	<ul style="list-style-type: none"> <li>Advised staff to document fall history in patient records</li> <li>Advised staff to clarify with old age homes or relatives about the recent fall history</li> </ul>	Situation awareness, process analysis, communication
Monitoring	<b>2) Distance</b>			
	Patients with poor mobility or high fall risk were allocated to beds far away from toilets	Patients had to walk a long distance to the toilets	Advised nurses to allocate patients with poor mobility or high fall risk to beds nearer to the toilets or provide staff assistance	Job design
	<b>3) Bed alarm mats</b>			
	There were no suggested criteria for application of bed alarm mats	Staff had to use their personal judgment to identify which patients could be applied with bed alarm mats	Developed criteria on the use of bed alarm mats for high fall risk patients	Decision making, job design
	Inadequate quantity of bed alarm mats in wards	Staff tended not to apply bed alarm mats as they perceived the mats might have to be applied for other patients with higher fall risk	Conducted a stock take exercise on bed alarm mats quantity and increased the stock level in each ward	Perception, decision making
Communication	<b>4) Call bell system</b>			
	Not all beds and toilets were installed with a call bell system	Patient could not seek help from staff promptly and had to leave their beds or the toilet to seek for help	Installed standard call bell systems in all beds and patient toilets	Perception, behaviour and attitudes, environmental design
	<b>5) Intercom</b>			
	Staff could not initiate communication with patients in isolation rooms	Patients might leave their beds to seek for help	Installed intercom facilities in isolation rooms so that staff could proactively talk to patients to address their needs	Perception, behaviour and attitudes, environment design, user experience

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<b>Communication (cont'd)</b>	<b>6) Patient education</b>			
	Falls education pamphlets were only distributed to high fall risk patients	Patients with low fall risk might not know about the fall preventive measures and did not know they were also prone to falls	Distributed fall prevention education pamphlets to all hospitalised patients (excluded bed-bound patients)	Perception, behaviour and attitudes
	The patient education poster for proper shoe wear was only available as an A3 poster which was stuck on ward notice board	The poster was not on the line of sight that patients generally would not read the information	Revised the fall prevention education pamphlets to include information of 'proper shoe wear'	Attention
<b>Patients</b>	<b>7) Strength/balance</b>			
	Patients picked items on the floor or got their items from their personal lockers in squatting position without asking for help	Patients did not realise that squatting is a risk factor of falls and their mobility might be reduced	Conducted a programme on bedside activities training by occupational therapists for high fall risk patients	Perception, behaviour and attitudes, job design
<b>Environment and Equipment</b>	<b>8) Ward environment</b>			
	High colour contrast of floor pattern in wards	Patients might perceive as level changes	Replaced flooring with monotone pattern during ward renovation	Perception, visual environment
	Mobile screens were placed in the ward corridors	The legs of the mobile screens might cause tripping	Removed all mobile screens from the corridors and only use them when necessary	Product design, environmental design
	<b>9) Patient toilet</b>			
	The toilet cubicle size was too small for patients with walking aids	Patients with walking frame might fall when performing turning	Enlarged toilet cubicle size by conducting anthropometric measurements by occupational therapists	Anthropometrics, environmental design
	Inadequate amount of grab bars for patients to hold in hand washing area of patient toilets	Patients had no aids to hold when they attempted to fall	Installed more grab bars in hand washing area of patient toilets	Environmental design
No seats to allow patients to rest in patient toilets	Patients would easily fall when they felt unwell	Installed benches in patient toilets	Environmental design	

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<b>Environment and Equipment (cont'd)</b>	<b>10) Weighing scale</b>			
	No handrail was installed at weighing scales	Patients might fall when stepping up or down the weighing scales	Installed handrail devices at weighing scales	Product design, user centred design
	<b>11) Geriatric chair</b>			
	Safety belts of geriatric chairs could not effectively prevent falls	Patients could easily slip out from the geriatric chairs	Changed to use pelvic belts to offer better protection	Product design, user centred design
	<b>12) Safety vest (applied only as last resort when all alternatives were considered not feasible according to the hospital fall prevention and management policy)</b>			
Inadequate quantity and inappropriate sizes of safety vests were supplied to wards	Staff had no safety vest to use or had to apply a wrong size of safety vest	Worked with Linen Unit to review the supply of safety vests and conducted snap shot audits to ensure compliance	Job design, evaluation of work activities	
Staff did not know the dimensions and meanings of colour strips of different sizes of safety vests	Staff based on their perception to pick a safety vest for patients	Developed a cue card and stuck on the line of sight of storage cabinet to facilitate staff in picking the correct size	Anthropometrics, perception, user experience	
<b>Organisation</b>	<b>13) Fall prevention and management</b>			
	Local falls were mainly managed by nurses only	There was no input from other professions	Formed a Falls Review Team with members from various disciplines to review falls from different perspectives	Organisational learning, safety culture
	Only falls with severe injuries, e.g. fracture, were reviewed and visited	There was no prompt evaluation of falls with minor injuries	All falls including severe and minor injuries were visited on the day of fall or the next working day	Organisational learning, safety culture
No proactive fall risk assessment from hospital management	The design of environment, equipment and workflow was not assessed to prevent falls	Proactively visited wards (both in service and under renovation) to assess the equipment and environmental design	Organisational learning, safety culture, environmental design, product design, process analysis	