Factors Associated with Falls in Psychogeriatric Inpatients and Comparison of Two Fall Risk Assessment Tools

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Abstract

Objectives: Development of a fall prevention programme for psychogeriatric inpatients is required. Therefore, the present study aimed to investigate factors associated with falls in psychogeriatric inpatients and compare two fall risk assessment tools.

Methods: This study had two parts. First, all fall reports involving psychogeriatric inpatients in United Christian Hospital in 2016 were retrospectively reviewed. Factors associated with the falls were identified by comparing patients who had a fall incident and those who did not. Second, in a pilot study, 30 consecutive psychogeriatric inpatients were assessed for fall risk using the Morse Fall Scale (MFS) and the Wilson Sims Fall Risk Assessment Tool (WSFRAT), and outcomes were then compared with the modified Functional Ambulation Classification (MFAC).

Results: In 2016, 46 women and 47 men aged 65 to 94 years were admitted to the psychiatric wards (two women and two men were admitted twice). A total of 12 falls involving nine women and two men were reported. Over 66% of falls involved patients with dementia, 75% involved women, and over 50% occurred on the way to the bathroom, mostly during the night shift when the staffing level was low. In the pilot study, of 30 consecutive psychogeriatric inpatients, 20 were classified as high risk by the WSFRAT and 10 of them were also classified as high risk by the MFS. Those classified as high risk by WSFRAT matched perfectly with those classified as high risk by MFAC. However, 30% of those classified as high risk by MFAC were not classified as high risk by MFS.

Conclusions: Patients with dementia and women had higher risk of fall. Extra proportion of at-risk patients are able to benefit from additional fall risk interventions when WSFRAT is used instead of MFS. Further studies are needed to calculate the psychometric properties of WSFRAT.

Key words: Accidental falls; Geriatric psychiatry

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Introduction

Falls among elderly inpatients is common and can be associated with severe morbidity, functional decline, and mortality.¹ Patients at a psychiatric unit are at greater fall risk owing to a multiplicity of issues including psychotropic medications, over-activity, and confusion.^{2,3} The incidence of falls in psychiatric units is higher than that in general acute care hospital units (13.1-25 vs 3-5 per 1000 inpatient-days).² In a study in Western Australia comparing two psychiatric units, 139 falls were reported in a 12-month period, and the incidence of falls per 1000 bed-days was higher in one psychiatric unit than in any other clinical

specialty unit of the tertiary hospital.⁴ Unlike those in the medical ward, older people in psychiatric units may be restless and agitated and spend less time on their beds. They may experience dizziness, and at risk of falling when getting up from chairs, beds and particularly in bathrooms, owing to old age and comorbidities.²

There are limited studies on falls in psychogeriatric inpatients despite the high number of falls.⁵ Many hospitals use a single instrument that has not been validated in psychiatric settings for assessment of fall risk in all units.⁶ The Morse Fall Scale (MFS) is a fall assessment tool for patients in acute medical-surgical units, but it has not been validated in psychiatric inpatients. Toileting is an important factor contributing to falling, which the MFS does not capture.⁷

Despite adoption of the fall risk protocol, the number of falls per 1000 patient-days in a geriatric psychiatric facility remained at 4.83, which was higher than that in the rest of the hospital units.⁸ Psychiatric inpatients have unique risk factors for fall that are compounded by other factors such as medications, anxiety, and agitation. A fall risk assessment tool for psychiatric inpatients is therefore needed. The Wilson Sims scale and the Edmonson

Psychiatric Fall Risk Assessment Tool are recommended fall risk assessment tools for psychiatric adult and geriatric patients.^{9,10} A major difference between these two scales is the inclusion of nurse judgment in the Wilson Sims scale. A clinical judgment of an experienced professional is as good as a validated fall prediction tool.¹¹

United Christian Hospital (UCH) is an acute general hospital in Hong Kong. It serves a population of about 1.1 million of which 150 000 were aged ≥ 65 years. It has two psychiatric wards with a total of 80 beds (16 of which for patients aged ≥ 65 years); each ward has five cubicles. One cubicle with eight beds is for female elderly patients and another with eight beds is for male elderly patients. These patients share the same day room with male adult patients. Each ward has four nursing staff and one to two health care assistants on duty in the day shift, and two nursing staff and one health care assistant on duty in the night shift.

In 2016, among all psychiatric inpatients, 25 falls occurred, 12 of which involved elderly patients. In 2015, 25 falls occurred but only 9 of which involved elderly patients. The rate of fall per 1000 bed-day increased from 1.54% in 2015 to 2.05% in 2016. In UCH, the MFS is used to assess the risk of fall in all inpatients, and fall prevention and management guideline is followed in the psychiatric wards.¹² All fall incidents are reported through the Advance Incident Reporting System to the governing authority and follow-up actions are taken promptly. A fall prevention working group (involving psychiatric doctors, nurses, physiotherapist, and occupational therapist) reviews all fall cases and discuss measures to prevent fall in the psychiatric ward. Those deemed to be at high fall risk are referred to the Fall Prevention and Intervention Programme for provision of suitable walking aids and training. Patients and their carers are educated on fall risk and precaution. Special nursing precautions include putting on a fall risk signage, use of bed exit alarm, provision of an easily accessible call bell, use of bed rail, and sitting arrangement in close proximity to nurse station.

This study aimed to investigate factors associated with falls in psychogeriatric inpatients and to compare two fall risk assessment tools for psychiatric patients.

Methods

This study had two parts. First, all fall reports involving psychogeriatric inpatients in UCH in 2016 were retrieved from the Advance Incident Reporting System and retrospectively reviewed. Factors associated with the falls were identified by comparing patients who had a fall incident and those who did not for development of a fall prevention programme.

Second, in a pilot study, 30 consecutive psychogeriatric inpatients were assessed for fall risk using the Morse Fall Scale (MFS) and the Wilson Sims Fall Risk Assessment Tool (WSFRAT). The WSFRAT included clinical judgment by nursing staff so that they could upgrade the fall risk of a patient. Those classified as high risk by both scales were

compared with those classified as high risk by the modified Functional Ambulation Classification (MFAC).¹³ MFAC was developed by the Coordinating Committee in Physiotherapy of the Hospital Authority and is used by physiotherapists to assess walking capacity of psychogeriatric patients. MFAC scores are from 1 to 7 on a 7-point Likert scale. Patients with a MFAC score of 1 to 5 were classified as high risk (with abnormalities of balance and gait) and those with a score of 6 to 7 were classified as low risk.

Statistical analysis was performed using SPSS (Windows version 21.0, SPSS, Chicago [IL], US). Comparisons of patients with and without falls were made using the *t* test for continuous variables and the Chi-squared test or Fisher's exact test for categorical variables.

Results

In 2016, 46 women and 47 men aged 65 to 94 years (mean $\pm$ standard deviation [SD], 75.1 ± 7.3 years) were admitted to the psychiatric wards (two women and two men were admitted twice). Of the 93 patients, 35 were diagnosed with mood-related problems (including adjustment disorder, depressive episode, mixed anxiety and depressive disorder, and generalized anxiety disorder), 25 with dementia, 19 with psychotic disorder (including schizophrenia, delusional disorder, and schizoaffective disorder), four with bipolar affective disorder, two with delirium, one with alcohol-related disorder, and seven with two psychiatric diagnoses (one of them being dementia) [Table 1].

Table 1. Diagnoses of psychogeriatric inpatients admitted in 2016

Diagnosis	No. of patients (n = 93)
Depression	19
Adjustment disorder	9
Generalised anxiety disorder	3
Mixed anxiety and depressive disorder	4
Dementia	25
Schizophrenia	11
Delusional disorder	7
Bipolar affective disorder	4
Schizoaffective disorder	1
Alcohol-related disorder	1
Delirium	2
Dementia & schizophrenia	2
Dementia & mixed anxiety and depressive disorder	2
Dementia & bipolar affective disorder	2
Dementia & alcohol-related disorder	1

A total of 12 falls involving nine women and two men aged 66 to 94 years (mean $\pm$ SD, 78.4 $\pm$ 9 years) were reported. Of the 11 patients, seven were diagnosed with dementia (two of them also had either schizophrenia or mixed anxiety and depressive disorder), three with depression, and one with schizophrenia. Compared with those who did not fall, those who had a fall incident were more likely to be women (81.8% vs 45.1%, $p = 0.027$) and have dementia (63.6% vs 43.9%, $p = 0.04$) but their age was similar (t -value = 1.6, $p = 0.1$).

According to the MFS, before their fall incidents, four patients were classified as high risk, six as medium risk, and one as low risk. One of them was classified as medium risk and then as high risk after his first fall.

According to the Advance Incident Reporting System, seven falls were related to toileting (all involved women) in early morning ($n = 4$; 3 of them fell near bedside), before midnight ($n = 1$), in the afternoon ($n = 1$), and in the evening ($n = 1$). For the remaining five falls, one woman with Parkinson's disease and dementia rolled from her bed; one woman fell when she rushed back for lunch; two patients lost balance without specific precipitating factors; and one of these two patients fell again when he was pulled down by an adolescent in the same ward who was annoyed by his behavioural and psychological symptoms of dementia. Of the 12 falls, eight did not result in any injury and four resulted in minor injuries such as loss of a tooth ($n = 1$), bodily pain ($n = 2$), and superficial abrasion over the left forehead ($n = 1$).

No fall occurred within the first week of hospitalisation. No patient had a drop in postural blood pressure immediately after the fall. Seven patients had upward titration of psychotropic drugs within 5 days of the fall. The 11 patients were taking a mean number of psychotropic drugs of 3.1 (range, 1-5) and had a mean of 2.3 (range, 1-4) comorbidities (diabetes mellitus, hypertension, Parkinson's disease, osteoarthritis of the knees, and congestive heart failure). Those who had a fall incident and those who did not were comparable in terms of the number of psychotropic drugs taken and the number of comorbidities.

In the pilot study, of 30 consecutive psychogeriatric inpatients, 17 were classified as high risk by the WSFRAT and 8 of them were also classified as high risk by the MFS (Table 2) During the pilot study, two of the 8 patients

who were classified as high risk by both scales had a fall incident; sensitivity was 100% when the risk was dichotomised to high risk or not. Those classified as high risk by WSFRAT matched perfectly with those classified as high risk by MFAC. However, 30% of those classified as high risk by MFAC were not classified as high risk by MFS.

Discussion

The National Institute for Health and Clinical Excellence guidance no longer recommends the use of fall risk assessment tools,¹⁴ as most falls occur in patients classified as low risk. Instead, it recommends that all older individuals should be considered to be at high risk of falls. Nonetheless, in view of limited manpower, it is more desirable to use a sensitive fall risk assessment tool to detect those with high fall risk and refer them to the Fall Prevention and Intervention Programme. Our frontline nursing staff have been educated about the constant change in risk factor of inpatients and will reassess the fall risk whenever needed. We decided to use the WSFRAT as it allows clinical judgment of nurses when interpreting fall risk. After the pilot study, WSFRAT was used together with MFS in all psychogeriatric patients, and an extra 30% of at-risk patients could benefit from fall risk interventions. The pilot study would extend to patients aged 60 to 64 years to determine whether the WSFRAT can be used routinely for all psychiatric inpatients.

Although the MFAC may substitute the WSFRAT in psychogeriatric patients, MFAC score cannot be available immediately upon admission and does not cover risk factors (such as use of psychotropics and undergoing detoxification) that are specific to psychiatric inpatients. MFAC only assesses mobility, but most adult patients do not have mobility problem (unlike psychogeriatric patients).

In our study, over half of the patients fell on the way to the bathroom. This finding was compatible with that in a study reporting that >45% of inpatient falls were associated with elimination-related activities.⁷ Patients deemed to have fall risk were advised to seek help before they left their bed or chair, but they went to the bathroom without calling for assistance. Five of these seven falls occurred during the night shift when the staffing level was low, which is associated with a higher fall risk.¹⁵ In three of these falls, the patients was found next to the bedside, indicating that they fell shortly after they tried to get up. Nonetheless, use of restraint during sleep was avoided, as it is associated with an even higher fall risk and increased severity of injuries among elderly inpatient fallers.¹⁶ Removal of restraints does not increase fall risk or subsequent injuries from falls in nursing home residents.¹⁷ The use of bed-exit alarm can accurately detect bed absence episodes among geriatric inpatients and alert nurses accordingly, and significantly reduces the total workload score, with high acceptability among the nurses.¹⁸ Use of bed exit alarm is encouraged for suitable psychogeriatric female patients at night time to alert staff when they attempted to leave their bed without

Table 2. Fall risk of patients classified by the Morse Fall Scale and the Wilson Sims Fall Risk Assessment Tool (WSFRAT)

Fall risk	No. (%) of patients (n = 30)
High risk by both scales	8 (26.67)
Low or medium risk by both scales	13 (43.3)
High risk by WSFRAT only	9 (30)

calling for assistance from staff. It is being used in two patients with dementia at night.

Although some hospitals use diapers at night for patients with dementia, this might not reduce the frequency of toilet visits, as patients are not used to urinating into diapers and insist on getting up to urinate in the toilet. Although patients with dementia can be potted at fixed intervals (ie, timed voiding) and prompted by nurses to void (ie, prompted voiding) at night, these are more labour intensive than diaper use and are practically difficult during night shift. Male inpatients did not have fall incidents related to toileting, probably because of the use of bed pans or urinals. In a multifaceted fall prevention programme, the use of bedside commode is recommended to increase accessibility and efficiency in patient care delivery.¹⁹ Nonetheless, use of commode chair is limited by the lack of space in the psychogeriatric cubicle. Use of bed pan is encouraged for suitable female patients to reduce the travelling distance to the toilet.

Some falls occurred few days after upward titration of psychiatric medications. It is not uncommon for psychogeriatric inpatients to be put on multiple psychiatric medications. The likelihood of falling increases with the use of neuroleptic and antipsychotic drugs.²⁰ Combination of psychotropics or other drugs might increase sedating effect and is prone to drug interactions. Fall risk is associated with polypharmacy when at least one fall risk-increasing drug is part of the daily regimen.²¹ These older patients commonly have comorbidities that further increase the number of medications. A slow titration speed and frequent monitoring of side-effects are important for psychogeriatric patients. Older people on psychotropic medications should have their medication reviewed and, if necessary, discontinued to reduce the risk of falling.¹⁴ Psychogeriatric doctors should be aware of the risk of fall in psychogeriatric patients and be cautious in prescribing medications to reduce iatrogenic cause of fall.

The mixed ward setting may also increase the fall risk of elderly patients. Fall incidents related to elderly patients being pushed down by teenage patients were recorded. It is hoped that this problem could be solved after redevelopment of the hospital. Fortunately, no falls resulted in major injury or fracture. Over 75% of falls involving older adult psychiatric inpatients resulted in no injury.²² This may be due to better physical condition of elderly patients in the psychiatric ward than those in medical wards.

Staff supervision is important. Adequate staff availability when residents exit bed is necessary.²³ Close supervision is important in fall prevention in ambulant patients; this includes checks at least every hour when patients are resting.²⁴ A higher staff-to-patient ratio and direct monitoring of the two psychogeriatric cubicles by designated staff especially during the night shift are necessary to prevent falls. There will be an addition of two staff for the two psychiatric wards during night shift. Staff working with older people at risk of falls should update their knowledge and skills regarding causes and prevention

of falls.⁵ Training on fall prevention and transfer of patients is provided to ward staff regularly.

In this study, diagnoses were made by the case doctor and endorsed by the associate consultant or consultant of the psychogeriatric team in the multidisciplinary ward round. Cognitive assessment was performed for all patients. Psychiatric diagnoses including dementia were made accurately and comprehensively. However, the numbers of patients and fall cases were small. Circumstances related to the fall were based on the Advance Incident Reporting System only. Documentation of fall incidents is adequate and relevant, as the fall prevention working group regularly provides feedbacks to ward nurses. Findings of this pilot study can be used to guide planning of further multi-centre studies with larger sample size so that psychometric properties of WSFRAT can be calculated.

Conclusions

The majority of falls involved patients with dementia, women, or patients on the way to the bathroom, mostly during the night shift when the staffing level was low. Use of bed exit alarms and bed pans is encouraged for suitable patients. Extra proportion of at-risk patients are able to benefit from additional fall risk interventions when WSFRAT is used instead of MFS. Psychogeriatric doctors should be aware of drug titration speed and side-effects of medications. A higher staff-to-patient ratio should be in place for prevention of falls in ambulant psychogeriatric patients.

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